Draft
Appendix M
Baseline Human Health Risk Assessment

Berry's Creek Study Area
Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

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LIST OF ACRONYMS

ADAF	age-dependent adjustment factor
ADD	average daily dose
ATSDR	Agency for Toxic Substances Disease Registry
BCC	Berry's Creek Canal
BCSA	Berry's Creek Study Area
BHHRA	baseline human health risk assessment
CalEPA	California Environmental Protection Agency
COPC	chemical of potential concern
CSF	cancer slope factor
CSM	conceptual site model
CTE	central tendency exposure
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
HEAST	health effects assessment summary table
HI	hazard index
HQ	hazard quotient
IRIS	Integrated Risk Information System
IUR	inhalation unit risk
LBC	Lower Berry's Creek

LOAEL	lowest-observed-adverse-effects level
MBC	Middle Berry's Creek
MESA	Memorandum on Human Exposure Scenarios and Assumptions
MOA	mode of action
MRL	minimal risk level
NJDFW	New Jersey Division of Fish and Wildlife
NJMC	New Jersey Meadowlands Commission
NJSEA	New Jersey Sport and Exposition Authority
NOAEL	no-observed-adverse-effects level
PAH	polycyclic aromatic hydrocarbon
PAR	Pathway Analysis Report
PCB	polychlorinated biphenyl
PIC	Peach Island Creek
ppt	part per thousand
PPR	Paterson Plank Road
PPRTV	provisional peer-reviewed toxicity value
RBSL	risk-based screening level
RfC	reference concentration
RfD	reference dose
RI	remedial investigation
RI/FS	remedial investigation and feasibility study
RME	reasonable maximum exposure
SOW	statement of work
TAL	target analyte list
TEQ	toxicity equivalence
TEQ_{df}	toxicity equivalence for dioxins and furans
TEQ_{p}	toxicity equivalence for polychlorinated biphenyls
UBC	Upper Berry's Creek
UCL	upper confidence limit
UPIC	Upper Peach Island Creek

Note: Tables and figures may have additional acronyms and abbreviations.

EXECUTIVE SUMMARY

A baseline human health risk assessment (BHHRA) has been conducted as part of the remedial investigation (RI) for the Berry's Creek Study Area (BCSA). The BHHRA was conducted in accordance with the U.S. Environmental Protection Agency (EPA) approved *Work Plan for the Remedial Investigation/Feasibility Study, Berry's Creek Study Area* (BCSA Group 2009). It follows the approach presented in the Memorandum on Human Exposure Scenarios and Assumptions and Pathway Analysis Report, both of which were prepared and submitted to EPA as interim deliverables to the BHHRA.[1]

Site Setting

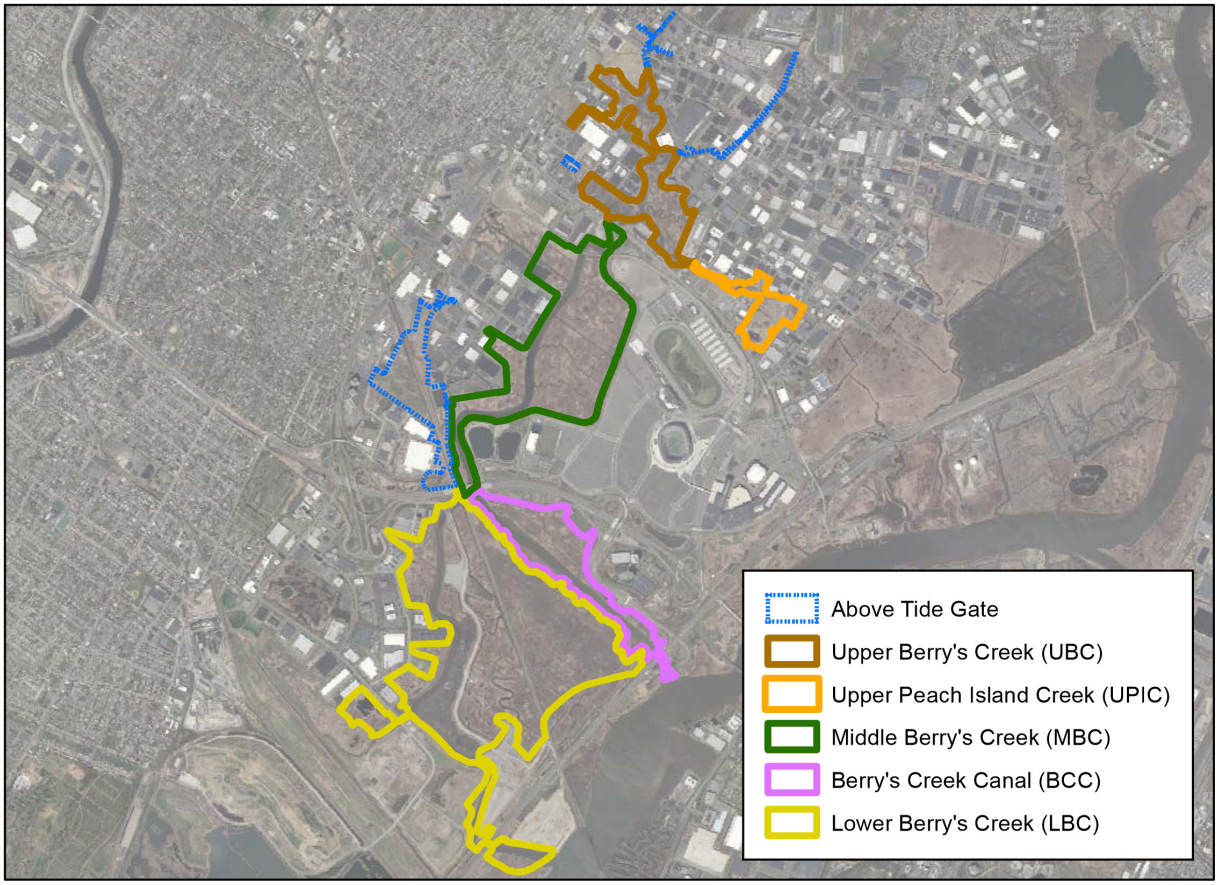
The BCSA is an urban watershed located in Bergen County, New Jersey, within the New York City metropolitan area. The areas studied in the RI consist of tidal waterways and associated wetlands. The upland areas bordering the tidal areas are 90 percent developed. Light industrial and commercial operations, the New Jersey Sports and Exposition Authority development, and connecting roadways dominate the land use immediately adjacent to the BCSA tidal areas. Residential development is concentrated above the 100-year flood zone, and most land adjacent to the tidal area is zoned non-residential.

Summary of Key Findings

- Recreational users (angler, crabber, boaters) and workers are the potential receptor groups in the BCSA.
- For all receptor groups, calculated RME excess lifetime cancer risks across all exposure pathways range from 9×10^{-8} to 3×10^{-5}. Calculated HIs range from less than 1 to 3. No CTE lifetime cancer risks or HIs for the individual exposure pathways exceeded 1×10^{-6} or 1, respectively.
- RME risks are highest for angler, primarily due to the consumption of recreationally caught fish, though direct contact with sediment contributes 13 to 20 percent of the total cancer risks.
- Fish consumption risk is due to PCBs, and direct contact risk is due primarily to arsenic, PAHs, and PCBs. Angler noncancer hazard also is due primarily to PCBs, with minor contribution due to mercury.
- Fish consumption risks are higher in UBC, lower in MBC and BCC, and lowest in LBC following the pattern of COPC concentrations in white perch. In contrast to the strong spatial patterns observed in surface water and sediment, differences in perch COPC concentrations across reaches are small, likely due in part to perch movement across and outside of the study area.
- Site-specific factors contribute to reducing the magnitude of site risks. These include physical constraints on site access posed by dense stands of *Phragmites* and the very soft mudflats bordering the waterway along with geochemical conditions and processes that reduce COPC bioavailability and uptake.

[1] BCSA Group (2015a,b).

Five study segments were distinguished in the RI for discussing the site. These are designated as follows: Upper Berry's Creek (UBC), Middle Berry's Creek (MBC), Berry's Creek Canal (BCC), Lower Berry's Creek (LBC), and the area in UBC above the Peach Island Creek tide gate, often referred to as Upper Peach Island Creek (UPIC) (Graphic ES-1). UPIC is designated a separate area for investigation because it is somewhat isolated above a tide gate.



Graphic ES-1. BCSA Study Area Reaches

Three reference sites were studied in the RI and were selected in coordination with EPA based on similar tidal dynamics, vegetation, geology, and salinity: Bellman's Creek and Mill Creek (tributaries to the Hackensack River north and east of the BCSA), and Woodbridge River on the south end of Arthur Kill about 23 miles south of the BCSA.[2]

Marshes dominated by dense stands of the common reed *Phragmites australis* (*Phragmites*) are the predominant feature of the BCSA tidal zone, occupying 306 hectares (756 acres) of the BCSA tidal area. Waterways, consisting of channel and mudflat areas of Berry's Creek and tributaries, comprise approximately 178 hectares (439 acres).

[2] Refer to Section 3.1 of the RI Report for a description of the process used to identify reference sites.

Chemical Sources and Chemicals of Potential Concern

Chemicals are present from multiple historical and ongoing[3] sources located within and outside of the BCSA.[4] Mercury and other metals, methyl mercury, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), pesticides, and a variety of other organic chemicals have been detected in the tidal area waterways and marshes. Mercury, methyl mercury, and PCBs were identified early in the RI as primary chemicals of potential concern (COPCs) important to defining site risks and were a focus of site investigations. A full suite of other compounds also were evaluated in the RI and recognized to be potential contributors to total risk at the site.

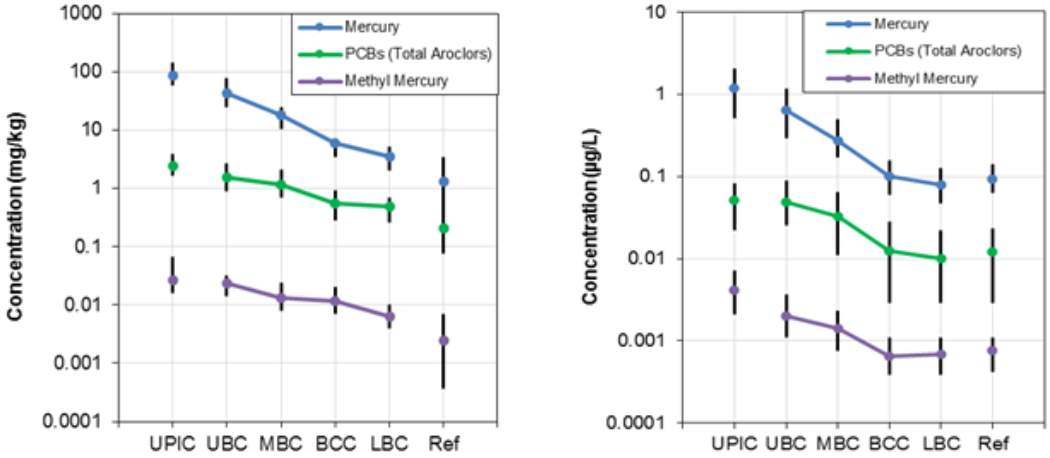
Twenty-seven chemicals, representing a subset of all chemicals detected, were included as COPCs for quantitative evaluation in the BHHRA. COPCs were selected by comparing maximum detected chemical concentrations in each exposure medium to chemical and site-specific risk-based screening levels developed to be protective of cumulative exposures, considering both cancer and noncancer effects. The BHHRA calculated risks from exposures to chemicals in the following classes:

- Sediment (surface): target analyte list (TAL) metals, PAHs, pesticides, and PCBs
- Sediment (all depths): TAL metals, PAHs, pesticides, PCBs, and volatile organic compounds (VOCs)
- Surface water: TAL metals, PAHs, and VOCs
- Fish/crab: TAL metals, methyl mercury, and PCBs.

Many of the COPCs detected at the site tend to partition to sediment.[5] A few (i.e., VOCs and elemental mercury) can also partition to air. COPCs in sediment partition between sediment and porewater and/or the overlying surface water, with the concentrations in each compartment dependent upon chemical-specific properties and location-specific conditions. Analysis of RI data indicates that most COPCs are present on particulate matter in the sediment bed or in the water column. People could contact COPCs in both media.

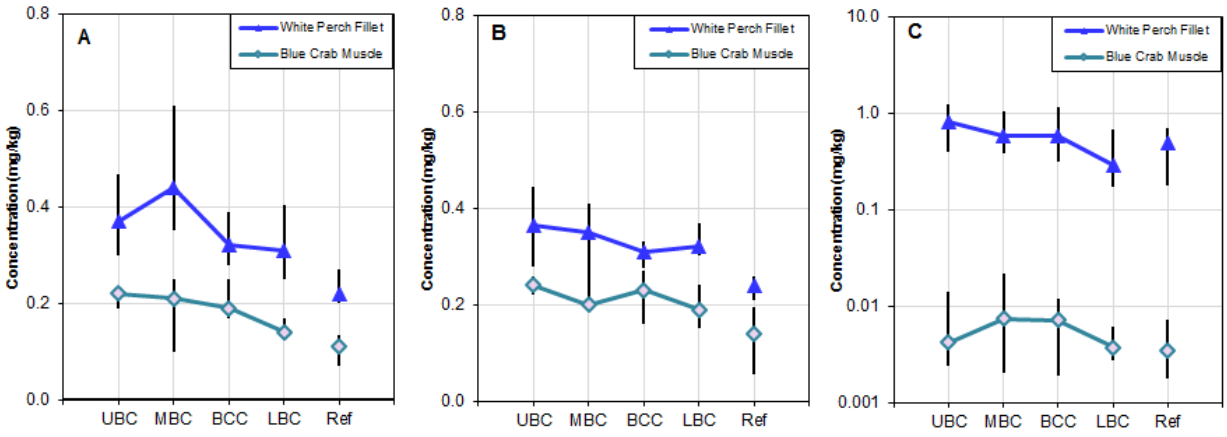
Overall, COPCs in sediments and surface water follow a general trend of decreasing concentration moving from upper reaches to lower reaches, with concentrations in the lower reaches approaching levels observed in reference sites (Graphic ES-2).

[3] Ongoing sources stem from regional contributions such as sewage inputs from the Hackensack River.
[4] Refer to Sections 2.1 and 6.1.2 of the RI Report.
[5] Refer to Sections 5.1 and 6.2 of the RI Report.



Graphic ES-2. Example of the Spatial Trend of Concentrations of Total Mercury, Methyl Mercury, and PCBs in Surface Sediment (left) and Surface Water (right) (Total Concentrations) in the Waterways of the BCSA and Reference Sites (Median, 25th, and 75th Percentiles – in log scale)

A number of the COPCs can accumulate (e.g., a variety of metals) and biomagnify (e.g., methyl mercury and PCBs) as they move through the aquatic food web. Therefore, fish and crabs that may be consumed by recreational users also are exposure media for human receptors. White perch (*Morone americana*) is the primary sport fish present in Berry's Creek. In contrast to the strong spatial patterns observed in surface water and sediment, differences in perch and blue crab COPC concentrations across reaches are small (Graphic ES-3). This is likely due in part to the movement of both species across and outside of the study area as part of local and seasonal movement. Summer movement of white perch, for example, is local and random and can cover a distance of up to 19 km (12 miles).[6] Given this broader regional movement, some portion of the COPC body burdens in perch and crab is likely due to accumulation from sources outside the BCSA.



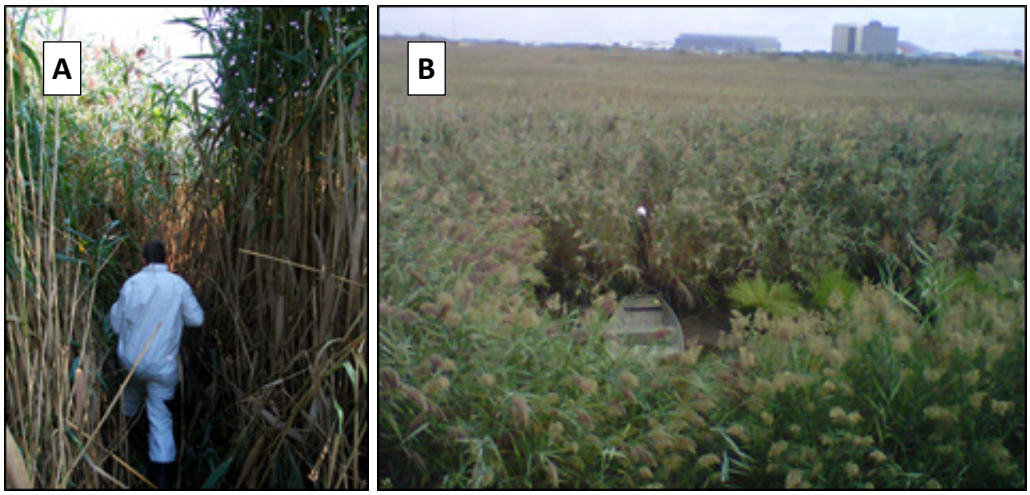
Graphic ES-3. Example of the Spatial Trend of COPC Concentrations of Total Mercury (A), Methyl Mercury (B), and PCBs (C) in White Perch Fillet (150-190mm) and Blue Crab Muscle in the Waterways of the BCSA and Reference Sites (Median, 25th, and 75th Percentiles – in log scale)

[6] Stanley and Danie (1983).

For COPC exposures within the BCSA, evidence presented in the RI demonstrates that a number of factors control bioavailability and uptake.[7] Organic matter partitioning, sulfide complexation, and binding to other mineral phases (e.g., iron or manganese oxides) all play an important role in the fate, transport, and bioavailability of COPCs in the BCSA. Mercury in BCSA sediment is strongly bound to minimally soluble sulfide complexes and other binding phases (e.g., organic carbon), which limits the availability of mercury for methylation. Additionally, mercury methylation in BCSA marsh sediments is inhibited by dissolved oxygen supplied to the subsurface by tidal saturation/desaturation and oxygen release from the *Phragmites* roots. These site-specific conditions and geochemical processes are well understood and limit mercury bioavailability and methyl mercury biouptake in the BCSA. PCBs also are strongly associated with sediment particulate matter, which is characterized by high organic matter concentrations in the BCSA. Binding of PCBs to organic matter limits the concentrations of freely dissolved PCBs and the bioavailability of PCBs to ecological and human receptors. Additionally, the flat trophic structure of the BCSA food web limits COPC biomagnification.

Receptors and Exposure Pathways

Access to the tidal portions of the BCSA is limited by the physical setting. The *Phragmites* stands that dominate the wetlands and the very soft mud present on the mudflats and along the marsh tributaries limit human use of the area (Graphic ES-4). Limited use has been confirmed via a multiyear camera survey of human activity and observations by the RI team during field activities.



Graphic ES-4. Typical Stand of *Phragmites* Surrounding the BCSA Waterways Shown with RI Team Member through a Cut Path (A) and Dense Stands of *Phragmites* Surrounding a Sampling Team Boat within the BCSA Waterway (B)

Based on the observations throughout the RI and considering the physical setting, access constraints, zoning, and land use, recreational users and workers are the primary populations potentially exposed to the tidal portions of the BCSA under current and likely future conditions.

[7] Refer to Section 6 of the RI Report and Appendix H.

Fishing, crabbing, and boating, including kayaking/canoeing, are the potential recreational activities evaluated in the BHHRA. Nearby commercial workers as well as municipal and construction workers are additional receptor groups.

Of these receptors, anglers and crabbers are anticipated to be the principal receptor groups under current conditions. Fish and crab are present throughout Berry's Creek, and anglers and crabbers have been observed in the study area. Habitat conditions and limited access to waterways in the BCSA likely affect the frequency of these activities to some degree. Poor water quality associated with regional sewage impacts, regularly depressed dissolved oxygen, and the shallow nature of the upper reaches of BCSA waterways limit fish populations in number and size, making the BCSA less desirable as a recreational outlet when compared to other higher-quality water bodies in the region.[8] Further, white perch in the study area are generally small (typically in the range of 150 to 190 mm [~6 to ~8 in.] or less) and below "eating size"—considered by the New Jersey Division of Fish and Wildlife (NJDFW 2005) to be in the range of 250 to ~300 mm (10 to 12 in.).

Exposures could occur via ingestion of fish and crab tissue, dermal contact and incidental ingestion of sediment and water, and inhalation of COPCs in air. These exposures were evaluated quantitatively in the BHHRA (Table ES-1). Both adults and children could be exposed through recreational activities. Consistent with EPA guidance[9], samples from areas where direct contact is not realistic (e.g., *Phragmites* marshes) were not considered when estimating current exposure concentrations for direct contact pathways.

Given the physical setting, zoning, and wetland protection regulations, future human use of the area is projected to remain consistent with present day activities. It is possible, however, that increased promotion of eco-tourism and/or improvement in regional water quality could create some additional exposure scenarios. Therefore, two additional future use receptor populations were selected for qualitative evaluation in the BHHRA: swimmers in waterways and hikers in marsh areas. Adults and older children (6 to <18 years of age) were the assumed receptor population. Potential exposures for swimmers, through direct contact with sediment and surface water and inhalation of volatiles, were assumed to occur in the waterways and shoreline areas and at waterway access points in the marshes. For future hikers in the marsh area, the primary exposure route would be inhalation of volatiles. The boardwalks needed to support hiking through the tall reed marshes would prevent direct contact with the sediments.

[8] Refer to Sections 4.7.4 and 4.8 of the RI Report.
[9] USEPA (1989)

Table ES-1. Exposure Pathways Evaluated Quantitatively in the BCSA BHHRA

Receptor Group	Exposure Media	Exposure Routes	Age Groups Exposed
Angler	Sediment (Surface, 0–15 cm) [a]	Incidental ingestion	A, OC
		Dermal contact	A, OC
	Surface water	Dermal contact	A, OC
	Ambient air	Inhalation	A, OC
	White perch (fillet)	Ingestion	A, OC, YC
Crabber	Sediment (Surface, 0–15 cm) [a]	Incidental ingestion	A, OC
		Dermal contact	A, OC
	Surface water	Dermal contact	A, OC
	Ambient air	Inhalation	A, OC
	Blue crab (muscle)	Ingestion	A, OC, YC
	Blue crab (muscle + hepatopancreas)	Ingestion	A, OC, YC
Kayaker/Canoer	Sediment (Surface, 0–15 cm) [b]	Incidental ingestion	A, OC
	Surface water	Incidental ingestion	A, OC
		Dermal contact	A, OC
	Ambient air	Inhalation	A, OC
Construction Worker	Sediment (All depths) [c]	Incidental ingestion	A
		Dermal contact	A
	Ambient air	Inhalation	A

Notes: A = adult; OC = older child (6 to <18 years old); YC = younger child (0 to <6 years old)

[a] Sediment from mudflats and marshes at waterway access points within each reach.

[b] Sediments from mudflats throughout each reach and marsh at waterway access points within reach.

[c] Sediment from mudflats and subtidal areas throughout each reach.

Risk Characterization

Risks were quantified following EPA guidance. Toxicological criteria were selected following EPA's hierarchy of sources. Exposures were quantified for both a reasonable maximum exposures (RME) and central tendency exposures (CTE) condition consistent with EPA guidance. Sources of uncertainty in the exposure and risk estimates were evaluated. To provide perspective to support risk management decisions, estimated risks based on data collected from regional reference sites also were presented.

Hazard indices (HIs) were used to quantify potential noncancer effects, and potential cancer risks were expressed as excess lifetime cancer risks. Endpoint-specific HIs less than 1 are typically

interpreted as below levels that are actionable. For cancer risks, EPA considers 1×10^{-6} to 1×10^{-4} to be the acceptable risk range. [10]

For all receptor groups, calculated RME excess lifetime cancer risks across all exposure pathways fall within or below EPA's acceptable risk range, and range from 9×10^{-8} to 3×10^{-5}. HIs range from less than 1 to 3.

Table ES-2 summarizes quantitative RME cancer risks and hazards for waterway exposures for all receptor groups. Construction worker cancer risks and hazards for exposures in marsh areas, which have maximums of 1×10^{-6} and 1, respectively, are not shown in Table ES-2.

Table ES-2. RME Excess Lifetime Cancer Risks and Maximum Noncancer Hazards for BCSA Receptor Exposures in Waterways Quantitatively Evaluated in the BHHRA

Receptor	Total RME Lifetime Cancer Risks by Receptor and Exposure Area					
	UPIC	**UBC**	**MBC**	**BCC**	**LBC**	**Reference**
Angler	--	3E-05	2E-05	3E-05	1E-05	2E-05
Crabber (muscle)	--	7E-06	4E-06	4E-06	2E-06	4E-06
Crabber (muscle + hepatopancreas)	--	1E-05	6E-06	6E-06	8E-06	6E-06
Kayaker/Canoer – Current Use	--	4E-06	3E-06	2E-06	1E-06	3E-06
Kayaker/Canoer – Future Use	--	9E-06	6E-06	4E-06	3E-06	6E-06
Construction Worker	7E-07	4E-07	5E-07	3E-07	3E-07	--
Receptor	**Maximum RME Hazard Index by Receptor and Exposure Area**					
	UPIC	**UBC**	**MBC**	**BCC**	**LBC**	**Reference**
Angler	--	3	2	2	1	1
Crabber (muscle)	--	0.4	0.4	0.2	0.2	0.1
Crabber (muscle + hepatopancreas)	--	0.6	0.5	0.4	0.7	0.3
Kayaker/Canoer – Current Use	--	0.2	0.1	0.06	0.06	0.06
Kayaker/Canoer – Future Use	--	0.4	0.3	0.1	0.1	0.1
Construction Worker	1	0.6	0.5	0.3	0.3	--

Notes: -- = Construction worker only receptor for UPIC. Risks not evaluated in reference sites.

Cumulative excess lifetime cancer risks and noncancer hazards are greatest for anglers. No CTE lifetime cancer risks or HIs for the individual exposure pathways exceeded 1×10^{-6} or 1, respectively. Construction worker RME and CTE exposures in marshes did not result in lifetime cancer risks or HIs that exceeded 1×10^{-6} or 1, respectively. RME and CTE inhalation exposures to mercury did not result in an HI > 0.04 for any receptor.

Total excess lifetime cancer risks in anglers are due primarily to the consumption of recreationally caught fish, though direct contact with sediment contributes between 13 and 20 percent of the total

[10] As discussed in the National Contingency Plan (NCP), 40 CFR 300.430.

cancer risks.[11] Surface water exposures were negligible contributors to total risk at 1 percent or less, depending on the reach.

Fish consumption cancer risk is due to PCBs; direct contact risk is due to arsenic, PAHs, and PCBs. Angler noncancer hazard is also due primarily to PCBs, with some contribution from mercury. On an endpoint-specific basis, PCBs are the predominant contributor to the fish consumption hazard quotient, with a minor contribution from inorganic mercury (for immunological endpoints).

Fish consumption risks are higher in UBC, lower in MBC and BCC, and lowest in LBC following the pattern of COPC concentrations in white perch (Table ES-3). In contrast to the strong spatial patterns observed in surface water and sediment, differences in perch COPC concentrations across reaches are small, likely due in part to perch movement across and outside of the study area where additional COPC exposures and uptake can occur.

Table ES-3. Angler Fish Ingestion RME Excess Lifetime Cancer Risks and Maximum Noncancer Hazards by Exposure Areas

Health Endpoint	UBC	MBC	BCC	LBC	Reference
Lifetime Cancer Risk	3E-05	2E-05	2E-05	1E-05	1E-05
Maximum Hazard Index	3	2	2	1	1

Changes in exposures under probable future land use conditions are not projected to result in additional risks or hazards compared to those calculated in the BHHRA, given access limitations and zoning.

Uncertainty Evaluation

A series of uncertainty evaluations was conducted to provide additional information important to interpreting risks. The topics investigated included, but were not limited to:

- Exposure parameter assumptions related to frequency and duration of exposures and exposure point concentrations used for intake calculations.
- Uncertainties in the fish ingestion pathway, including the effects of cooking loss on COPC intake, consumption of whole body fish, and potential for higher COPC burden in large white perch from the BCSA.
- Evaluation of risks from regional contaminants present in the BCSA (e.g., dioxins, furans, PCBs, metals).

[11]Refer to Section 5 of Appendix M and Exhibit 5 in Attachment M4 for a summary of COPC-specific contribution.

- Uncertainty in risks estimates related to evaluation of PCBs as Aroclors versus congeners, and the potential mediation of mercury toxicity potency by selenium.

Quantitative and qualitative evaluations were conducted. When considered collectively, the uncertainties present in the BHHRA do not introduce significant differences in the risk estimates and should not affect risk management decisions.

Conclusions

Human activities in the BCSA could be associated with increased cancer risk or noncancer hazard. For all receptor groups, calculated RME cumulative excess lifetime cancer risks across all exposure pathways range from 9×10^{-8} to 3×10^{-5}. HIs range from less than 1 to 3. No CTE lifetime cancer risks or HIs for the individual exposure pathways exceed 1×10^{-6} or 1, respectively.

Calculated RME cancer risks and hazards are highest for angler, primarily due to the consumption of recreationally caught fish, though direct contact with sediment contributes 13 to 20 percent of the total cancer risks. Fish consumption cancer risk is due to PCBs, and direct contact cancer risk is due primarily to arsenic, PAHs, and PCBs. Angler noncancer hazard also is due primarily to PCBs, with minor contribution due to mercury.

Fish consumption cancer risks are higher in UBC, lower in MBC and BCC, and lowest in LBC, following the pattern of COPC concentrations in white perch. In contrast to the strong spatial patterns observed in surface water and sediment, differences in perch COPC concentrations across reaches are small, likely due in part to local and seasonal movement of perch across and outside of the study area. Regional sources likely contribute some COPC burden in BCSA perch.

A combination of site-specific factors contributes to reducing the magnitude of site risks. These include physical constraints on site access posed by dense stands of *Phragmites* and the very soft mudflats bordering the waterway, along with geochemical conditions and processes that reduce COPC bioavailability and constrain uptake.

SECTION 1

INTRODUCTION

The Berry's Creek Study Area (BCSA) is an urban watershed located in the Hackensack River Meadowlands in Bergen County, New Jersey. A baseline human health risk assessment (BHHRA) has been conducted as part of the remedial investigation (RI) for the site. This appendix summarizes the results of the risk assessment and includes a discussion of the conceptual site model (CSM) that defines the scope of the BHHRA, and the details of the toxicity and exposure assessments, risk characterization results, and conclusions.

1.1 Purpose

The purpose of the BHHRA is to provide input for developing risk management options as part of the overall RI for the BCSA. U.S. Environmental Protection Agency (EPA) guidance for conducting a remedial investigation and feasibility study (RI/FS) under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 requires that remedies at contaminated sites be protective of human health and the environment (USEPA 1988). Baseline risk assessments evaluate the potential threats to human health and to the environment posed by sites in the absence of any remedial action. Specifically, a BHHRA is an analysis of the potential adverse health effects for individuals who may be reasonably anticipated to be exposed under current and future site use conditions to hazardous substances released from a site in the absence of any actions to control or mitigate those releases. The results of the BHHRA are used to help determine whether remedial action is needed, and to provide the basis for the evaluation of the effectiveness of any subsequent remedial action.

The BHHRA was conducted in accordance with the EPA approved *Work Plan for the Remedial Investigation/Feasibility Study, Berry's Creek Study Area* (BCSA Group 2009). The scope of the BHHRA includes a quantitative exposure assessment to characterize the likelihood and magnitude of human contact with chemicals of potential concern (COPCs) under both current and reasonably anticipated future use conditions.

The BHHRA presented here builds upon previous analyses and discussions with EPA regarding the scope and approach to the risk assessment for the site. The *Memorandum on Human Exposure Scenarios and Assumptions* (MESA) was submitted to EPA early in the RI and detailed the receptors, pathways, and parameters that would be used to characterize potential exposures. The *Pathway Analysis Report* (PAR) was submitted along with the MESA, and identified COPCs and presented preliminary calculations of exposure point concentrations (EPCs) for each receptor and pathway. Both documents have undergone a series of revisions in response to EPA comments. The most recent submittals of these documents (BCSA Group 2015a,b) reflect the cumulative understanding and agreements reached with EPA. Revisions to the assessment approach in

response to comments received from EPA on these most recent draft documents are incorporated into this draft BHHRA.

1.2 Risk Assessment Guidance Documents

The approaches and methodologies used in this BHHRA are consistent with EPA guidance for conducting human health risk assessments. The overall methodology for conducting the exposure assessment and risk characterization was obtained from EPA's *Risk Assessment Guidance for Superfund (RAGS), Volume 1 – Part A* (USEPA 1989), *Part D* (USEPA 2001), *Part E* (USEPA 2004), and *Part F* (USEPA 2009b). EPA's *Exposure Factors Handbook* (USEPA 2011) and *Update of Standard Default Exposure Factors* (USEPA 2014b) were used to supplement site-specific exposure factors in quantifying the magnitude of potential exposure pathways evaluated in the BHHRA. Other regulatory guidance used for focused applications is noted in the relevant portions of the BHHRA discussion.

1.3 Document Organization

The presentation of the BHHRA is organized according to the major components of the analysis and conclusions as follows:

- Section 2: Problem Formulation—provides an overview of the site setting and CSM that guided the BHHRA.
- Section 3: Exposure Assessment—presents the methods used to estimate the intake, or exposure dose, associated with the exposure scenarios evaluated in the BHHRA.
- Section 4: Toxicity Assessment—discusses the toxicological criteria used to evaluate cancer risks and noncancer hazards of chemicals selected for analysis in the BHHRA.
- Section 5: Risk Characterization—combines the exposure and effects assessments to generate estimates of cancer risks and/or noncancer hazards for the exposure pathways and receptors addressed in the BHHRA, and includes an evaluation of uncertainties in the risk assessment and consideration of potential site risks in the context of regional background conditions.
- Section 6: Summary of Results to Inform Risk Management—presents a discussion of the BHHRA results in the context of providing input for making risk-management decisions at the BCSA.
- Section 7: References—cites literature referenced in this appendix.

The text presented in the sections listed above is designed to provide an overview of the analyses conducted, the basis for the analyses, and the overall findings and conclusions. Attachments to this appendix provide greater detail regarding the methods, calculations, and results, and include a presentation of information in the table format required by EPA (RAGS Part D).

SECTION 2

PROBLEM FORMULATION

The problem formulation is the analytical phase of the risk assessment in which the purpose for the assessment is articulated, the problem is defined, and a plan for analyzing and characterizing risk is determined (USEPA 1998, 2014b). This section provides an overview of the BCSA characteristics and resulting CSM, followed by a discussion of the analysis plan that was developed and implemented.

2.1 Site Setting[12]

The BCSA is located in Bergen County, New Jersey (Figure 2-1), within the New York City metropolitan area. Consistent with the statement of work (SOW), the RI/FS is focused on the tidal portions of the BCSA and its tributaries and associated wetlands. The tidal portion of the BCSA consists of three primary features: open channel waterways (including the main Berry's Creek channel, tributaries, mudflats, and subtidal areas), wetlands, and uplands buffer. BCSA uplands outside of the tidal portion are 90 percent developed. Light industrial and commercial operations, the New Jersey Sports and Exposition Authority (NJSEA) development, and connecting roadways dominate the land use immediately adjacent to the BCSA tidal areas. Residential development is concentrated above the 100-year flood zone, and most land adjacent to the tidal area is zoned non-residential. Upland areas outside of the tidal portions of the BCSA are not part of the risk assessment activities included in the RI/FS SOW for the site.

To support the RI, the tidal portion of the BCSA has been divided into five study segments encompassing the major waterways and associated tributaries and wetlands (Figure 2-1). Consistent with EPA guidance for identifying separate areas of concern at Superfund sites (USEPA 1989), these study segments were defined based on probable and known differences in characteristics related to the presence, magnitude, and distribution of COPCs, as well as geomorphology, hydrology, geochemistry, infrastructure, and past/present land use of adjacent areas. The five study segments, are as follows:

- Upper Berry's Creek (UBC) stretches north from the Paterson Plank Road (PPR) Bridge and includes the waterway up to the East Riser and West Riser ditch tide gates and the Peach Island Creek (PIC) tributary. UBC is characterized by relatively narrow channels and well-developed intertidal mudflats and tributaries extending into the marshes and uplands. Typical UBC salinity ranges from 1 part per thousand (ppt) to near 5 ppt with a median of 3 ppt. There is

[12] Refer to RI Report, Sections 4.2 and 4.3 for a more detailed discussion of current and future land use.

some evidence from more recent but short-term sampling that salinity is increasing in UBC and throughout the BCSA.[13]

- Middle Berry's Creek (MBC) extends south from the PPR Bridge to the Route 3 Bridge. MBC has a range of conditions that fall between UBC and the lower reaches of the system, with wider channels and less intertidal mudflat area than UBC. Well-defined, deep pools occur at meander bends. Salinity is typically in the range of 2 to 7 ppt with a median of 4 ppt.

- Berry's Creek Canal (BCC) was constructed in 1911 as an alternate flow path for Berry's Creek. BCC is a nearly straight waterway that starts at the Route 3 Bridge and terminates at its confluence with the Hackensack River. Its average channel depth is the deepest in the BCSA (up to 22.5 ft deep), and it has the least amount of intertidal mudflat area. Salinity is in the range of 3 to 9 ppt with a median of 6 ppt.

- Lower Berry's Creek (LBC) extends from a culvert near the Route 3 Bridge at its northern end to the natural confluence with the Hackensack River at its southern end. It is a shallow channel with expansive intertidal mudflats. A pipeline bridge across the lower end of LBC allows access only by small watercraft and for only short periods of time during each tide cycle. Salinity is in the range of 4 to 11 ppt, with a median of 8 ppt.

- Above Tide Gate Areas includes Upper Peach Island Creek (UPIC), the riser ditches, the Rutherford/East Rutherford ditches, and all other investigated areas upstream of the head of tide gates. These areas are generally not considered to be tidal reaches of the BCSA.

Marshes dominated by dense stands of the European variety of the common reed, *Phragmites australis,* are the predominant feature of the BCSA tidal zone, occupying 306 hectares (756 acres) representing more than 73 percent of the area (Figure 2-2).

In addition to the five study areas, regional reference sites sampled as part of the RI were also evaluated in the BHHRA to provide context on regional conditions. In coordination with EPA, three reference sites were selected to support the RI: 1) Bellman's Creek located along the Hackensack River approximately 2.7 miles north of the BCSA, 2) Mill Creek, also located along the Hackensack River approximately 1.9 miles north of the BCSA, and 3) Woodbridge River located along the Arthur Kill tidal strait about 23 miles south of the BCSA.[14] The approximate locations of the reference sites relative to the BCSA are shown on Figure 2-1. The RI Report and appendices provide detail regarding the type, frequency, and location of all sampling conducted as part of the RI and an in-depth analysis on the nature and distribution of COPCs within the BCSA.

[13] Refer to Appendix E for salinity data for all reaches.
[14] Refer to Section 3.1 of the RI Report for a description of the process used to identify reference sites.

That information will not be repeated here but is relied upon and is incorporated by reference to support the BHHRA.

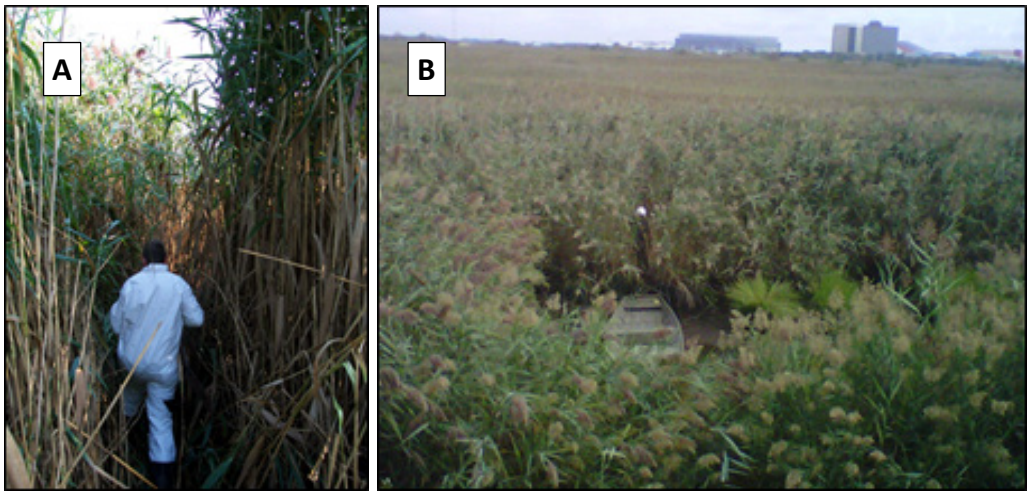
2.2 Human Use

Human activities in the tidal portions of the BCSA are a function of 1) the types of activities that could be supported by the study area environments, 2) the quality of the environments to support those activities, and 3) accessibility of the area to people.

Fishing and crabbing are anticipated to be the principal pathways by which people could potentially be exposed to COPCs in the BCSA. Fish and crab are present (seasonally) throughout Berry's Creek, and anglers and crabbers have been observed in the study area. Habitat conditions and limited access to waterways in the BCSA likely affect the frequency of these activities to some degree. Poor water quality associated with regional sewage impacts, regularly depressed dissolved oxygen, and the shallow nature of the upper reaches of BCSA waterways limit fish populations in number and size, making the BCSA less desirable as a recreational outlet when compared to other higher-quality water bodies in the region.[15] Data collected during the RI as part of the 2009 and 2010–2011 fish community surveys indicate that dissolved oxygen–sensitive sport fish such as striped bass (*Morone saxatilis*) are uncommon in the BCSA, with only a few individuals collected over the course of 2 years.[16] Further, white perch (*Morone americana)*, which is the predominant sport fish in the study area, are small (typically in the range of 150 to 190 mm [~6 to ~8 in.] or less) and below "eating size"—considered by the New Jersey Division of Fish and Wildlife (NJDFW; 2005) to be in the range of 250 to ~300 mm (10 to 12 in.).

Overall, human access to the tidal portions of the BCSA is limited. The *Phragmites* stands that dominate the wetlands of the area are sufficiently dense and tall that they present a barrier to free movement of people on the marsh surface (Graphic 1). Additionally, the substrate on the mudflats and along marsh tributaries is such that human mobility is highly restricted and potentially physically dangerous; the deep soft mud does not support much weight and cannot be easily traversed.

[15] Refer to Sections 4.7.4 and 4.8 of the RI Report.
[16] Refer to Section 4.2.2.1 of the RI Report.



Graphic 1. Typical Stand of *Phragmites* Surrounding the BCSA Waterways Shown with RI Team Member through a Cut Path (A) and Dense Stands of *Phragmites* Surrounding a Sampling Team Boat within the BCSA Waterway (B)

Observations by the RI team throughout the field activities conducted from 2007 to 2015 indicate that most human activity in the tidal portions of the study area occurs at access points where roadways and bridges meet the creek. Overall, there is a relatively small portion of shoreline (estimated to be less than 3 percent) along the primary waterway and major tributaries that is both readily accessible to people and composed of relatively hard surfaces (e.g., bridge abutments, parking lots, gravel surface) that could support fishing or crabbing activity from the shore. In addition to this very limited land access, access to the BCSA can occur via boat from the Hackensack River, although fixed span bridges in the upper portion of the system limit boat access to small recreational vessels.

Given the limited accessibility of the tidal portions of the study area coupled with the expected poor quality of the fishery due to habitat conditions, it was hypothesized that human use of the study area would be low, even though the water body is near areas of dense population.

To investigate this hypothesis, camera surveys of human activity were conducted in 2009, 2010, 2011, and again in 2014. Cameras were deployed at known access points across the BCSA, and photographs were obtained at 30-minute increments during daylight hours. In addition, field crews completed separate recordings of any human activity observed from 2009 through 2015.[17] These efforts confirmed the hypothesis that human use of the tidal portions of the BCSA is intermittent and limited. Key findings from these efforts include:

- Boating in BCC and fishing at the Route 3 Bridge were the most common activities found during the multiyear camera survey, but were observed infrequently. Across 724 cumulative observation days in BCC, boating (primarily in small motor boats) was observed on 68 days

[17] Refer to Appendix N for details on methodologies for the camera study and recording of human use observations.

(9 percent). Fishing at the Route 3 Bridge occurred even less frequently, being observed on 32 out of 531 observation days (6 percent) at that location. Crabbing was observed, primarily at the PPR Overpass, but only on 7 of 704 observation days (1 percent) at that location. These activities occurred throughout the week; no preference for activity on any particular day of the week, or on weekends compared to weekdays, was noted.

- Direct observations by the RI field crew corroborated the findings of infrequent human activity based on the camera survey. Across the 7-year RI study period, a total of 71 human use events were recorded, most often occurring at the known access points monitored by the cameras. Of the 71 recorded events, fishing was the most frequent activity, observed in 38 instances and occurring primarily at the confluence of UBC and MBC at Stiletto Bank and the PPR Overpass, and at the confluence of MBC and BCC at the Route 3 Bridge area. More than a quarter of the documented observations of fishing (11 out of 38) was for bait fish.

Additionally, interviews with residents in the study area (public availability sessions in 2009) and discussions with Meadowlands Environmental Research Institute staff support the conclusion that human use is limited to certain areas and occurs at low levels in those areas.

Other human uses of the study area are not expected under current conditions:

- **Additional residential exposures**. Two new residential developments were recently completed adjacent to LBC. Residential housing that has been built, or is approved, has no existing or planned direct recreational connection to the tidal waterways and marshes. Those residents in these developments who engage in recreational activities within the watershed would have the same potential exposures identified for the recreational receptors.

- **Surface water use**. Beyond recreational activities, no surface water use occurs or is likely to occur in the future. Local drinking water is provided by public community water systems that obtain surface water exclusively from other water management areas in the region. Within Bergen County there are 22 public community water systems serving homes and businesses year-round).[18] United Water, a principal provider of drinking water to Bergen County residents, obtains water from four reservoirs—Oradell, Woodcliff Lake, and Lake Tappan reservoirs in Bergen County, and Lake DeForest Reservoir in Rockland County, New York.[19] Berry's Creek is not a source of drinking water. Further, given the brackish water quality, it will not be a source of drinking water in the future.

[18] http://www.co,bergen.nj.us/index,aspx?NID=388 (accessed August 2016)
[19]https://unitedwater.com/uploadedfiles/localized_content/uw_new_jersey/20/w_i11_franklinlakes.pdf (accessed` August 2016)

- **Groundwater use**[20]. Groundwater is not used as a source of domestic water in the study area. Further, shallow groundwater is unlikely to be used for water supply in the future given its brackish nature or close proximity to brackish water. In fact, much of the shallow groundwater throughout the Meadowlands region is brackish and considered unsuitable for municipal and most industrial uses (Carswell 1976).

  Locally, groundwater occurs in the upland fill and salt marsh/estuarine materials that comprise the thin surficial deposits within much of the Meadowlands and throughout the BCSA uplands. In the tidal portion of the BCSA, the surface fill and surface marsh and alluvial deposits are underlain by an extensive varved clay aquiclude. The intrinsically low permeability of this clay layer limits potential exchange from the marsh and alluvial deposits with the deeper till deposits and bedrock aquifer. The groundwater in the thin surface water deposits has no value for potable supply (high salinity and low yield) and highly limited value as an industrial water source due both to the brackish nature of the water and the low volume that would not be sustainable with prolonged pumping.

  The Passaic Formation is the primary groundwater resource in the Meadowlands. Groundwater in the Passaic Formation is isolated from contact with impacted sediment and waters in the BCSA by a low-permeability, varved clay deposit that separates the surface deposits from deeper groundwater. As a result, there is limited potential for bedrock groundwater to interact with impacted sediment and surface water in the BCSA.

Future land use is not expected to change the types of activities that occur within the tidal portions of the BCSA. Most of the upland areas of the watershed are already developed, and any future residential development is likely to occur in these areas and areas outside of the 100-year flood zone that are zoned for residential use. A revision of the 2004 Master Plan for the Meadowlands District is expected in the next 5 to 10 years as the legislation that merged the New Jersey Meadowlands Commission (NJMC) and the NJSEA called for an update to the Master Plan. The most substantial pending development/redevelopment projects near, but outside of the BCSA tidal areas are "The American Dream Meadowlands" project, which is a planned shopping and entertainment complex in East Rutherford, and the Kingsland Redevelopment Plan to facilitate environmental closure of landfills in lower reaches of the study area (NJMC 2011).

Within and around the tidal zone, construction of infrastructure for flood and storm surge protection measures is currently being explored under the "Rebuild by Design" Program (HUD 2014).[21] This program was initiated as part of a broader planning effort following Hurricane Sandy to improve flood protection and coastal community resilience. Though these actions could have

[20] Refer to Section 4.7.2.4 of the RI Report for a more detailed discussion of site hydrogeology.
[21] Refer to Section 4.3 of the RI Report.

considerable effect in adjacent upland areas by reducing flooding frequency, they are not likely to change human use within the tidal zone from that observed under current conditions.

Other major anthropogenic modifications are not likely for the tidal portion of the BCSA[22] as there is a strong regulatory preference and stakeholder interest (e.g., Hackensack Riverkeeper) to avoid impacts to wetland areas and waterways. There will be periodic repairs and replacements of tide gates, in particular the UPIC tide gate in UBC. A turnpike widening project crossing BCC is under construction, with only localized activity along the edge of the canal near the Hackensack River. In addition, the Fish Creek culvert under the Rutherford landfills access road in LBC may require repair or replacement in the near future.

2.3 Conceptual Site Model

The CSM for human exposure presents the potential pathways for people who may be exposed to the environmental media within the BCSA. The CSM reflects the course a chemical takes from a source to an exposed receptor. For an exposure pathway to be considered complete there must be a source, a mechanism of chemical release from the source, a transport medium, a potentially exposed population (receptor), an exposure point, and an exposure route for the potential exposure. A summary of the human exposure pathway CSM developed for the BCSA is presented in Figure 2-3 and discussed below. The human exposure CSM is an extension of the comprehensive project CSM that is detailed in the RI Report. The project CSM described in the RI Report[23] provides more details on COPC sources, fate, and transport than are summarized below.

2.3.1 Sources and Stressors[24]

A full suite of chemicals was measured during the RI and evaluated as part of the risk assessment. Mercury, methyl mercury, and polychlorinated biphenyls (PCBs)[25] were identified as the predominant chemical stressors of potential concern for the BCSA, and are collectively referred to as primary COPCs. However, all chemicals that exceeded risk screening criteria (see Section 3.2) were addressed fully in the risk assessment.

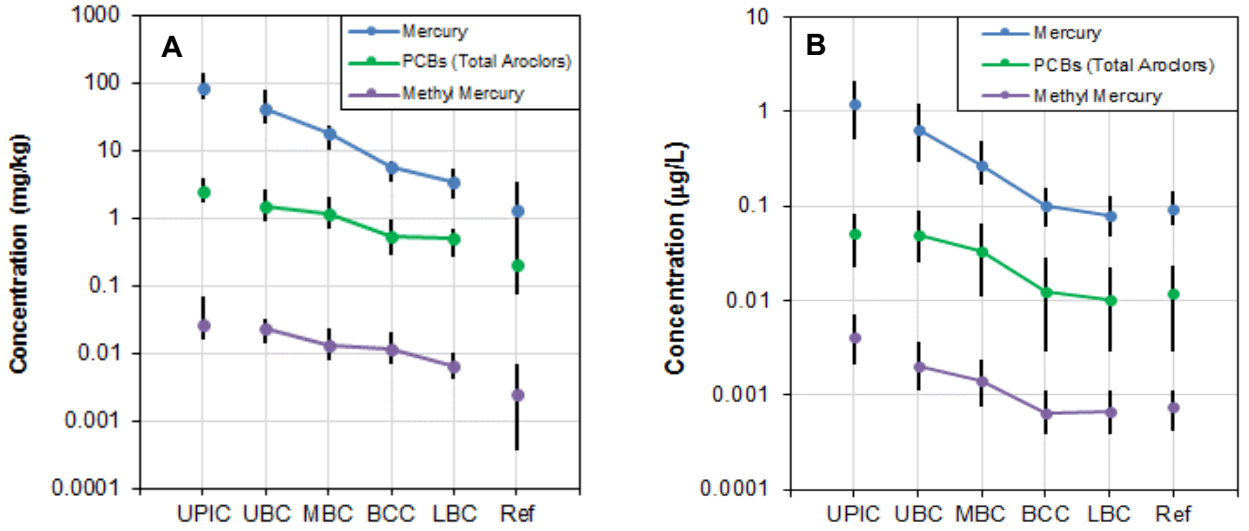
COPC sources in the BCSA include industrial discharges from historical and current operations, historical discharges from sewage treatment plants, stormwater runoff, tidal flow from the Hackensack River, watershed drainage from nontidal tributaries, leachate from landfilled wastes located adjacent to and in the area's marshes, and atmospheric deposition.

[22] Refer to Section 4.3 of the RI Report.
[23] Refer to Section 6 of the RI Report and Appendix H.
[24] Refer to Section 6.1 of the RI Report.
[25] Aroclors were the primary measure of PCBs evaluated in the BHHRA. PCB congeners were measured in a subset of tissue samples (refer to Section 5.6.5).

Chemicals released from primary sources are subject to a variety of physical transport and chemical fate mechanisms. These mechanisms result in the distribution of chemicals to environmental media, which can then become secondary sources. Sediment is considered to be a potential secondary chemical source in the BCSA, depending upon the specific COPCs, the location within the BCSA, and the depth of COPC contamination within the sediment column.

Many of the COPCs tend to partition to sediment[26] and could be contacted by people. A few (i.e., volatile organic compounds and elemental mercury) can also partition to air, leading to inhalation exposures. Chemicals in sediment partition between sediment and porewater and/or the overlying surface water, with the concentrations in each compartment dependent upon chemical-specific properties and location-specific conditions. Analysis of RI data indicates that most COPCs are present on particulate matter in the sediment bed or in the water column. COPC uptake in waterway biota appears to be mediated through a detritus-based food web, and diet and surface water particulate matter have been shown to be correlated with COPC uptake.[27] A number of the COPCs can accumulate (e.g., a variety of metals) and magnify (e.g., methyl mercury and PCBs) as they move through the aquatic food web. Therefore, fish and crabs that may be consumed by recreational users also are exposure media for human receptors. Contact with COPCs in surface water is an additional exposure route.

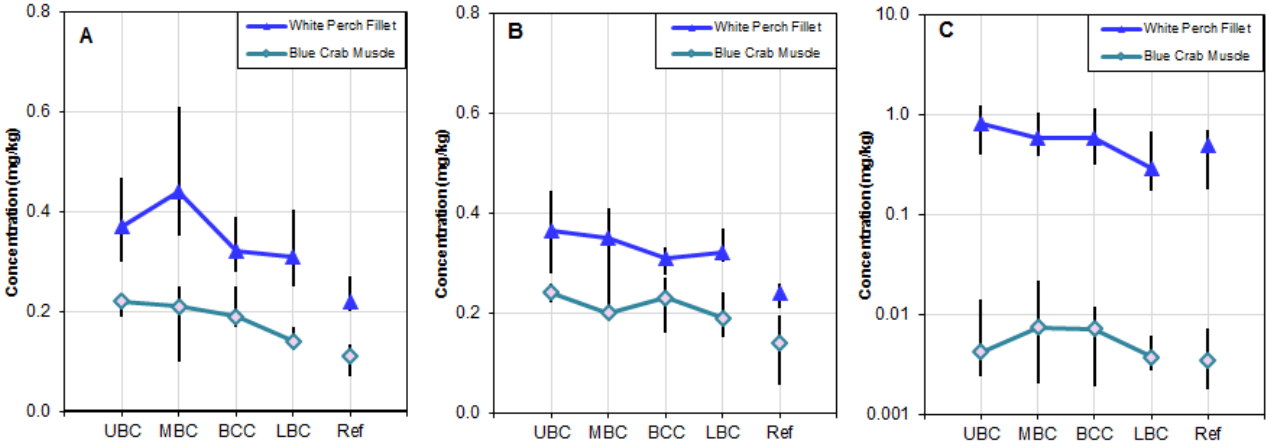
Overall, the analysis presented in the RI indicates that COPC concentrations in sediment and surface water are, to varying degrees, higher in the northern end of the study area and decrease approaching the Hackensack River (Graphic 2).



Graphic 2. Example of the Spatial Trend of COPC Concentrations of Total Mercury, Methyl Mercury, and PCBs in Surface Sediment (0–6 cm in UPIC/UBC; 0–10 cm all others) (A) and Surface Water (B) (Total Concentrations) in the Waterways of the BCSA and Reference Sites (Median, 25th, and 75th Percentiles)

[26] Refer to Sections 5.1 and 6.2 of the RI Report.
[27] Refer to Section 6.3.1 of the RI Report and Appendix H.

In contrast to the strong spatial patterns observed in surface water and sediment, differences in perch and blue crab COPC concentrations across reaches are small (Graphic 3). This is likely due in part to the movement of both species across and outside of the study area as part of local and seasonal movement. Summer movement of white perch, for example, is local and random and can cover a distance of up to 19 km (12 miles) (Stanley and Danie 1983). Given this broader regional movement, some portion of the COPC body burden in perch and crab is likely due to accumulation from sources outside the BCSA. An analysis of COPC data indicates that concentrations in the BCSA reference sites are generally similar to, and in some instances lower than, the COPC levels reported in the broader Hackensack Meadowlands region.[28] In the few instances where this is not the case, the distribution of COPC concentrations in the BCSA reference sites has a high degree of overlap with the broader region. For white perch and crab that spend time outside of the BCSA and in the broader region, some accumulation of COPCs due to exposures outside of the BCSA is likely.



Graphic 3. Example of the Spatial Trend of COPC Concentrations of Total Mercury (A), Methyl Mercury (B), and PCBs (C) in White Perch Fillet (150–190mm) and Blue Crab Muscle in the Waterways of the BCSA and Reference Sites (Median, 25th, and 75th Percentiles – in log scale)

For COPC exposures within the BCSA, evidence presented in the RI demonstrates that a number of site-specific factors control bioavailability and uptake.[29] For example, the high sulfide and organic matter content of the waterway and marsh sediments provides a high capacity for the sediments to sequester mercury (Hammerschmidt and Fitzgerald 2004; Chen et al. 2009), which reduces mercury availability to microbes for methylation (Barkay et al. 1997) and potentially limits the bioavailability to other ecological receptors (Chen et al. 2009). Data show that mercury in BCSA sediment is strongly bound to minimally soluble sulfide complexes and other binding phases (e.g., organic carbon). Additionally, mercury methylation in BCSA marsh sediments is inhibited by dissolved oxygen supplied to the subsurface by tidal saturation/desaturation and

[28] Refer to Appendix J.
[29] Refer to Section 6 of the RI Report and Appendix H.

oxygen release from the *Phragmites* roots. These site-specific conditions and geochemical processes are well understood and limit mercury bioavailability and methyl mercury biouptake in the BCSA. PCBs also are strongly associated with sediment particulate matter, which is characterized by high organic matter concentrations in the BCSA. Binding of PCBs to organic matter limits the concentrations of freely dissolved PCBs and the bioavailability of PCBs to ecological and human receptors. Additionally, the flat trophic structure of the BCSA food web limits COPC biomagnification.

2.3.2 Potentially Exposed Populations

Based on the observations throughout the RI and considering the physical setting, access constraints, and zoning, the primary populations potentially exposed to the tidal portions of the BCSA under current and reasonably anticipated future use conditions are recreational users and workers.

Recreational users could comprise residents living within the watershed who engage in recreational activities, recreational users from outside the watershed, and workers who may recreate during breaks and off-hours of the workday. Additionally, workers engaged in surveys or sampling (e.g., NJSEA workers have been observed at the site), construction workers in and along the waterway (e.g., for pipeline or utility work, or tide gate construction), or maintenance personnel (e.g., clearing debris from tide gates) compose potentially exposed populations. For assessment purposes, recreational and worker populations have been divided into specific receptor populations that reflect the principal activities in which they may be engaged.

Specific receptor groups selected for evaluation under current and future use conditions are discussed below.

2.3.2.1 Angler/Crabber

Fishing and crabbing have primarily been observed in the BCSA from the shore at waterway access points located at the PPR and Route 3 bridges and infrequently from a boat on BCC. The angler/crabber receptor group could be composed of local residents who engage in this activity, persons from outside the watershed, and workers who recreate during breaks and off-hours. For the BHHRA, it was assumed that the angler/crabber receptor group includes persons directly engaged in the activity and family members who consume the catch. Adults and older children (6 to <18 years of age) were assumed to engage in fishing/crabbing and consume their catch.[30] Younger children (0 to <6 years of age) were assumed to consume the catch but not to participate in the fishing/crabbing activity at the BCSA. Although some regional surveys suggest that sharing catch from at least some regional urban water bodies is relatively rare (Ray et al. 2007), it could

[30] Per EPA request, anglers are assumed to be adult males. This is consistent with regional data. Pflugh et al. (1999) reported that >90 percent of anglers surveyed in other parts of the Newark Bay Complex were adult males.

occur. The BHHRA assumed that all sport fish and crab that are caught will be consumed, despite evidence collected to date that indicates some of the fishing activity in the BCSA is for bait fish only.

Fishing and crabbing were assumed to be focused along the waterway shoreline areas of the BCSA, and along marshes at waterway access points. Based on observations to date, fishing and crabbing do not occur equally in all segments of the site. White perch is the most prevalent sport fish in the BCSA and has been observed in all BCSA reaches.[31] White perch migrate seasonally throughout the Meadowlands region (Hardy 1978), and white perch sampled in the BCSA are generally between 2 to 3 years of age. Mummichog (*Fundulus heteroclitus)*, a commonly collected bait fish, also is present throughout the BCSA, as are blue crabs (*Callinectes sapidus)* during the summer months. Even though crabbing has been observed principally at the PPR Bridge, given the distribution of fish and crabs at the site, fishing and crabbing could occur, and were assumed to occur, in all BCSA reaches for purposes of the BHHRA. The angler/crabber receptor group is considered applicable for both current and hypothetical future use conditions.

2.3.2.2 Kayaker/Canoer

Boaters have been observed in the BCSA. Most of the observations have been of motorboats in BCC that enter Berry's Creek directly from the Hackensack River. A few kayakers have been observed (two instances at the UBC/MBC boundary and one in BCC). Although observations to date indicate that the overall frequency of these activities is low, they do occur.

A range of boating activities could occur in the BCSA, including kayaking and canoeing. Kayakers and canoers have an equal or greater potential for exposure to surface water and sediment than power boaters and, therefore, were selected as the boater receptor group to be evaluated in the BHHRA. Kayakers/canoers could be composed of local residents living within the watershed who engage in this recreational activity, persons from outside the watershed, and workers who recreate in the BCSA during off-hours. Adults and older children (6 to <18 years of age) are assumed to engage in this activity. For both kayakers and canoers visiting the area, exposures are expected to occur infrequently, and to occur only during the warmer months. This activity was assumed to occur under both current and future conditions; however, under future conditions, an increase in frequency was assumed relative to current conditions to reflect possible changes in BCSA use (e.g., eco-tourism).

For the purposes of the BHHRA, it was assumed that this activity could occur in all reaches, even though current evidence indicates that boating is most frequent in BCC. Potential exposures were assumed to be in the waterways and shoreline areas and at waterway access points in the marshes.

[31] See Section 4.8.2.2.1 of the RI Report.

2.3.2.3 Workers

Workers potentially exposed in the BCSA include local workers who may be present occasionally or irregularly in the tidal portions of the BCSA and construction workers who may engage in intrusive but short-term activities throughout the BCSA. For purposes of the BHHRA, these two worker populations were treated distinctly:

- **Local workers.** Local workers include workers at local businesses who may occasionally recreate in the waterways during breaks or off-hours and workers who engage in some type of infrequent, nonintrusive activity in the BCSA, such as the NJSEA staff who were observed in the waterway. Exposures for these workers are similar to or less than those assumed for the recreational populations, potentially involving some contact with surface water and surface sediment, contact with marsh sediment at waterway access points, and/or occasional ingestion of fish or crab. These potential exposures could occur in each reach of the BCSA. All workers were assumed to be adults.

- **Construction workers.** For purposes of the BHHRA, construction workers were differentiated from local workers based on the intensity and duration of potential exposures, as well as the sediment exposure depth profile. Relative to local workers, potential construction worker exposures were assumed to involve greater contact with contaminated surface and subsurface sediment, but were assumed to be of shorter duration. Dermal contact with surface water could occur for construction workers, but exposures via this pathway were assumed to be negligible given that construction jobs in these types of environments typically are designed to control/divert water. Construction projects were assumed to occur in the waterways and marshes in all study area reaches including the area above the tide gates in UPIC. In 2014, EPA also identified the presence of divers completing work around the pilings of the Route 3 Bridge.

2.3.2.4 Future Recreational User

Though future human use of the area is expected to remain consistent with the activities of present day, it is possible that increased promotion of eco-tourism and/or improvement in the regional water quality could create some additional exposure scenarios. Two additional future use receptor populations were selected for qualitative evaluation in the BHHRA:

- **Swimmer—waterways.** There is no evidence of swimming under current conditions. No instances of swimming have been observed during the 7-year RI field program or identified in interviews with community residents during public availability sessions in 2009. In fact, the waterway is not suitable for recreational contact with water given that fecal coliform levels are consistently above safe criteria. Data collected during 2009 demonstrated that the surface waters of the BCSA frequently exceed the New Jersey surface water quality standards of 770 colonies per 100 mL, even though there are no longer sewage treatment plants discharging within the BCSA. This is a regional water quality issue, with many regional waterways listed

as impaired for fecal coliform (NJDEP 2003). There are at least 15 combined sewer outfalls on the Hackensack River, and the primary treatment plant in Little Ferry releases untreated sewage during storm events. This leads to sewage-impacted surface water entering the BCSA with the daily tidal exchange.[32]

A total maximum daily load for fecal coliform has been established for multiple regional water bodies. Assuming that regional water quality improves in this regard, it is conceivable that swimming would be possible in the BCSA in the distant future. Even with improved water quality, the area is unlikely to attract swimmers, given the poor access, and the predominantly shallow water with very soft mud bottoms throughout the area. Nevertheless, this receptor group was assessed. Adults and older children (6 to <18 years of age) were the assumed receptor population.

- **Future hiker—marshes.** The *Phragmites* stands prevalent in the study area are sufficiently dense and tall that they present a barrier to free movement of people on the marsh surface. While these marshes were assumed to persist in the future, it is possible that boardwalks or paths could be constructed in the marshes as part of future recreational improvements in the area. If this occurs, future hikers along these pathways could be exposed, and this scenario was evaluated. The primary exposure route would be via inhalation of volatile chemicals; direct contact with surface sediment would not occur given the presence of walkways. Adults and older children (6 to <18 years of age) were the assumed receptor population.

2.3.3 Exposure Pathways

The potentially complete exposure pathways considered for evaluation in the BHHRA are depicted in Figure 2-3 for both waterway and marsh environments and are described below.

Recreational users and workers may be exposed to sediment in the BCSA through direct contact pathways. Recreational users (i.e., angler/crabbers and kayaker/canoers) and local workers were assumed to potentially come into contact with surface sediment. Anglers/crabbers and local workers could contact sediment around waterway access points on mudflats, the nearby banks, and the marsh. Kayakers/canoers could contact mudflat sediment along the length of the waterway, in addition to the same contact at waterway access points assumed for angler/crabbers. No contact with subsurface or subtidal sediment was assumed. Observations to date indicate that hard surfaces along the waterway are used to access the creek, and the instability of the mud flats makes it highly unlikely that a person could safely navigate on foot to and from the subtidal portions of the waterway. Persons fishing and crabbing from boats are unlikely to have appreciable contact with site sediment. For construction workers, in addition to exposure to surface sediment, short contact with subsurface sediment in the waterways and marshes is assumed to be possible if excavation

[32] Refer to Section 4.7.4 of the RI Report.

occurs as part of construction. In the future, swimmers could contact surface sediment along the shoreline while entering or exiting the waterways.

For surface water, the exposure point for recreational users and local workers is the water column in the waterways. Recreational users and local workers could have some dermal contact with surface water while fishing, crabbing, or engaging in other activities, either from the bank or from a boat. Kayakers and canoers could have an additional exposure to surface water through incidental ingestion if they accidentally fall out of the boat and into the water. Future swimmers could have dermal contact and incidental ingestion, similar to overboard kayakers/canoers. As mentioned previously, construction workers were assumed to have limited contact with surface water given that construction projects in these settings are designed to control/divert water, and occasional short-term contact (e.g., via splashing) would result in negligible exposures.

Inhalation of chemicals that have volatilized from surface water or sediment and into ambient air could occur in all receptor groups under current and future use conditions.

Ingestion of finfish is an additional exposure pathway for anglers. Given that the population of white perch in the BCSA is dominated by smaller fish (typically <190 mm), it is possible that fishing may occur but consumption of catch may be limited. Nevertheless, for the BHHRA, white perch fillets were assumed to be an exposure medium. Ingestion of whole body fish is expected to be rare, but is considered in the uncertainty evaluation for the BHHRA.

Ingestion of blue crab is an additional exposure pathway for crabbers. Exposures via ingestion of blue crab muscle and hepatopancreas were evaluated.

2.4 Analysis Plan

The goal of the BHHRA is to provide input for BCSA risk management decision-making through characterization of human health effects for potential exposures pathways identified for the site. The analysis plan provides the framework for conducting the risk assessment in a manner that supports the project goals. The primary components of the analysis address the exposure and toxicity assessments and the risk characterization.

The analysis plan for each of these components was developed and implemented throughout the RI process. The RI/FS Work Plan initially outlined the key potential receptors and exposure pathways for the BHHRA. These constructs were further developed in the MESA and PAR and modified and refined during subsequent discussions with EPA. Data collection during the RI was designed to provide information to support the selection of the key receptors, exposure scenarios, and exposure calculations, and address uncertainties. Specific data collection in this regard included the following:

- COPC concentrations in sediment, surface water, white perch fillet, and crab muscle to support exposure and risk calculations for these key exposure media.

- COPC sampling of sediment at waterway access points to support exposure and risk calculations at documented exposure units.

- Camera survey and human use observations to refine assumptions regarding the type, location, and frequency of human use.

- Ambient air monitoring for mercury to assess potential exposures to mercury vapor that could be released from surface water or sediment[33] and inhaled by recreational users of the waterway; a specific focus of the sampling was potential exposures in kayakers and canoers, whose breathing zone would be located closest to the water surface and, therefore, who potentially could experience higher concentrations than other receptors more distant or at a higher elevation above the water surface.

- Supplemental analyses to explore alternative exposure pathways and address uncertainty, including:

  - Analysis of COPC concentrations in whole body white perch to assess hypothetical exposures via alternative consumption of the small perch that predominate in the BCSA waterway.

  - Collection and COPC analysis of fillets from large (>200 mm in total length) white perch to characterize potential exposures associated with consumption of these larger fish, which are much less frequent than smaller perch in the BCSA, but could be preferentially selected by anglers.

  - Crab hepatopancreas analysis for mercury, methyl mercury, and PCBs to address potential exposures by consumers of this tissue.

  - Analysis of temporal variability of COPC concentrations in tissue.

[33] Mercury was the focus of the air sampling during the RI because it is present at elevated concentrations in study area surface water and sediment and because mercury in these media can be transformed into gaseous (elemental) mercury and volatilize to air in a form that can be rapidly absorbed if inhaled. PCBs were not included in the sampling because they volatilize to a lesser degree and are more likely to remain sorbed to sediment and particulate organic carbon. No other COPC was of concern regarding potential volatilization due to infrequent occurrence and/or low concentrations in the BCSA. Refer to Section 5.4 of the RI Report and Appendix O.

- Arsenic speciation analysis of fish tissue to determine the proportion of arsenic present as nontoxic organic arsenic.[34]

- PCB congener analysis of perch fillet and crab muscle to address uncertainties associated with Aroclor-based risk calculations.[35]

- Dioxin/furan congener analysis to characterize potential site exposures to this regional contaminant and assess uncertainties related to cumulative risks in addition to those associated with BCSA COPCs.[36]

- Selenium analysis in tissue samples for use in evaluating the potential interactions between mercury and selenium that might reduce mercury toxicity.

Key aspects of the BHHRA analysis plan relevant to the calculation of exposures and risk detailed in this appendix are summarized below:

- **COPCs.** COPCs evaluated quantitatively in the BHHRA were selected by medium, based on a comparison of detected concentration within BCSA with site-specific risk-based screening levels (RBSLs). The RBSLs were calculated to represent a cancer risk of 1×10^{-7} and a hazard quotient (HQ) of 0.01 to ensure that cumulative effects were adequately considered during the COPC screening process. RBSLs for each medium were calculated for all relevant receptor populations, and the most restrictive value was used in selection of the COPCs. The COPC screening is discussed later and in Attachment M1.

- **Exposure Units and Concentrations.** EPCs were calculated for each of the distinct study area reaches and individual marshes. This approach allowed the BHHRA to provide insights on the spatial distribution of risks to support risk management decisions. COPC data collected and analyzed as part of the RI were used to derive EPCs.

- **Toxicity.** Toxicity criteria for cancer and/or noncancer endpoints were obtained for all COPCs identified for the BHHRA. Surrogate values were identified for chemicals that did not have values provided in the EPA recommended sources for toxicity criteria.

- **Risk Ranges.** Reasonable maximum exposure (RME) and central tendency exposure (CTE) scenarios were evaluated to provide estimates of the potential for adverse health effects from upper-bound and likely activity levels, respectively, at the BCSA. Site-specific exposure values were used to the extent possible and then augmented with EPA recommended defaults.

[34] Refer to Attachment M1 and Section 3.2.4 of Appendix I.
[35] Refer to Appendix I, Attachment I2 for sampling data used in the BHHRA.
[36] Refer to Appendix I, Attachment I2 for tissue data, and Appendix F, Attachment F5 for sediment data used in the BHHRA.

The risk range was calculated to characterize uncertainty in the risk calculations and to provide a range of information to support risk management decisions.

- **Reference Site Risks.** In addition, risks also were evaluated using data collected from the reference sites to provide comparative data with which to assess site risks and support risk management decisions. These risks were estimated using methods and exposure factors identical to what was used for estimating risks at the BCSA. Data collected across all reference sites were combined to support these risk calculations.

- **Uncertainty Assessment.** Qualitative and quantitative evaluations of uncertainty in the BHHRA were performed to assess the impacts on the risk characterization results and provide further data and context to support risk management decisions.

SECTION 3

EXPOSURE ASSESSMENT

The exposure assessment calculates potential chemical intake, or exposure dose, from the exposure pathways evaluated in the BHHRA. The intake for a pathway is a function of the chemical concentration at the point of contact and parameters that characterize the activity patterns of the exposed receptors. This section provides an overview of the exposure assessment for the BCSA. It includes a description of the receptor populations and exposure pathways for which intakes were calculated[37], identifies the COPCs evaluated, discusses exposure units and the calculation of the associated EPCs, and finally, details the other exposure parameters used in the calculations. Attachments M1, M3, and M4 provide a more detailed discussion of the information presented here.

3.1 Potentially Exposed Populations and Pathways

The potentially exposed populations identified in the BCSA are recreational users and workers. Potential exposure pathways identified for the BHHRA include direct contact with surface water and sediment, ingestion of fish or crab, and inhalation of mercury vapors. A complete listing of all receptor populations and exposure pathways identified for the BHHRA is contained in Table 3-1.

The BHHRA includes both qualitative and quantitative evaluations of the potential health implications of the pathways identified for the BCSA. Potentially complete and significant exposure pathways were evaluated quantitatively. Exposure scenarios that represent exposures equal to or less than those in other receptor groups (i.e., local worker recreational exposures relative to recreators including angler/crabbers and kayaker/canoers), those that are considered very unlikely (i.e., future swimmers), or those that are likely to result in negligible exposures (i.e., future hikers on a marsh boardwalk) were evaluated qualitatively.

By receptor, the following are the exposure pathways that were evaluated quantitatively in the BHHRA:

- Angler/Crabber (current/future)
  - Ingestion of white perch or blue crab
  - Incidental ingestion and dermal contact with surface sediment
  - Dermal contact with surface water

[37] The equations used for calculating intakes are included in Exhibit 4 of Attachment M4.

  - Inhalation of mercury in ambient air

- Kayaker/Canoer (current/future)
  - Incidental ingestion and dermal contact with surface sediment
  - Incidental ingestion and dermal contact with surface water
  - Inhalation of mercury in ambient air
- Construction Worker (current/future)
  - Incidental ingestion and dermal contact with sediment (surface and deep)
  - Inhalation of mercury in ambient air.

Exposures and risks to other receptor groups were evaluated qualitatively using the results of the quantitative analyses and assumptions about the relative exposure of the receptor groups. Exposures and risks calculated for adult anglers/crabbers were used to evaluate potential exposures and risks to local workers who may occasionally fish or crab in the waterways during breaks or off-hours, and to workers who engage in some type of infrequent and nonintrusive activity in the BCSA. The exposures and risks estimated for recreators who are exposed via inhalation to mercury released from the waterways were used to evaluate exposure and risks to future hikers. The exposures and risks estimated for kayakers/canoers, who may fall overboard and be submerged in the water, were used to evaluate exposure and risks future swimmers in the BCSA.

3.2 Identification of Chemicals of Potential Concern[38]

COPCs evaluated in the BHHRA are a subset of all chemicals detected at the site. COPCs were selected if the maximum detected concentration in a given medium exceeded the site-specific RBSL developed for the chemical. The use and development of site-specific RBSLs and the overall process used to select COPCs was detailed in the PAR (BCSA Group 2015b) and was discussed with EPA prior to being implemented.

Site-specific RBSLs were derived for sediment, surface water, and tissue for each of the receptors and the associated exposure pathways being evaluated in the BHHRA. The site-specific RBSLs were calculated for noncarcinogens (except lead) using a target HQ of 0.01, and for potential carcinogens using a target excess lifetime cancer risk level of 1×10^{-7}. For lead, the RBSL was based on the published criteria and/or screening values or was calculated using the EPA Adult

[38] Refer to Attachment M1 for details on the COPC screening process.

Lead Methodology (USEPA 2003b). For each medium, the lowest calculated chemical-specific RBSL was used for screening COPCs.

There were two exceptions to the COPC screening process described above. A site-specific RBSL was not derived for mercury in air; mercury was the sole chemical measured in ambient air and was identified as a COPC without completing a comparison of site concentrations to a risk-based level. Additionally, the lead COPC selection was based on comparison of the RBSL to the average concentration for the relevant media (rather than the maximum concentration) as per EPA guidance regarding exposure concentrations appropriate for assessing risks from lead (USEPA 2003b).

A total of 27 COPCs were identified for evaluation in the BHHRA. Mercury, methyl mercury, and PCBs (total Aroclors) were identified as COPCs and have been a focus of RI activities at the site. In addition, target analyte list (TAL) metals, pesticides, polycyclic aromatic hydrocarbons (PAHs) and two volatile compounds (trichloroethene and vinyl chloride) were identified as COPCs. Table 3-2 provides a summary of the COPCs selected by medium.

Two PAHs (benzo[a]pyrene and dibenz[a,h]anthracene), were identified as COPCs in surface water. Dermal contact with PAHs in surface water was not quantified in the risk assessment, consistent with EPA recommendations against quantifying dermal exposure to and risk from PAHs in surface water, which is highly uncertain (USEPA 2004).

A number of chemicals were detected at the site that do not have published toxicity values or appropriate surrogates, and for which RBSLs or risks cannot be calculated. These chemicals are listed in Attachment M1 and addressed further in the uncertainty analysis conducted for the BHHRA.

3.3 Exposure Units

Exposure units are the spatial constructs over which risks to receptors are estimated. An exposure unit is the area throughout which a particular receptor may move and can encounter an environmental medium for the duration of their exposure (USEPA 2002a). The exposure units for the BCSA were defined in part based on known or anticipated exposure points and in part to reflect differences in the spatial distribution of COPCs and/or other spatial boundaries. Though a receptor could theoretically roam across, or catch and consume fish or crab from more than one exposure unit or the entire tidal area throughout the course of a lifetime, estimating exposure across such a large area provides little information of value for identifying areas of the site that might require remediation. As a consequence, smaller exposure units were used.

In the waterways, exposures were evaluated by study area reach—UBC, MBC, BCC, and LBC—which span the site moving from north to south (Figure 2-1). An analysis of sediment data collected during the RI indicates that there is a spatial gradient of decreasing concentrations of most COPCs moving from north to south within the study area, with higher concentrations in the upper reaches

(UBC/MBC) compared to the lower reaches (BCC/LBC). Further, each of these reaches differs in characteristics that affect accessibility and likely use, as evidenced by the camera survey and other observations. Therefore, each reach is treated as a separate exposure unit.

In the marshes, exposures were evaluated for each of the 11 individual named marshes within the BCSA tidal zone (Figure 2-2). The primary potential receptors in the marshes are construction workers. Though construction projects could span multiple marshes, construction projects within individual marshes also could occur, and an analysis of exposures on a marsh-by-marsh basis provides important spatial information to support risk management decisions.

3.4 Exposure Point Concentrations

EPCs were calculated for each exposure medium in each exposure unit. EPCs represent the chemical concentration that a receptor could contact over the exposure period. EPCs for sediment, fish, crab, surface water, and ambient air were calculated as upper end concentrations (i.e., 95 UCL [upper confidence limit] on the mean or the maximum concentration if less than the calculated UCLs; Attachment M4).

For recreational receptors, the following data and approach were used to calculate EPCs:

- **Sediment**. Sediment data were available from 2006, 2007, and each year from 2009 to 2015 and were used collectively for calculating sediment EPCs. Sediment EPCs for recreators were based on COPC concentrations in surface sediment (0–15 cm). Consistent with EPA guidance, samples from areas where direct contact is not realistic (e.g., *Phragmites* marshes) were not considered when estimating EPCs for direct contact pathways (USEPA 1989). No exposure to subtidal sediment will occur under any of the exposure scenarios evaluated.

  The location of the surface sediment data used in the EPC calculation varied by receptor group because the areas of the site that would likely be accessed by each receptor group varies. For anglers/crabbers, sediment data collected in accessible areas around known waterway access points (approximately 1,000 ft upstream/downstream) were used in the EPC calculation. For kayakers/canoers, sediment data collected from waterway access points as well as mudflats throughout the length of the reach were used, given that boaters can traverse the length of the reach.

  The surface sediment sample locations in the BCSA used for calculating EPCs for anglers/crabbers and kayakers/canoers are shown in Figures 3-1 and 3-2, respectively. For reference sites, all waterway surface sediment samples were included in the EPC calculation (Figure 3-3).

- **Fish.** White perch fillet data were available annually from 2009 to 2015 and were used collectively for calculating white perch fillet EPCs. White perch fillet EPCs were calculated

for each reach using data for composite samples of white perch fillet. White perch between 150–190 mm in total length are the predominant size perch within the BCSA and were the source of the fillet data used in the BHHRA. Evaluations of concentrations of COPCs in fillets collected from individual larger white perch (>200 mm) and in smaller (i.e., 150–190 mm) whole body perch composites are presented in the uncertainty evaluation in Section 5.6. Mercury in perch fillet was evaluated as methyl mercury and inorganic mercury. Total mercury and methyl mercury were analyzed in the tissue. Inorganic mercury was calculated for each sample as the difference between total mercury and methyl mercury. This approach was used for tissue samples because some portion of the mercury contributing to total mercury concentrations is in the form of methyl mercury. In white perch fillet, most of the mercury detected is methyl mercury.[39]

- **Blue Crab**. Blue crab were sampled in 2009, 2010, and 2013. These data were used collectively for calculating blue crab EPCs. Blue crab EPCs were calculated for each reach for muscle and for hepatopancreas plus muscle. EPCs for crab muscle plus hepatopancreas were calculated as weighted averages in which muscle was assumed to represent 81 percent of the mass and hepatopancreas the remaining 19 percent. In the absence of site-specific information on mass, these assumptions were based on the average masses of hepatopancreas and muscle for blue claw crab from the Newark Bay Complex reported by Weidou (1981, as cited by NJDEP 2002). Because hepatopancreas data were not available for all COPCs, the approach to calculating a weighted-average EPC that represents both muscle and hepatopancreas could not be taken for all COPCs. For COPCs with no available data in hepatopancreas (i.e., antimony, copper, iron, manganese, selenium), the EPCs for crab muscle only were applied in the calculation of exposure for crabbers exposed to muscle and hepatopancreas. Consistent with the approach used for white perch fillet, total mercury was measured in tissue, and inorganic mercury was calculated for each sample as the difference between total mercury and methyl mercury.

- **Surface Water.** Surface water was sampled annually between 2009 and 2015, and these data were used collectively to estimate surface water EPCs. Surface water EPCs were calculated using total concentrations within each of the four reaches.

- **Air.** EPCs for mercury in ambient air used data that were collected in 2011 and 2012 from above the waterway within each of the four reaches.

For construction workers, the following approach was used to calculate EPCs:

- **Sediment**. Exposure to sediment could occur in both the waterway and the marshes. EPCs in sediment were calculated using data from sediment collected in 2006, 2007, and annually

[39] Refer to Section 3.2 of Appendix I.

between 2009 and 2015 from the surface and at depth. The focus of RI sediment data collection was on the surface sediment depth interval. For this reason, a significant proportion of sediment data are from locations where only the surface sediment interval was collected. Since concentrations of COPCs in sediment vary with depth, it was important to consider the potential bias that may be introduced by including sediment locations for which only surface sediment data are available. To minimize this potential bias, data from the high- and low-resolution coring studies, which include both surface sediment and deeper intervals at a given sample location, were used preferentially. Sediment data from these studies were available for the majority of COPCs and exposure units; however, there were some instances where COPCs were not measured at high/low-resolution coring locations. For exposure units where no COPCs were available in deeper sediment intervals, data from the surface sediment (0–15 cm) were used to estimate EPCs. Using the selected data, a depth-weighted average concentration was calculated for each sediment location, which was then used in the calculation of the EPC for each exposure unit (i.e., reach or marsh). Figure 3-4 shows the sediment samples used for calculating EPCs for this receptor group.

- **Air.** The ambient air data collected to support exposure calculations for recreational users also were used to assess potential construction worker exposures in the waterway. No ambient air data were collected in UPIC or from the marsh areas, where construction activities also could occur. Therefore, construction worker exposure to mercury in ambient air in UPIC and the marshes was not evaluated quantitatively. The absence of data to assess this pathway is addressed in the uncertainty evaluation (Section 5.6).

Tables 3-3 and 3-4 provide a summary of EPCs used in the BHHRA.[40]

3.5 Exposure Parameters

Exposure parameters are used to quantify the frequency, duration, and magnitude of contact with an impacted medium for each exposure scenario being evaluated. EPA guidance, site-specific information (e.g., from human use observations), and best professional judgement were used to select the exposure parameters for the BHHRA.

Exposure parameters were identified to estimate both RMEs and CTEs. The intent of the RME is to estimate a conservative exposure case (i.e., well above the average case) that is still within the range of possible exposures (USEPA 1989), whereas the CTE should be representative of the average, or typical, individual in the affected population.[41] The exposure parameters selected for the RME and CTE cases were designed to result in this range of exposures. For the RME case, exposure was assumed to occur over a range of ages. Anglers/crabbers were assumed to be younger

[40] Refer to Attachment M4, Exhibit 3 for the statistical basis for each EPC.
[41] https://www.epa.gov/risk/conducting-human-health-risk-assessment.

children (0 to <6 years of age), older children (6 to <18 years of age), and adults[42]; kayakers/canoers were assumed to be older children (6 to <18 years of age) and adults. As established in the MESA, for the CTE analysis, only adult exposures were evaluated. The evaluation of adults only is representative of site-specific observations of primarily adult activity within the BCSA throughout the duration of the field effort since 2008.

Table 3-5 provides a summary of the exposure parameters used in the BHHRA.[43] The exposure parameters selected for the BHHRA did not consider fishing advisories or institutional controls. Key site-specific exposure factors for each of the receptor groups is provided below. Other exposure parameters were based on recommendations available from USEPA (2014b, 2011) and are discussed in Attachments M3 and M4.

3.5.1 Angler/Crabber

Consumption rates of caught fish and crab can vary widely depending upon location/region, type of fishing, and species of fish caught. Given this, EPA has directed that consumption rates for fish/shellfish used in Superfund site risk assessments be based on site-specific considerations (USEPA 2014b). No site-specific consumption surveys have been conducted for the BCSA, but as already summarized, a considerable amount of information has been compiled that provides insight on fishing and crabbing activity in the BCSA.

Based on the site-specific setting and direct observations generated through the camera survey and field team observations, and analysis of information generated during the RI, the data indicate that 1) the BCSA is located in an urban, industrialized area and its waterways are small, shallow, and relatively inaccessible due to the physical setting; 2) fishing/crabbing occur infrequently and unequally throughout the study area; 3) few individual crabbers/anglers appear to return repeatedly to particular monitored areas of BCSA; 4) habitat conditions likely affect the number and size of fish and crab populations in the BCSA and, as a result, the desirability of the study area as a recreational destination; and 5) the fish of the BCSA are generally small and not likely to be the target of anglers for purposes of sport fishing or consumption.

As outlined in the MESA, these collective factors support development of a site-specific consumption rate for the BCSA that is lower than that traditionally assumed by EPA for more accessible and attractive water bodies in the region. Fish and crab consumption rates derived from nationwide databases provided the starting point for the exposure assumptions in the BHHRA, but it was recognized that data from national surveys would likely overestimate potential consumption in the BCSA. These data are often derived from larger water bodies with higher-quality habitats

[42] Adults and older children were assumed to engage in fishing/crabbing and consume their catch, while younger children were assumed to consume the catch but not participate in the fishing/crabbing activity.
[43] Refer to Attachment M4 for the rationale and sources for all exposure parameters.

that are far more accessible and are located in settings where fishing or crabbing activity is more commonplace than in the BCSA.

USEPA (2014a) published data from 30-day fish consumption frequency questionnaires and 2-day dietary recall surveys to provide updated information on usual (i.e., long-term average) consumption rates for episodically consumed foods. EPA calculated usual consumption rates by multiplying the probability of consumption on a given day by the average amount consumed on a day when some fish is consumed (i.e., a "consumption day") (USEPA 2014a). Based on this analysis, the 90th and 50th percentiles of consumption rates of uncooked finfish and shellfish for adult consumers of freshwater and estuarine organisms are 22.0 and 5.0 g per day, respectively (USEPA 2014a). These values were selected as the RME and CTE values for fish and crab consumption rates for adult anglers and crabbers in the BCSA BHHRA. Because these consumption rates combine finfish and shellfish consumption, a recreational user of the BCSA is assumed to consume only finfish or only crab at these rates.

The preponderance of site-specific information gathered indicates that it is unlikely that anglers or crabbers would regularly consume fish or crab solely from the BCSA over the course of multiple years. Under a 365 days per year consumption frequency, the RME consumption rate of 22.0 g per day, for example, equates to 8,030 g per year, or nearly 18 lb of fish or crab from the BCSA each year per person. This amount of fish or crab consumption is considered unrealistic given the evidence to date that indicates infrequent fishing/crabbing activity in the BCSA, combined with the fact that the primary sport fish of the water body (white perch) are well below "eating size," as defined by NJDFW (2005).

For these reasons, and based on discussions with EPA as documented in the MESA, the frequency of consumption of fish and crab caught in the BCSA was assumed to be 27 days per year (RME) and 15 days per year (CTE). This consumption frequency also was selected as the exposure frequency for angler/crabber contact with sediment and surface water, and inhalation of mercury in ambient air.

Applying the RME exposure frequencies to the RME consumption rate of 22.0 g per day yields a daily consumption rate of 1.6 g per day on an annualized basis, or a total of 1.3 lb of fish or crab per year. This RME rate is equivalent to an average of 5.2 4-oz fish meals or 2.6 8-oz fish meals each year for 26 years. Given that BCSA white perch are typically not large enough to be considered "eating size," these consumption rates still may overestimate consumption of BCSA white perch.

Fish and crab consumption rates for older child and younger child consumers were derived by scaling the adult rates. This approach was recommended by EPA and has been adopted in other risk assessments in the region (TAMS and Gradient 2000; Louis Berger Group 2014; HDR et al. 2011). The consumption rate for an older child was scaled to two-thirds of the adult RME rate to derive an RME finfish/shellfish consumption rate of 14.7 g/day (22*2/3), which equates to

397 g/year using the 27-day frequency (3.5 4-oz meals/year or 1.75 8-oz. meals/year). The consumption rate for a younger child was scaled to one-third of the adult RME rate to derive an RME finfish/shellfish consumption rate of 7.3 g/day (22*1/3), which equates to 197 g/year using the 27-day frequency (1.75 4-oz meals/year or about 1 8-oz. meals/year).

3.5.2 Kayakers/Canoers

No regional or site-specific information was available to support the selection of the annual exposure frequency for the adult and older child kayakers/canoers. There was a single observation of a lone kayaker in the BCSA over the duration of the camera study and direct observation during RI activities that spanned multiple years and seasons, indicating it is not a common occurrence. The exposure frequencies assumed were based on best professional judgment in consultation with EPA. For current kayakers/canoers, an RME of 18 days/year was selected. This RME assumes that an individual visits the site 2 times/month on average, from early spring through fall. A CTE of 9 days/year was selected and assumes that an individual visits the site an average of 1 time/month over these same months. In the future, if eco-tourism and use of the area as a recreational setting is promoted, it is possible that kayakers/canoers may visit the site more often. For future kayaker/canoers, the RME and CTE durations of 39 days/year (i.e., an average of 1 visit/week from early spring through fall) and 19 days/year (i.e., an average of 1 visit every other week from early spring through fall), respectively, were adopted as recommended by USEPA (2009a).

3.5.3 Construction Workers

Exposure frequency for construction workers will depend upon the activity. A variety of construction activities have been documented in the BCSA. These activities have involved rail line construction, tide gate replacement and repair, stormwater outfall construction, and water main break repairs. Based on information for construction activities in the BCSA, the maximum amount of time that a worker has spent potentially in direct contact with impacted media is estimated to be between 5 days and 8 weeks, though the projects themselves had a longer duration. In consultation with EPA, the maximum duration of construction activity observed at the site (8 weeks or 40 days) was selected as the RME exposure frequency for construction workers. A CTE exposure frequency of 10 days was selected to reflect the average time spent in recent construction activities at the BCSA. It is likely, however, that actual direct contact with contaminated media is much less than these estimates, given that BCSA construction workers are very likely to use some personal protective equipment during these activities. Nevertheless, for the BHHRA, construction workers were assumed to have some direct contact with contaminated media.

SECTION 4

TOXICITY ASSESSMENT

The toxicity assessment summarizes the health effects that may be associated with exposure to the COPCs selected for the risk assessment, and identifies doses that may be associated with those effects. Toxicological criteria are numerical expressions of dose and response and are used along with estimates of exposure to calculate potential risks to human receptors. These criteria may differ depending on the duration and route of exposure. Therefore, the toxicological criteria required for this BHHRA were selected to reflect the potential exposures represented in the CSM. Toxicological criteria are available for cancer and noncancer effects.

This section provides an overview of toxicological criteria for cancer and noncancer effects, outlines the methods that were used to select the criteria, and presents the final selected criteria for the BHHRA. In addition, it includes a summary of the toxicology of mercury, methyl mercury, and PCBs, which are the primary COPCs that have been the focus of RI activities at the site. Additional detail on the toxicological criteria used in the BHHRA are provided in Attachment M2.

4.1 Dose-Response Assessment

Toxicological criteria are numerical expressions of chemical dose and response. For carcinogens (chemicals assumed to have the potential to cause cancer), toxicological criteria for oral and dermal exposures are termed cancer slope factors (CSFs) and criteria for inhalation exposures are termed inhalation unit risks (IURs). These criteria are developed from laboratory or epidemiological studies in which either tumors or precursors to tumorogenicity are observed. The resulting criteria are upper-bound estimates of the carcinogenic potency of chemicals. They are used to estimate the incremental risk of developing cancer, corresponding to a lifetime of exposure at the levels estimated in the exposure assessment. Under EPA's standard default risk assessment procedures, estimates of carcinogenic potency reflect the assumption that there is no threshold dose for carcinogenic effects; that is, there is no entirely "safe" dose and exposure to any amount of the chemical will contribute to an individual's overall risk of developing cancer during a lifetime. EPA does recognize that some carcinogens act in a manner within the body (i.e., a mode of action [MOA]) that follows a nonlinear, threshold response. EPA allows for estimates of carcinogenic potency to be based on a nonlinear model when sufficient evidence exists to support a nonlinear MOA for the general population and any subpopulations of concern (USEPA 2005a).

Some carcinogenic chemicals operate through a mutagenic MOA. USEPA (2005b) assumes that early-life exposures to chemicals that act with a mutagenic MOA may result in higher carcinogenic risks compared to exposures that occur later in life. When no chemical-specific data are available to evaluate cancer susceptibility from early life exposures to a mutagenic carcinogen, EPA

recommends that an age-dependent adjustment factor (ADAF) be applied when evaluating exposures and risks.

For chemicals that are assumed to have the potential to cause noncancer health effects, toxicological criteria for oral and dermal exposures are reference doses (RfDs) and criteria for inhalation exposures are reference concentrations (RfCs). USEPA (1989) defines the chronic RfD or RfC as a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime. These criteria are derived from laboratory or epidemiological studies. The RfD or RfC is typically calculated by first identifying either the highest concentration or dose that does not cause an observable adverse effect (the no-observed-adverse-effects level [NOAEL]), the lowest-observed-adverse-effects level (LOAEL), or a modeled effect level (e.g., benchmark dose level). Next, uncertainty and modifying factors that account for limitations or uncertainties in toxicity data, differences in responses among animal species and humans, and variations in inter-individual sensitivity within the human populations are applied. These factors are intended to provide a margin of safety to ensure that exposures resulting in actual doses less than or equal to the RfD or RfC are unlikely to result in adverse effects to exposed populations. The resulting RfDs and RfCs reflect the underlying assumption that systemic toxicity occurs as a result of processes that have a threshold (i.e., that a safe level of exposure exists and that toxic effects will not occur until this level is exceeded).

Noncancer RfDs and RfCs may differ depending on the length of human exposure. EPA defines acute exposures as lasting less than 2 weeks (USEPA 1989). Subchronic exposures are defined as lasting for at least 2 weeks but less than 7 years, and chronic exposures are defined as lasting 7 years or more. The majority of the exposure scenarios evaluated in the BHHRA for the BCSA are chronic. The exception is the exposure scenario for construction workers, for whom exposure is assumed to last 1 year. Chronic toxicological criteria were used for all exposure scenarios evaluated in the BHHRA. The implications of using chronic toxicological criteria to assess subchronic exposures are addressed in the uncertainty evaluation (Section 5.6).

Toxicological criteria also may differ depending upon the route of exposure. Criteria for both cancer and noncancer effects may be specifically derived for the dermal, ingestion, or inhalation exposure routes. Potential exposures via all three of these routes have been quantified in the BHHRA, and relevant toxicological criteria were selected, when available. While dermal-specific toxicological criteria are available for some chemicals, there are no dermal-specific toxicological criteria available for the COPCs selected for the BHHRA. Thus, the oral criteria were used to evaluate toxicity for both the oral and dermal routes of exposure, with appropriate adjustments for absorption efficiency by the dermal route, as outlined in USEPA (1989, 2004) guidance.

Toxicological criteria were selected following EPA's hierarchy (USEPA 2003a) as follows:

- Tier 1: EPA's Integrated Risk Information System (IRIS) (USEPA 2016)
- Tier 2: EPA's provisional peer-reviewed toxicity values (PPRTVs) (USEPA 2015)
- Tier 3: Other sources that are publicly available and peer-reviewed, giving priority to those sources that are most current, including but not limited to:
  - The California Environmental Protection Agency (CalEPA) toxicity values (CalEPA 2015)
  - The Agency for Toxic Substances and Disease Registry (ATSDR) minimal risk levels (MRLs) (ATSDR 2015)
  - EPA's Health Effects Assessment Summary Tables (HEAST) toxicity values (USEPA 1997).

Table 4-1 summarizes the types of toxicological criteria that were available for each COPC for each of the exposure pathways being evaluated in the BHHRA. The toxicological criteria used in the BHHRA are summarized in Table 4-2 (cancer) and Table 4-3 (noncancer) (see Exhibits 1 through 3 of Attachment M2).

4.2 Toxicity of Primary Chemicals of Potential Concern

Mercury, methyl mercury, and PCBs were identified as primary COPCs for the BCSA (BCSA Group 2009). This section provides a brief overview of the toxicity of each of these compounds and the toxicological criteria used to evaluate them in the BHHRA. A web site link to the toxicity profile used to develop the toxicological criteria for the remainder of the COPCs can be found in Tables 4-2 and 4-3.

4.2.1 Mercury and Methyl Mercury

Mercury is a naturally occurring element that exists in two major valence states in the environment, +1 and +2. Many inorganic and organic forms of mercury can be formed from the divalent cation. Inorganic mercury can be converted to organic forms by natural processes or by microorganisms. The most common form of organic mercury is methyl mercury. The accumulation and toxicity of inorganic and organic forms of mercury in biological organisms differs (ATSDR 1999).

Epidemiological studies have indicated that the critical toxicological effect of methyl mercury is neurotoxicity in children. Chronic low-dose prenatal exposure to methyl mercury in fish has been associated with subtle endpoints of neurotoxicity in children. Prenatal exposure to these low levels of methyl mercury were reportedly associated with behavioral problems (attention/hyperactive disorder) and cognitive development in adolescents and young children (Oken et al. 2005, 2008; Jedrychowski et al. 2006; Freire et al. 2010; Suzuki et al. 2010; Boucher et al. 2012; Sagiv et al. 2012). Strain et al. (2015) more recently reported that other factors—namely the profile of maternal

omega-3 to omega-6 fatty acids—may play a role in lessening the effect of methyl mercury on certain developmental outcomes.

Exposure to higher doses of organic mercury in adults has resulted in severe adverse neurological effects. In addition, low-level methyl mercury exposure has been associated with cardiovascular effects in humans (ATSDR 1999). Short-term, high-dose studies in laboratory animals have shown an association between ingestion of methyl mercury and adverse reproductive effects (USEPA 2016).

The cause of methyl mercury toxicity has not been fully defined, but there is a growing body of evidence that indicates mercury toxicity is directly related to its highly specific and irreversible binding to selenium-dependent enzymes (selenoenzymes), which among other things, are important for protecting the body against certain types of toxicity within the nervous system (Ralston and Raymond 2010). If excessive mercury exposures occur during pregnancy, mercury binds to maternal selenium causing the transport of selenium across the placenta to be limited (Ralston 2009). However, this would only appear likely in populations with a compromised selenium status along with exposure to foods with unusually high levels of mercury (Raymond and Ralston 2004). Supplemental selenium in the diet of animals has been shown to reduce mercury toxicity (Dang and Wang 2011; Ralston and Raymond 2010; Agarwal et al. 2010; Branco et al. 2012). The ability of selenium compounds to decrease the toxic action of mercury has been established in all investigated species of mammals and fish (Beijer and Jernelov 1978; Culvin-Aralar and Furness 1991).

Studies of oral and inhalation exposure to various inorganic forms of mercury in humans and animals have shown that inorganic mercury is toxic to the kidneys and central nervous system. Stomatitis (inflammation of the oral mucosa) and cardiovascular effects, including increased heart rate and increased blood pressure have also been reported following human exposure to inorganic mercury (ATSDR 1999).

Several epidemiological studies examining mortality among workers exposed to elemental mercury vapor have reported conflicting results regarding a correlation between inorganic mercury exposure and an increased incidence of cancer mortalities (Ahlbom et al. 1986; Amandus and Costello 1991; Barregard et al. 1990; Buiatti et al. 1985; Cragle et al. 1984; Ellingsen et al. 1992). These studies have limitations that complicate the interpretation of their results for determining the carcinogenic potential of inorganic mercury (USEPA 2016). However, mercury and methyl mercury are not considered carcinogenic by the ATSDR (1999).

EPA has classified inorganic mercury as "Group D – not classified as to human carcinogenicity" (USEPA 2016). Several available studies have evaluated the carcinogenic potential of methyl mercury in laboratory animals and have reported mixed results. Based on inadequate data in humans and limited evidence of carcinogenicity in animals, EPA has classified methyl mercury as a possible human carcinogen (e.g., Group C). Based on results in mice, it is likely that systemic

noncancer effects would be seen at methyl mercury exposures lower than those required for tumor formation (USEPA 2016).

The following summarizes the toxicological criteria used for mercury in the BHHRA:

- IRIS (USEPA 2016) provides a chronic RfD of 1×10^{-4} mg/kg-day for methyl mercury. The RfD is based on neuropsychological effects in the offspring of women exposed to methyl mercury in fish. In developing the RfD, EPA derived a benchmark dose level and applied an uncertainty factor of 10 to account for intraspecies variability. This RfD was used to estimate noncancer hazards from methyl mercury in tissue.

- IRIS (USEPA 2016) provides a chronic RfD of 3×10^{-4} mg/kg-day for inorganic mercury (as mercuric chloride) based on autoimmune effects. In deriving the RfD, EPA back-calculated a LOAEL exposure level from a drinking water equivalent level, which is based on findings from multiple rat studies. EPA adjusted the back-calculated LOAEL of 0.003 mg/kg-day by a combination of uncertainty factors that totaled 1,000 (10X for LOAEL to NOAEL conversion, 10X for the use of a subchronic study), and a combined 10X for both interspecies and intraspecies variability. This RfD was used to estimate noncancer hazards from mercury in tissue (inorganic fraction only) and sediment (total mercury).

- IRIS (USEPA 2016) provides a chronic RfC of 3×10^{-4} mg/m^3 for elemental mercury based on effects to the nervous system. In developing the RfC, EPA derived a LOAEL of 0.025 mg/m^3 from six occupational studies of workers exposed to mercury vapor. The LOAEL, which was based on an occupational exposure of 5 days/week and an inhalation rate for occupational settings, was adjusted to a LOAEL of 0.009 mg/m^3 for exposure assumed to occur 7 days/week and an inhalation rate for residential settings. A combination of uncertainty factors that totaled 30 (10X for intraspecies variability, 3X for database) was used to adjust the LOAEL. This RfC was used to estimate noncancer hazards from mercury in air.

4.2.2 Polychlorinated Biphenyls

PCBs can cause a range of noncancer health effects. Acute toxicity exposures in experimental animals have been associated with mild liver damage. Rats, mice, and monkeys with dietary exposure to high levels of PCBs over several weeks or months developed a variety of health effects including anemia, acne-like skin conditions, and liver, stomach, and thyroid gland injuries. Reductions in immune system function, behavioral alterations, and impaired reproduction have also been associated with PCBs. Some PCBs can mimic or block the action of hormones from the thyroid and other endocrine glands (ATSDR 2000)—because hormones influence the normal functioning of many organs, some of the effects of PCBs may result from endocrine changes.

The potential for PCBs to cause developmental effects in children is uncertain. In one study, women who consumed high amounts of fish contaminated with PCBs and other chemicals gave

birth to babies that weighed less compared to babies from women who did not eat fish. Similar observations have been made in some studies of women exposed to lower levels of PCBs; however, not all studies have confirmed these findings (ATSDR 2000). Babies born to women who ate fish contaminated with PCBs before and during pregnancy showed abnormal responses to tests of infant behavior. Some of these behaviors, such as problems with skills and a decrease in short-term memory, persisted for several years (ATSDR 2000). However the women in these studies may have been exposed to other chemicals. Other studies suggest that the immune system may be affected in children born and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects in humans caused by exposure to PCBs or of health effects of PCBs in older children (ATSDR 2000).

Studies of occupationally exposed individuals show associations with cancer of the liver, biliary tract, intestines, and skin, and, as a whole, provide evidence that PCBs are carcinogenic (ATSDR 2000). PCBs have been classified as probable human carcinogens (i.e., Class B) by USEPA (2016). Several authors have critically reviewed the epidemiological studies published over the past 40 years that have investigated the relationship between occupational PCB exposure and cancer or other diseases. Their comprehensive reviews have concluded that the weight of the evidence does not support a causal association for PCBs and human cancer (Golden et al. 2003; Golden and Kimbrough 2009). There is unequivocal evidence that PCBs are hepatocarcinogenic in animals (ASTDR 2000).

The following summarizes the toxicity criteria used for PCBs in the BHHRA:

- IRIS (USEPA 2016) provides a chronic RfD of 2×10^{-5} mg/kg-day for Aroclor 1254, based on changes in immune response, increased ocular exudate, and disturbance in nail-bed formation measured in rhesus monkeys. In deriving the RfD, EPA adjusted the LOAEL of 0.005 mg/kg-day by a combination of uncertainty factors that totaled 300 (10X for intraspecies variability; 3X for interspecies variability; 3X for the use of a LOAEL instead of a NOAEL; and 3X for the use of a subchronic study). EPA's IRIS additionally houses an RfD of 7×10^{-5} for Aroclor 1016. More highly chlorinated Aroclors 1248, 1254, and 1260 were the only Aroclors detected in tissue at the BCSA. The RfD for Aroclor 1254 was used to estimate noncancer hazards to total PCBs in sediment and tissue.[44]

- According to USEPA (2016), the cancer potency of PCB mixtures depends on the media of interest and the PCB congeners present. EPA's IRIS database provides upper bound and central tendency CSFs of 2 and 1 $(mg/kg\text{-}day)^{-1}$, respectively, for more highly chlorinated PCB mixtures such as those composed of Aroclor 1248, 1254, and 1260 that have been detected in tissue from the BCSA. The CSF of 2 $(mg/kg\text{-}day)^{-1}$ was used to estimate the RME and CTE cancer risks associated with exposure to total PCBs in sediment and tissue.

[44] PCBs were not identified as a COPC in surface water.

SECTION 5

RISK CHARACTERIZATION

Risk characterization combines estimates of dose with toxicity criteria to provide an assessment of the potential cancer risk and noncancer hazards for the scenarios quantified in the risk assessment. Per EPA guidance, risk characterization conveys the nature and presence or absence of risks in quantitative and qualitative terms, evaluates uncertainty and variability in the findings, and provides a clear and transparent description of the findings of the risk assessment (USEPA 1989, 2014b). These approaches have been adopted in this assessment.

Cancer risk estimates are expressed as the incremental probability that an individual described by an exposure scenario might develop cancer during his or her lifetime as a result of exposure to COPCs in the area under study. The term "incremental" reflects the fact that the calculated risk associated with any exposures is in addition to the background risk of cancer experienced by all individuals in the course of daily life.

Lifetime cancer risks are calculated as the product of the estimated dose and the expression of the carcinogenic potency of chemicals (e.g., CSF). Excess incremental lifetime cancer risk from oral and dermal exposures is calculated as:

$$Cancer\ Risk(unitless) = LADD \times CSF$$

Where:

LADD	=	lifetime average daily dose of the chemical (mg/kg-day)
CSF	=	cancer slope factor (kg-day/mg)

Cancer risks are summed for all COPCs and across all relevant exposure pathways to estimate cumulative incremental cancer risk. Lifetime cancer risk from inhalation exposures was not estimated for the BHHRA as the only COPC evaluated in air (i.e., mercury) is not evaluated as a carcinogen.

Both federal and state regulatory agencies define what they consider to be an acceptable level of incremental cancer risk associated with exposure to chemicals in environmental media. For cancer risks, EPA considers 10^{-4} to 10^{-6} to be the acceptable risk range.[45]

[45] As discussed in the National Contingency Plan (NCP), 40 CFR 300.430.

Noncancer health risks are termed hazards. To evaluate noncancer hazards, the ratio of the exposure term (e.g., average daily dose [ADD]) to the corresponding noncancer toxicity reference value (e.g., RfD) is calculated. The HQ is calculated for oral and dermal exposures as:

$$HQ(unitless) = \frac{ADD}{RfD}$$

Where:

ADD	=	average daily dose of the chemical (mg/kg-day)
RfD	=	reference dose (mg/kg-day)

The HQ is calculated for inhalation exposures as:

$$HQ(unitless) = \frac{EC_{Air}}{RfC}$$

Where:

EC_{Air}	=	exposure concentration in air (mg/m^3)
RfC	=	reference concentration (mg/m^3)

To evaluate cumulative noncancer effects, HQs are summed for all COPCs and across all relevant exposure pathways to determine a noncancer hazard index (HI) as:

$$HI\ (unitless) = HQ_1 + HQ_2 + \ldots + HQ_i$$

Where:

HI	=	hazard index
HQ	=	hazard quotient for a specified exposure route (unitless)

HIs that are calculated for multiple chemicals are likely to overstate risk if the RfDs for the chemicals are based on adverse effects to different target organs. This is because the noncancer health hazards associated with chemicals that affect different target organs or have different health effects are not likely to be additive. Following USEPA (1989) guidance, if the total HI for a particular BCSA receptor exceeded 1 for all COPCs combined and across all exposure pathways, separate HIs for groups of COPCs that affect the same target organ or endpoint were estimated. These effect-specific HIs provide a more accurate indication of whether there is potential for a specific adverse health effect to occur for the specific scenario being evaluated.

If the resulting multi-chemical or effect-specific HI is 1 or less for a given scenario, then no adverse health effects are expected to occur (USEPA 1989). If the HI is greater than 1, then further risk

evaluation may be appropriate. However, HIs greater than 1 do not necessarily mean that any actual adverse health effects would be observed in a receptor population under the assumed exposure. A substantial margin of safety has been incorporated into the RfDs used to evaluate the COPCs, and adverse health effects may not occur even if the HI is much larger than 1. The HI is not a measure of probability that adverse health effects will occur. That is, the level of concern for health effects to occur does not necessarily increase linearly as the RfD is approached or exceeded (USEPA 1989).

Whereas cancer risks are generally presented for a lifetime exposure, it is customary to present noncancer HIs for the individual age groups evaluated in a risk assessment (i.e., younger child, older child, adult).

Graphic 4 provides a summary of the total risks and hazards for each receptor group and exposure area. Table 5-1 provides estimated RME and CTE cumulative lifetime cancer risks and noncancer HIs for each receptor group, by exposure unit. Risks are reported to 1 significant figure, consistent with guidance (USEPA 1989). Figures 5-1 through 5-4 summarize the cumulative lifetime cancer risks and noncancer HIs and show the relative contribution of each exposure pathway to the overall risks or hazards. These figures also show how the risks and hazards vary spatially across the BCSA.

Graphic 4. Excess Lifetime Cancer Risks and Maximum Noncancer Hazards for BCSA Receptor Exposures in Waterways Quantitatively Evaluated in the BHHRA

Receptor	Total RME Lifetime Cancer Risks by Receptor and Exposure Area					
	UPIC	**UBC**	**MBC**	**BCC**	**LBC**	**Reference**
Angler	--	3E-05	2E-05	3E-05	1E-05	2E-05
Crabber	--	7E-06	4E-06	4E-06	2E-06	4E-06
Crabber (Including Hepatopancreas)	--	1E-05	6E-06	6E-06	8E-06	6E-06
Kayaker/Canoer – Current Use	--	4E-06	3E-06	2E-06	1E-06	3E-06
Kayaker/Canoer – Future Use	--	9E-06	6E-06	4E-06	3E-06	6E-06
Construction Worker	7E-07	4E-07	5E-07	3E-07	3E-07	--
Receptor	**Maximum RME Hazard Index by Receptor and Exposure Area**					
	UPIC	**UBC**	**MBC**	**BCC**	**LBC**	**Reference**
Angler	--	3	2	2	1	1
Crabber	--	0.4	0.4	0.2	0.2	0.1
Crabber (Including Hepatopancreas)	--	0.6	0.5	0.4	0.7	0.3
Kayaker/Canoer – Current Use	--	0.2	0.1	0.06	0.06	0.06
Kayaker/Canoer – Future Use	--	0.4	0.3	0.1	0.1	0.1
Construction Worker	1	0.6	0.5	0.3	0.3	--

Notes: -- = Construction worker only receptor for UPIC. Risks not evaluated in reference sites.

The risk results for each receptor group are discussed below. Next, uncertainties in the assumptions and methodologies in the BHHRA, and their impacts on the risk results, are presented. Last, the overall summary of the risk characterization is presented.

5.1 Anglers

Potential exposure routes for older child and adult anglers at the BCSA were assumed to include ingestion of white perch fillet from a given reach, and exposures at waterway access points via incidental ingestion of and dermal contact with surface sediment (mudflat and marsh), dermal contact with surface water, and inhalation of mercury in ambient air. Potential exposures for the younger child receptor was assumed to include ingestion of white perch fillet only because young children (0 to <6 years of age) are not assumed to participate in fishing at the site. Risks were calculated for UBC, MBC, BCC, and LBC and the reference sites. For the baseline risk estimates, it was assumed that individuals consume perch fillet from the fish that are prevalent at the site (i.e., 150–190 mm size).[46] The risks to anglers consuming larger white perch (i.e., >200 mm in size) and perch sampled predominately in the RI (i.e., 150–190 mm) are discussed in the uncertainty evaluation of this BHHRA (Section 5.6).

RME cumulative lifetime risks for anglers ranged from 1×10^{-5} to 3×10^{-5} in the BCSA, and were 2×10^{-5} at reference sites. The risks for the CTE cases were lower than for RME, ranging from 7×10^{-7} to 2×10^{-6} in the BCSA, and were 9×10^{-7} at reference sites (Table 5-1). Fish ingestion accounted for approximately 80 percent or more of the total excess lifetime cancer risks in all reaches (Table 5-2). Fish consumption risk is due to PCBs. Direct contact with sediment (dermal and incidental ingestion combined) accounted for between 13 and 20 percent of the lifetime cancer risks in all reaches (Table 5-2). Arsenic and benzo[a]pyrene accounted for the majority of the estimated cancer risks from sediment exposures (Table 5-5). PCBs and other PAHs (benz[a]anthracene, benzo[b]fluoranthene, dibenz[a,h]anthracene, indeno[1,2,3-cd]pyrene) were the other COPCs contributing greater than 1 percent of the estimated risks from contact with sediment. Exposure to surface water was not an important exposure pathway, contributing less than 1 percent to the excess lifetime cancer risks for anglers (Table 5-2).

Noncancer HIs for the three age groups evaluated were highest for the younger child. For younger children consuming BCSA fish, cumulative RME noncancer HIs ranged from 1 to 3 in the BCSA and were 1 at reference sites. RME noncancer HIs for the older child and adult anglers ranged from 0.8 to 2. CTE noncancer HIs for anglers did not exceed 1 (Table 5-1). Fish ingestion accounted for 85 percent or more of the noncancer HIs for all pathways combined in both older children and adults. Fish ingestion was the only pathway evaluated for younger children (Table 5-3).

For younger children (i.e., the age group most highly exposed to COPCs on a body weight basis and exhibiting the highest noncancer HIs), endpoint-specific HIs for immunological effects

[46] Perch fillet in the size range of 150–190 mm were evaluated as composites.

(inorganic mercury and PCBs) and dermal (selenium and PCBs) and ocular (PCBs only) effects in UBC, MBC, and BCC exceeded 1—these endpoint-specific HIs are identical to the cumulative HIs for all chemicals reported above. PCBs accounted for approximately 99 percent or greater of each of these endpoint-specific HIs. (Table 5-4, and Exhibit 6 of Attachment M4).

For older child and adult anglers (who consume perch and are also exposed to sediment, surface water and volatiles in air), endpoint-specific HIs for immunological effects (inorganic mercury, PCBs, zinc), dermal effects (arsenic, selenium, and PCBs), and ocular effects (PCBs only) exceeded 1 at UBC only.[47] PCBs and inorganic mercury in perch and sediment accounted for approximately 95 percent and 5 percent of the immunological HI respectively.[48] PCBs in perch and sediment accounted for nearly 100 percent of the dermal and ocular HIs.[49]

Fish consumption cancer risks and hazards are higher in UBC, lower in MBC and BCC, and lowest in LBC. Calculated RME excess lifetime cancer risk from consumption of perch was 3×10^{-5} in UBC, 2×10^{-5} in MBC and BCC, and 1×10^{-5} in LBC. Calculated cancer risk at reference sites was 1×10^{-5}, which equals the calculated risks for LBC. Endpoint-specific noncancer HIs for immunological effects, ocular effects, and dermal effects for the younger child for consumption of perch (the receptor group with the highest exposure per unit of body weight) were 3 in UBC, 2 in MBC and BCC, in 1 in LBC and at reference sites.

This spatial pattern follows the general pattern of COPC distribution in sediment, which shows higher concentrations of COPCs in the upper reaches of the system and lower concentrations at or approaching reference site levels in the lower reaches. The overall spatial trend for fish (perch fillet) consumption risk, however, is less distinct than observed for sediment. The mobility of white perch throughout all BCSA reaches likely contributes to a less distinct spatial pattern of COPC distribution than observed in sediment. Additionally, seasonal movement of perch throughout the larger region likely results in some COPC exposures outside of the BCSA that could dampen site-specific spatial trends and contributions to total body burdens. White perch migrate seasonally throughout the Meadowlands region (Hardy 1978) and white perch sampled in the BCSA are generally between 2 to 3 years of age.[50] Given that mercury and PCBs are prevalent regional contaminants[51], it is likely that some exposure to COPCs outside of the BCSA has occurred. Thus the exposures and risks estimated for anglers consuming perch fillet may not be entirely attributable to COPC exposures in the BCSA. The range of white perch should be considered in determining metrics for long-term monitoring at the BCSA.

[47] See Table 9.1 and 9.2 of Attachment M4, Exhibit 6.
[48] Zinc contributed less than 1 percent to the immunological HI.
[49] Arsenic and selenium contributed less than 1 percent each to the dermal-specific HI.
[50] Refer to Section 3 of Appendix I.
[51] Refer to Appendix J for additional discussion of regional COPC data.

Overall, risks/hazards from the ingestion of perch at reference sites were equivalent to risks/hazards in LBC (Table 5-1 and 5-2) and provide an indication of the level of COPCs potentially present in the general region. An analysis of COPC data indicates that concentrations in the BCSA reference sites are generally similar to, and in some instances lower than, the COPC levels reported in the broader Hackensack Meadowlands region.[52] In the few instances where this is not the case, the distribution of COPC concentrations in the BCSA reference sites has a high degree of overlap with the broader region.

5.2 Crabbers

Potential exposure routes for older child and adult crabbers at the BCSA were assumed to include ingestion of crab tissue, incidental ingestion and dermal contact with sediment, dermal contact with surface water, and inhalation of volatiles in ambient air. Potential exposure in the younger child was assumed to be ingestion of crab tissue only. Risks were calculated by reach. Risks for crabbers were calculated two ways—1) assuming that crabbers eat muscle tissue only, and 2) assuming that crabbers eat muscle and hepatopancreas tissue.

Calculated RME cumulative lifetime risks for crabbers consuming muscle tissue ranged from 2×10^{-6} to 7×10^{-6} in the BCSA, and were 4×10^{-6} at reference sites. For crabbers consuming muscle and hepatopancreas RME cumulative lifetime risks were slightly higher and ranged from 6×10^{-6} to 1×10^{-5} in the BCSA, and were 6×10^{-6} at reference sites. CTE lifetime cancer risks for crabbers under both scenarios did not exceed 1×10^{-6} in any reach (Table 5-1). No RME or CTE HI exceeded 1 for any receptor or reach.

In contrast to anglers, for crabbers consuming muscle the direct exposure to sediment was the dominant exposure route, contributing more than 80 percent to the total calculated excess lifetime cancer risk. Overall, consumption of crab muscle from the BCSA was associated with low risk. RME and CTE cancer risks for consumption of crab muscle were below EPA's acceptable risk range across all BCSA reaches and the reference sites. When hepatopancreas consumption was additionally considered, the calculated crab ingestion risks were at the low end of EPA's acceptable risk range. Risks from dermal contact with surface water contributed minimally to cumulative cancer risks.

Risks from exposure to sediment (dermal and incidental ingestion combined) were greatest in UBC and generally decreased moving to the southern portion of the site. Only sediment risks in UBC (7×10^{-6}) were greater than those in references sites (4×10^{-6}) (Table 5-2). Chemicals contributing to direct contact risk in sediment were arsenic, PAHs, and PCBs.

There was little spatial pattern to the crab tissue risks. Like perch, crab move throughout all BCSA reaches, and this movement likely results in an averaging of exposures across the reaches and a

[52] Refer to Appendix J.

dampening of any apparent differences in COPC exposures within each reach. Additionally, like perch, crab move seasonally throughout the larger region and likely accumulate some COPC tissue burden from exposures outside the BCSA.

5.3 Kayaker/Canoer

Potential exposure routes for kayakers/canoers (older children and adults) in the BCSA were assumed to include incidental ingestion and dermal contact with surface sediment, incidental ingestion and dermal contact with surface water, and inhalation of mercury in ambient air. Risks were calculated by reach. Risks were estimated for this receptor group under assumed current conditions and hypothetical future conditions. The difference in these two scenarios was the exposure frequency—under current conditions kayakers/canoers were assumed to visit the site 18 days/year, whereas under future conditions they were assumed to visit 39 days/year.

For current kayakers/canoers, RME cumulative lifetime risks ranged from 1×10^{-6} to 4×10^{-6} in the BCSA, and were 3×10^{-6} at reference sites. For future kayakers/canoers, RME lifetime risks ranged from 3×10^{-6} to 9×10^{-6} in the BCSA, and were 6×10^{-6} at reference sites. For both scenarios, only risks at UBC exceeded the risks calculated for the reference sites. CTE lifetime cancer risks in all reaches of the BCSA did not exceed 1×10^{-6} (Table 5-1). No cumulative RME and CTE HIs for current and future kayakers/canoers exceeded 1 (Table 5-1).

Direct contact with sediment (through dermal contact and incidental ingestion) was the greatest contributor to risks. Direct contact with sediment accounted for approximately 80 percent or greater of the lifetime cancer risks for current and future kayakers/canoers (Table 5-2). Arsenic, PAHs and PCBs contributed to sediment direct contact risk (Table 5-6). Surface water exposures contributed minimally to overall risks (Table 5-1).

5.4 Construction Workers

Potential exposure routes for construction workers at the BCSA were assumed to include incidental ingestion and dermal contact with sediment (surface and deep), and inhalation of mercury in ambient air. Risks were calculated for waterway and marsh exposure units. As described in Section 3.4, data needed to calculate exposure via inhalation of mercury in air were only available for waterways; therefore, the risk estimates for construction workers in the individual marshes do not include exposure via this pathway. The impact of this data gap on the risk estimates is addressed in the uncertainty evaluation (Section 5.6).

RME and CTE lifetime cancer risks for construction workers did not exceed 1×10^{-6}. Cumulative RME and CTE HIs for construction workers did not exceed 1[53] (Table 5-1).

[53] USEPA (1989) guidance specifies that HIs should be reported to 1 significant figure. When reported to 1 significant digit, there are no HIs for construction workers that exceed 1.

5.5 Receptors Evaluated Qualitatively

As described in Section 3.1, the exposures and risks for a number of receptors were evaluated qualitatively. These include recreational swimmers (future), recreational hikers in marshes (future), and local workers (current/future):

- **Swimmers.** Potential exposure routes for hypothetical future swimmers were assumed to include incidental ingestion and dermal contact with surface water. As agreed with EPA, the frequency and intensity of exposure to surface water for swimmers was assumed to be identical to that of the future kayaker/canoer. These receptors were assumed to visit the site 39 days/year, and to have their entire body immersed in the water for 15 minutes per visit. They were assumed to ingest surface water during the time overboard based on a rate suggested by USEPA (1989) for swimming scenarios. Because these receptors were conceptualized similarly, the risks to recreational swimmers would be approximately equal to the risks for the future kayaker/canoer from contact with surface water. These cumulative risks from all COPCs are less than 1×10^{-6} and the noncancer HIs are less than 1.

- **Future Hikers in the Marsh.** Future hikers were envisioned to spend time hiking in marsh areas on boardwalks or paths constructed as part of future recreational improvements to the BCSA. Exposures would occur through inhalation of volatile chemicals. Concentrations of mercury in air in the marshes are not anticipated to be greater than over the waterways. Similarly, the exposure parameters used to describe the magnitude and frequency of the inhalation exposure for hikers would be equal to or less than the values assumed for quantifying this pathway for recreational receptors. Therefore, risks to future hikers would be equal to or less than the risks to other recreators from exposure to air.

- **Local (Non-construction) Workers.** Local workers were assumed to engage in infrequent, nonintrusive activities in the BCSA. It was assumed that these workers could be exposed to COPCs through direct contact with sediment and surface water, inhalation of mercury in ambient air, and ingestion of fish and/or crabs. These workers would be exposed at a lower or equal intensity, frequency, and duration compared to recreators that use the BCSA. Thus the exposures and risks for these receptors would be equal to, or lower than, those estimated for recreational anglers/crabbers.

- **Construction – Diver.** In 2014, EPA additionally identified the presence of divers completing work around the pilings of the Route 3 Bridge. EPA evaluated this diver scenario and concluded that the resulting exposures were acceptable when considering an 8-hour work day for 6 days a week and up to 1 year.[54]

[54] EPA's evaluation is presented as Exhibit 1 in Attachment M4.

5.6 Uncertainty Evaluation

According to USEPA (1989) guidance, risk characterization should also present information important to interpreting risks in order to place the risk estimates in perspective. There are numerous areas of uncertainty in any risk assessment, and assumptions made in the absence of information are often intentionally conservative. Such assumptions can lead to overestimates of risk. Some uncertainties could also lead to underestimates of risk. Uncertainties exist in each step, including the data collection and analysis, the estimation of potential site exposures, and the toxicity assessment. Table 5-7 summarizes the primary sources of uncertainty in the BHHRA, and describes the impact (both direction and relative magnitude) of each on the risk results. This section discusses the significant sources of uncertainty in this BHHRA. It also discusses explicit sources of uncertainty that EPA requested be addressed.

5.6.1 Exposure Frequency and Duration for Fishing/Crabbing

Based on observations to date, the assumption that fishing and crabbing are undertaken repeatedly by the same individuals under current conditions is likely to overestimate exposure. As described earlier, there is little evidence from the camera data and field crew observations that an individual repeatedly returns to the site to fish or crab over extended periods of time. The observations of occasional and infrequent use under current conditions support an assumption of short-term exposure events rather than an assumption of repeated, long-term use. The BHHRA assumed an exposure frequency of 27 days/year and exposure durations of 8, 12, and 6 years for adults, older children, and younger children respectively. These exposure durations are likely to overestimate risks from the consumption of fish and crab under current conditions.

There is uncertainty regarding the amount of fishing/crabbing that will occur in at the BCSA in the future. Increased promotion of eco-tourism and/or improvement in the regional water quality could result in increased fishing and/or crabbing activity. The presence and continued maintenance of multi-lingual consumption advisory signs posted in 2011 at the most commonly used access points is expected to continue to limit the frequency of fishing or crabbing, or consumption of catch by BCSA recreational users.

5.6.2 White Perch Fillet EPCs

EPCs for white perch fillet were estimated using data from samples collected annually from 2009 to 2015. Using data from a span of 6 years to estimate perch fillet EPCs assumes that the collective data are representative of concentrations of COPCs to which individuals might be exposed. As is the case with any biological tissue sampling, some amount of variability in measured concentrations of COPCs over time exists for BCSA perch fillet. Median concentrations of methyl mercury and PCBs were variable with time throughout BCSA reaches; however, the data do not

show a clear temporal trend.[55] If a subset of the 6 year data set collected for the RI were more representative of COPC concentrations in tissue to which individuals might be exposed, then the risks presented in this BHHRA (based on all sampling years) may be over or under represented.

5.6.3 Consumption of Whole Body Fish

The BHHRA assumed that anglers consume white perch fillet as this is the body part typically consumed by most anglers. There is some potential that anglers at the BCSA could consume whole body fish (e.g., prepared in stew). The potential risks from the consumption of whole body fish are dependent on the frequency and rate of ingestion as well as concentrations of COPCs in whole body fish and the preparation method used. The probability and rate at which individuals consume whole body fish at the BCSA is not known. If consumption rates of whole-body tissue in stew were identical to that calculated for fillet consumption, relative risks between the two exposure scenarios would be proportional to differences in EPC concentrations in whole body compared to fillet.

PCBs were the primary contributor to both cancer risk and noncancer hazard for the consumption of fish fillet. PCBs preferentially distribute and partition to lipid tissue, and the proportion of lipid tissue in whole body perch is greater than in fillet.[56] Table 5-8 compares EPCs for PCBs in whole body and fillet perch. Table 5-9 documents the EPCs for PCBs in whole body fish. PCB EPCs in whole body fish ranged from 2 times to 7 times greater than concentrations in fillet and varied by reach. Whole body samples were not gutted or otherwise processed prior to analysis and, therefore, likely included internal organs and other tissues that may not be consumed (even in a stew). Because PCBs can be present in internal organs at higher concentrations than in muscle, the assumed concentration in this simple assessment may overestimate potential PCB exposures involving more typical consumption patterns of whole body perch (i.e., excluding internal organs).

If the lifetime consumption rate and frequency for whole body fish in stew were equal to that assumed for fillet, anglers consuming whole fish at the BCSA would have 2 to 7 times higher lifetime cancer risks and noncancer hazards compared to anglers who consumed only fillet. However, it is unlikely that individuals frequently consume whole fish from the BCSA.

5.6.4 Large White Perch

Based on data collected throughout the RI, fish within the BCSA are generally small and not likely to be the target of anglers for purposes of sport fishing or consumption. As mentioned earlier, white perch, which are the predominant game fish in the BCSA, typically range from 6 to 8 in. or less and are below "eating size," considered by the NJDFW to be in the range of 10 to 12 in. The BHHRA assumed that anglers consume white perch in this size range (i.e., 150–190 mm in

[55] Refer to Appendix I, Attachment I4 for figures of methyl mercury and PCB concentrations in white perch fillet by sampling year.
[56] Refer to Section 3.2.3 of Appendix I.

length)[57], which is the length of perch that were targeted for collection under the baseline monitoring program. A small number of individual large white perch (i.e., >200 mm in length) were collected in 2014 and 2015 to determine if COPC concentrations were higher in larger perch collected from the study area. PCBs and methyl mercury were COPCs included in this analysis. Table 5-10 presents summary statistics for PCBs and methyl mercury in large and target size white perch fillet. The risks from consumption of fillet of perch in these two size ranges from PCBs and methyl mercury are summarized in Figures 5-5 through 5-7 and presented in Table 14 of Attachment M5. Both cancer and noncancer risks are driven by PCBs.

Overall, risk associated with the consumption of fillet from larger perch is similar to the risks calculated for target size perch. The greatest difference in risks was seen in UBC, where risks from consumption of fillet from large perch was 1.6 times higher than that calculated for smaller perch fillets. Different patterns of higher versus lower concentrations in smaller and larger white perch in the various reaches were found, and this is more likely a function of the uncertainties introduced by the smaller sample size for the individual white perch fillet samples from larger fish (n = 27 for PCBs across the BCSA) compared to the target size composites (n = 227 for PCBs across the BCSA)[58] rather than true differences in PCB concentrations across reaches. In all cases, the magnitude of the differences is not great, and, by extension, the uncertainties introduced into the risk assessment by relying on fillet in the size range of 150–190 mm for the risk estimates is not great.

The lack of significant difference in the risk estimates is due to the fact that PCBs are the primary COPC driving risk calculations, and PCB residues in BCSA fish do not increase with fish size. The analysis of tissue data presented in Appendix I[59] demonstrated that median PCB concentrations in white perch fillet were lower in fillets from large fish compared to smaller fish. In contrast, methyl mercury concentrations were greater in fillets collected from larger white perch. However, because noncancer hazards associated with the ingestion of white perch fillet were driven by PCBs and not methyl mercury, the difference in methyl mercury concentrations in larger fillet compared to smaller fillet did not result in any significant differences in noncancer HIs.

5.6.5 Total PCB Risk: Aroclor versus Congener

Total Aroclors was the analytical measure used to characterize PCB concentrations in the BCSA during the RI and to characterize exposures in all exposure media in the BHHRA. PCBs are composed of a mixture of up to 209 individual congeners. Aroclors are specific mixtures of PCB congeners. Although measurement of PCBs based on Aroclors can be sufficient to characterize the general magnitude of PCBs present in environmental media, there is uncertainty related to estimates of total PCBs concentrations and risks using this measurement. This is because the total

[57] Perch fillet in the size range of 150–190 mm were evaluated as composites.
[58] See Tables 4 and 5 of Attachment M5 for the distribution of PCB samples by reach.
[59] Refer to Section 3.2.5.1 and Figure 3-12 of Appendix I.

PCBs concentration can be underestimated at lower PCB concentrations due to the increased analytical sensitivity (lower detection limits) of individual congener compared to Aroclor methods.

To assess uncertainties introduced into the risk calculations from using total PCBs concentrations based on measurements derived from Aroclor data, individual congeners were also measured in a subset of the perch fillet, blue crab muscle, and hepatopancreas samples. Table 5-11 presents summary statistics for total Aroclors and total congeners by tissue type. Cancer risks and noncancer hazard for total PCBs based on the two analytical methods were compared.

For the consumption of white perch fillet, EPCs[60] and resulting risks (cancer and noncancer) from PCBs were between 1.5 and 2.3 times greater when calculated based on PCB congener data compared to those calculated using PCB Aroclor data (Figures 5-8 and 5-9).[61] The risk associated with crab consumption was up to 19 times greater when calculated based on congener data compared to that calculated using PCB Aroclor data (Tables 23 and 24 of Attachment M5), but in all cases, the risks were lower than those calculated for consumption of perch fillet.

Overall, PCB cancer risks associated with white perch fillet are approximately twice as high when calculated using total congener data compared to that calculated using total Aroclor data.

5.6.6 Dioxins and Furans

Dioxins and furans are a regional contaminant within the Hackensack River Meadowlands and the broader Newark Bay region, (USFWS 2005) and are present in BCSA sediment and in the tissue of white perch and blue crab. An analysis of dioxin and furan data in the BCSA sediment suggests that the source of these compounds in the BCSA is sediment input from the Hackensack River[62], and for these reasons, dioxins and furans were not selected as site COPCs. Their presence in the BCSA, nonetheless, does contribute to total cumulative risk within the BCSA.

To place into perspective the risks within the BCSA contributed by regional contaminants, toxicity equivalence (TEQ) risks for RME scenarios were calculated for dioxins and furans (TEQ_{df}) and PCBs (TEQ_p) based on toxic equivalency relative to 2,3,7,8-TCDD as described in detail in Attachment M5.

Ingestion of tissue by anglers and crabbers was the predominant pathway for TEQ risks. Figures 5-10 and 5-11 summarize lifetime cancer risks and noncancer hazards for anglers and crabbers by reach for the ingestion of tissue for TEQ_{df}, and TEQ_p (see also Tables 15 through 21 of Attachment M5). These risks are shown alongside the tissue ingestion risks for PCBs as the sum

[60] This relationship holds for mean concentrations as well, and is not, therefore, a consequence of higher EPCs based on higher UCLs that could results from the smaller sample size available for the congener data set.
[61] Refer to Attachment M5, Table 22. The younger child was the age group for anglers with the greatest exposure and risk.
[62] Refer to Attachment F4 of Appendix F.

of Aroclors, and PCBs as the sum of congeners to provide context about the relative risks of dioxins and furans compared to PCBs and the corresponding spatial trends.

In UBC and MBC, cancer risks and noncancer hazards due to TEQ_p were greater than risks due to TEQ_{df}, whereas in the lower reaches of the BCSA including BCC and LBC, the risks from TEQ_{df} were greater than risks from TEQ_p. Across all reaches, the highest calculated cancer risks for TEQ_{df} were for the consumption of perch fillet in BCC, where the excess lifetime cancer risks are slightly above 1×10^{-4}. Similarly, the highest noncancer TEQ HIs occur in BCC. TEQ_{df} excess cancer risks and noncancer hazards from perch at reference sites were 3×10^{-5} and 1, respectively (Table 15 of Attachment M5), demonstrating a regional conditions contribution to the estimated TEQ risk/hazard in the BCSA.

Overall, exposure to dioxins and furans add to the risks calculated for BCSA COPCs. Risks for TEQ_{df} do not follow the same spatial pattern as PCBs. Risks for TEQ_{df} in tissue were highest in BCC, followed by LBC, and then UBC and MBC; whereas, risks for PCBs in tissue were highest in UBC, and decreased as one moves south through the BCSA.

5.6.7 Regional Contributions

In addition to regional contributions of dioxin and furans, the collective data provide some evidence that contributions from the broader region are a potential source of other COPCs in the BCSA. This is due to both COPC input from the region to the BCSA lower reaches and local and seasonal movement of perch and crab into and outside of the BCSA. As discussed more fully in the RI[63], COPCs that are detected in the BCSA are also prevalent in the waterways throughout the region. Further, surface sediment COPC concentrations in the southern portion of MBC, BCC, and, in particular, LBC are approaching the concentrations measured in reference site sediments, consistent with the daily exchange of these reaches with the Hackensack River estuary and the ongoing deposition of estuarine sediment within the BCSA.[64] Additionally, the spatial pattern to COPC distribution in fish and crab indicate regional contributions. In fact, the median PCB levels in white perch in MBC and BCC are very similar to those in the BCSA reference sites, and those in LBC are lower (refer to Graphic 3 presented earlier). The importance of regional contributions to overall COPC distribution and risk will be a factor to consider in evaluating potential remedy effectiveness and in designing long-term monitoring programs.

5.6.8 Protective Effects of Selenium

A growing body of evidence indicates mercury toxicity is directly related to its highly specific and irreversible binding to selenium-dependent enzymes (selenoenzymes), which among other things, are important for protecting the body against certain types of toxicity within the nervous system

[63] Refer to Section 5 of the RI Report and Appendix J.
[64] Refer to Section 6.5.4 of the RI Report.

(Ralston and Raymond 2010). Supplemental selenium in the diet of animals has been shown to reduce mercury toxicity (Dang and Wang 2011; Ralston and Raymond 2010; Agarwal et al. 2010; Branco et al. 2012). According to Ralston and Raymond (2010) protective levels of selenium in humans typically begin when the dietary molar ratio favors selenium (i.e., selenium: mercury ratio of >1:1). Selenium to mercury ratios greater than 1 are present in all BCSA perch fillet (Figure 5-12).

Calculated noncancer HIs associated with methyl mercury in white perch fillet were well below 1 (i.e., maximum HI = 0.17 at UBC [Table 5-4]). However, the low HIs presented in this BHHRA could be overestimated due to the presence of selenium:mercury ratios greater than 1 in tissue, based on the literature demonstrating that selenium provides protective effects against mercury toxicity.

5.6.9 Cooking Loss

Another uncertainty in estimating exposure from the ingestion of tissue is related to the loss factor assumed for preparation and cooking. For the RME scenarios evaluated in the BHHRA, a cooking loss term of 0 percent (no loss) was conservatively assumed for PCBs. For the CTE evaluation, cooking loss terms of 30 and 20 percent were assumed for white perch fillet and crab tissue, respectively (Attachment M3).

It is well recognized that tissue preparation and cooking methods used may reduce chemical concentrations in fish tissues, particularly for lipophilic compounds such as PCBs (USEPA 2000, 2002b; Wilson et al. 1998). Because PCBs are lipid soluble, removing the fat prior to consuming the fish will reduce PCB exposure. U.S. Food and Drug Administration (FDA 2013) and various fishing advisories recommend that food preparation methods that remove fat, such as trimming fat and cooking fish, be used to reduce potential exposures to PCBs in tissue. Information on the specific cooking techniques that remove the largest amount of PCBs is not known; however, it is thought that those that allow for the fat to be separated or drained from the tissue are likely to reduce exposure the most. There is some uncertainty, however, regarding the precise amount of chemical-specific reduction that occurs.

A meta-analysis published by AECOM (2012) reviewed the available data on cooking loss for lipophilic compounds. Studies completed in a variety of tissue types and applying a range of preparation and cooking methods were reviewed, and those with sufficient data for quantitative analysis were used to determine the range and midpoint of cooking loss for PCBs. The analysis focused on studies that used a relevant and appropriate experimental method and presented changes in raw and cooked fish tissue COPC levels on a mass basis because a comparison of concentrations in raw and cooked fish alone neglects the change in tissue mass that occurs with cooking, which is often significant. The median losses were generally in the range of 20 to 50 percent for typical cooking methods and consistent differences in mass loss between cooking methods were not apparent. Across all tissue types and cooking methods, the median losses were

32 percent for PCBs. The results of this meta-analysis suggest that the RME risks and hazards presented in the BHHRA, which relied on a loss of 0, are conservative. If, as suggested by the literature, cooking practices that can reduce PCB concentrations are followed by anglers, then cancer risks and noncancer hazards from PCBs in tissue could be overestimated by 20 to 50 percent.

5.6.10 Sediment EPCs for Recreators

The selection of sediment data that were used in the calculation of EPCs for receptors is another source of uncertainty in the BHHRA. As described in Section 3.4, for recreators, data from sediment locations in proximity to human use or access points were used for estimating EPCs. To analyze the impact that the data selection step had on the risk results, EPCs for all surface sediment from the mudflat and marshes were estimated, and compared to the EPCs used for estimating risks to these receptors in the BHHRA. Table 5-12 presents a comparison of these EPCs in sediment for the risk driving chemicals in sediment—arsenic and benzo[a]pyrene. Table 5-13 presents the basis and resulting EPCs for all surface sediment from the mudflat and marshes for all COPCs. As can be seen in Table 5-12, the EPCs for arsenic and benzo[a]pyrene calculated from all marsh and mudflat surface sediment varied to some degree from those calculated for anglers/crabbers and kayakers/canoers based on selected sediment locations. No consistent bias in the direction of the EPCs was observed. In the majority of cases, the EPCs estimated for the recreator populations based on sediment data collected near human use or access points were higher (i.e., more conservative) than those based on the broader set of surface sediment samples. In a few instances (i.e., for crabbers/anglers—arsenic at BCC and LBC, and for kayakers/canoers—arsenic at LBC), the EPCs estimated for the recreator populations were lower (i.e., less conservative) than those based on all marsh and mudflat surface sediment. The magnitude and cumulative effect of the differences on the risk estimates, however, is not significant, and the choice of sediment locations to estimate exposures for recreator populations is not a significant source of uncertainty in the BHHRA.

5.6.11 Sediment EPCs for Construction Workers

Sediment EPCs for construction workers were calculated using depth-weighted average concentrations from the high/low-resolution coring locations where available, and using depth-weighted average concentrations from surface sediment (0–15 cm) only for COPCs for which no deeper sediment was available. The impact of this data selection step on the results of the BHHRA was explored by comparing the RME baseline risks to risks based on depth-weighted average concentrations from all shallow and deep sediment samples. Summaries of the resulting estimates of risk from exposure to marsh and waterway sediment are provided in Tables 5-14 and 5-15, respectively.

For waterways, the resulting baseline risks using the defined subset of the sediment data were greater than the risks calculated based on all sediment data. In contrast, for marshes, the resulting

risks using all sediment data were generally higher compared to risks estimated using only the defined subset of the sediment data. The calculated HI from contact with sediment exceeded 1 in three marshes—UPIC, Walden Swamp, and Ackerman's East Marsh—when all of the data were used. At UPIC, no endpoint-specific HIs exceeded 1. At Ackerman's East Marsh and Walden Swamp, endpoint-specific HIs exceeded 1 due to elevated levels of thallium in surface sediment:

- UPIC—The maximum concentration of thallium in surface sediment was 101 mg/kg (J), and the next highest concentration was 3.8 mg/kg. When all data were considered, this maximum concentration of 101 mg/kg became the EPC with which risks were estimated.

- Walden Swamp—Several elevated concentrations of thallium in the surface sediment resulted in an estimated EPC of 33 mg/kg. This EPC is significantly greater than the EPC of 5.7 mg/kg based on the subset of sediment data considered for estimating risks to construction workers in the baseline risk assessment.

The few samples containing elevated concentrations of thallium drive the EPC for thallium upwards based on all available data; however, these samples do not represent an average concentration to which construction workers would likely be exposed over time. Based on this analysis, the choice of the sediment data selected for evaluating exposures and risks to construction workers is not believed to introduce a significant amount of uncertainty into the risk assessment.

5.7 Summary

Exposures and risks were quantified for three potential receptor groups: anglers/crabbers, kayakers/canoers, and construction workers. Local workers and future recreators were evaluated qualitatively based on the results of the quantitative assessment. The exposure media evaluated included tissue (i.e., fish, crab), sediment, surface water, and ambient air. For each exposure group the BHHRA evaluated the potential exposure to COPCs and the possibility that adverse effects could occur as a result of assumed long-term exposures to these media. The parameters used for evaluating potential exposures and risks relied on multiple conservative assumptions, which enhance the likelihood that assumed exposures and associated calculated risks are overestimated. To provide perspective to the results, risks from reference sites were also presented.

For all receptor groups, calculated RME excess lifetime cancer risks across all exposure pathways fall within or below EPA's acceptable risk range and are between 9×10^{-8} and 3×10^{-5}. HIs range from less than 1 to 3. Cancer risks and hazards are greatest for anglers. No CTE lifetime cancer risks or HIs for the individual exposure pathways exceeded 1×10^{-6} or 1, respectively.

Total excess lifetime cancer risks in anglers are due primarily to the consumption of recreationally caught fish, though direct contact with sediment contributes between 13 and 20 percent of the total

cancer risks.[65] RME cancer risks for fish consumption range from 1×10^{-5} to 3×10^{-5}. Fish consumption cancer risk is due to PCBs. Angler noncancer hazards for fish consumption range from 1 to 3 and are also due primarily to PCBs, with some contribution from mercury. On an endpoint-specific basis, PCBs are the predominant contributor to the fish consumption HQ, with a minor contribution from inorganic mercury (for immunological endpoints).

Angler cancer risks and hazards for fish consumption are higher in UBC, lower in MBC and BCC, and lowest in LBC. Cancer risks and hazards in LBC are equal to reference site levels. The spatial pattern in COPC concentrations is less distinct than observed in sediment, potentially due to perch movement across and outside the study area. White perch migrate seasonally throughout the Meadowlands region, and it is likely that some exposure to and bioaccumulation of COPCs from outside of the BCSA has occurred. Thus the exposures and risks estimated for anglers consuming white perch fillet may not be entirely attributable to the BCSA. The range of white perch should be considered in determining metrics for long-term monitoring at the BCSA.

Estimated RME excess lifetime cancer risks from consumption of crab muscle plus hepatopancreas are on the order of 1×10^{-6} (the lower end of EPA's acceptable cancer risk range). CTE cancer risks are less than 1×10^{-6}. Also, RME and CTE lifetime cancer risks to crabbers consuming only muscle are below 1×10^{-6}. Estimated RME and CTE noncancer HIs for the consumption of crab (muscle only and muscle plus hepatopancreas) are less than 1. PCBs account for 100 percent of the risks from consumption of crab. Unlike consumption of perch fillet, risks for this pathway do not follow a spatial trend. As is the case for white perch, crab migrate seasonally and it is likely that some exposure outside of the BCSA has occurred.

Estimated RME excess lifetime cancer risks from recreational contact (under current and future use assumptions) with mudflat and marsh sediment immediately surrounding access points and in mudflats, also are on the order of 1×10^{-6} (the lower end of EPA's acceptable cancer risk range). Direct contact risk for sediment exposures are due primarily to arsenic, PAHs, and PCBs. A spatial trend is apparent for risks from direct contact with sediment (with risks in the north being the greatest and decreasing moving south).

Exposure to deeper sediment in waterways and marshes (through construction activity) does not result in cancer risk exceeding 1×10^{-6}, or HIs exceeding 1.[66] Likewise, exposures to COPCs in surface water or mercury in ambient air does not contribute significantly to estimated risks.

Changes in exposures under hypothetical future land use conditions are not expected to result in additional risks or hazards.

[65]Refer to Section 5 of the report for discussion of COPC-specific contribution.
[66] USEPA (1989) guidance specifies that HIs should be reported to 1 significant figure. When reported to 1 significant digit, there are no HIs for construction workers that exceed 1.

The risk assessment process is designed to yield conservative estimates of risk. When considered collectively, the uncertainties present in the risk assessment should not affect the ability of the risk assessment to support risk management decisions concerning the site.

SECTION 6

SUMMARY OF RESULTS TO INFORM RISK MANAGEMENT

USEPA (1989) describes a human health risk assessment as a quantitative evaluation of the risk posed to human health by the actual or potential presence of chemicals in the environment. A risk assessment provides a conservative estimate of the likelihood of potential health effects in a specific hypothetical population that conforms to stated exposure assumptions. The results of the risk assessment are intended to help determine when remedial action is needed; determine health-protective levels of chemicals that may remain after remedial actions are completed; provide a basis for comparing the health impacts of remedial alternatives; and provide a consistent process for documenting risks (USEPA 1989).

For this BHHRA, risks were characterized for recreational and worker populations. The exposure media evaluated in the assessment were fish, crabs, sediment, surface water, and volatiles in air. For each exposure group, the BHHRA evaluated the potential exposure to COPCs and the possibility that adverse effects could occur as a result of assumed long-term exposures to these media. The parameters used for evaluating potential exposures and risks relied on multiple conservative assumptions, which enhance the likelihood that assumed exposures and associated calculated risks are overestimated. To provide perspective to the results, risks at reference sites were also presented.

The key findings of the BHHRA for the BCSA are as follows:

- For all receptor groups, calculated RME excess lifetime cancer risks across all exposure pathways fall within or below EPA's acceptable risk range and are between 9×10^{-8} and 3×10^{-5}. HIs range from less than 1 to 3. No CTE lifetime cancer risks or HIs for the individual exposure pathways exceed 1×10^{-6} or 1, respectively.

- Calculated RME cancer risks and hazards are highest for anglers, due primarily to the consumption of recreationally caught fish, though direct contact with sediment contributes between 13 and 20 percent of the total cancer risks.

- Fish consumption cancer risk is due to PCBs; direct contact cancer risk is due to arsenic, PAHs, and PCBs. Angler noncancer hazard is also due primarily to PCBs, with a minor contribution from mercury.

- Fish consumption risks are higher in UBC, lower in MBC and BCC, and lowest in LBC, following the pattern of COPC concentrations in white perch. In contrast to the strong spatial patterns observed in surface water and sediment, differences in perch COPC

concentrations across reaches are small, likely due in part to local and seasonal movement of perch across and outside of the study area.

- Exposure to deeper sediment in waterways and marshes (through construction activity) does not result in risks exceeding the lower end of EPA's acceptable cancer risk range or HIs exceeding 1.[67]

- Exposures to COPCs in surface water and mercury in ambient air does not contribute significantly to estimated risks.

- Risks from dioxins and furans contribute to overall site risks. Differences in the spatial gradient of risks attributable to dioxins and furans indicate that dioxins and furans are from a regional source independent of the BCSA.

- Regional contribution of other COPCs, especially associated with sediment in the lower reaches of the BCSA and in mobile perch and crab that move in/out of the BCSA, also is occurring and is a relevant consideration in risk management.

- When considered collectively, the uncertainties present in the risk assessment should not affect the ability of the risk assessment to support risk management decisions.

- Future use upper end uncertainties are limited by low accessibility of the tidal area, limits on land use adjacent to the tidal area, and the provisions of the Master Plan for the Meadowlands District that apply to the BCSA.

- Site-specific factors contribute to reducing the magnitude of site risks. These include physical constraints on site access posed by dense stands of *Phragmites* and the very soft mudflats along the sides of the waterways, as well as an ever-present combination of geochemical conditions and processes that reduce COPC bioavailability and uptake.

[67] USEPA (1989) guidance specifies that HIs should be reported to 1 significant figure. When reported to 1 significant digit, there are no HIs for construction workers that exceed 1.

SECTION 7

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TABLES

Table 3-1. Receptors and Exposure Pathways
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 1

Scenario Timeframe	Medium [a]	Exposure Medium [b]	Exposure Point [c]	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future	Sediment	Sediment	Surface sediment (0–15 cm) Marsh and mudflat at access points, all reaches	Angler/ Crabber	Adult Older child (6 to <18)	Ingestion	Quantitative	Recreational users may incidentally ingest particles of bank or nearshore sediment while fishing or crabbing. Contact with bank/nearshore sediment less likely in BCC (which has less exposed shoreline) and in UBC, where recreational use is less likely due to shallow waters, compared to other study segments. Contact with marsh sediment may occur while they are walking to waterway access point.
						Dermal contact	Quantitative	Recreational users may come into contact with bank or nearshore sediment while fishing or crabbing. Contact with marsh sediment may occur while they are walking to waterway access point.
			Surface sediment (0–15 cm) Marsh at access points & all mudflats, all reaches	Kayaker/ Canoer	Adult Older child (6 to <18)	Ingestion	Quantitative	Kayakers and canoers may incidentally ingest particles of nearshore sediment while recreating in the area. Contact with nearshore sediment less likely in BCC and UBC for reasons noted above. Contact with marsh sediment may occur while they are walking to waterway access point.
						Dermal contact	Quantitative	Kayakers and canoers may come into contact with nearshore sediment while recreating. Contact with mudflat sediment less likely in BCC and UBC for reasons noted above. Contact with marsh sediment may occur while they are walking to waterway access point.
			Surface sediment (0–15 cm) Marsh and mudflat at access points, all reaches	Local worker	Adult	Ingestion	Qualitative	Local workers may incidentally ingest particles of bank or nearshore sediment while fishing or crabbing. Contact with marsh sediment may occur while they are walking to waterway access point. Adult angler/crabber sediment ingestion will serve as a surrogate for this receptor group.
						Dermal contact	Qualitative	Local workers may come into contact with bank or nearshore sediment while fishing or crabbing. Contact with marsh sediment may occur while they are walking to waterway access point. Adult angler/crabber sediment dermal contact will serve as a surrogate for this receptor group.
			Waterway and marsh sediment, all depths, all reaches	Construction worker	Adult	Ingestion	Quantitative	Workers may be involved in construction or maintenance activities that result in direct contact with waterway and marsh sediment.
						Dermal contact	Quantitative	Workers may be involved in construction or maintenance activities that result in direct contact with waterway and marsh sediment.

Table 3-1. Receptors and Exposure Pathways
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 1

Scenario Timeframe	Medium [a]	Exposure Medium [b]	Exposure Point [c]	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future	Surface water	Surface water	Surface water, waterways, all reaches	Angler/ Crabber	Adult Older child (6 to <18)	Dermal contact	Quantitative	Recreational users may contact surface water while fishing or crabbing.
				Kayaker/ Canoer	Adult Older child (6 to <18)	Dermal contact	Quantitative	Overboard kayakers/canoers will be exposed via dermal contact with surface water.
						Ingestion	Quantitative	Overboard kayakers/canoers may ingest limited surface water incidentally. Potential ingestion will likely be minimal because the exposure will be infrequent and of short duration.
				Local worker	Adult	Dermal contact	Qualitative	Local workers may come into contact with surface water while fishing or crabbing. Adult angler/crabber surface water dermal contact will serve as a surrogate for this receptor group.
				Construction worker	Adult	Dermal contact	Qualitative	Construction workers may come into contact with surface water. Potential contact will likely be minimal because the exposure will be infrequent and of short duration.
		Ambient air	Ambient air - Mercury vapor, waterways, all reaches	Angler/ Crabber	Adult Older child (6 to <18)	Inhalation	Quantitative	Receptors could inhale volatiles released to ambient air from surface water.
				Kayaker/ Canoer	Adult Older child (6 to <18)	Inhalation	Quantitative	Kayakers and canoers could inhale volatiles released to ambient air from surface water.
				Local and construction worker	Adult	Inhalation	Quantitative	Workers could inhale volatiles released to ambient air from surface water.
	Surface water & sediment	Fish	Finfish - Fillets, Shellfish - Blue crab, waterways, all reaches	Angler/ Crabber	Adult Older child (6 to <18) Younger child (0 to <6)	Ingestion	Quantitative	Recreational anglers may consume some portion of catch. This exposure could occur in all study segments; however, the species caught and consumed could vary given the variable salinity conditions throughout BCSA which could affect species presence and abundance. Adult anglers are assumed to bring home catch for a younger child to consume.
	Surface water & sediment	Shellfish	Finfish - Fillets, Shellfish - Blue crab, waterways, all reaches	Local worker	Adult	Ingestion	Qualitative	Local workers who fish are expected to consume some portion of catch. This exposure could occur in all study segments; however, the species caught and consumed could vary given the variable salinity conditions throughout BCSA which could affect species presence and abundance. Adult recreational fish ingestion exposure will serve as surrogate for this receptor group.

Table 3-1. Receptors and Exposure Pathways
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 1

Scenario Timeframe	Medium [a]	Exposure Medium [b]	Exposure Point [c]	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future Only	Surface water	Surface water	Surface water, waterways, all reaches	Swimmer	Adult Older child (6 to <18)	Dermal contact Ingestion	Qualitative	Swimming not a current recreational activity in BCSA waterways. Future exposures will be evaluated qualitatively based on the current use Kayaker/Canoer exposure.
		Ambient air	Ambient air - Mercury vapor, waterways, all reaches	Swimmer	Adult Older child (6 to <18)	Inhalation	Qualitative	Swimming not a current recreational activity in BCSA waterways. Future exposures will be evaluated qualitatively based on the current use Kayaker/Canoer exposure.
				Hiker in marsh	Adult Older child (6 to <18)	Inhalation	Qualitative	Future recreational improvements to BCSA could allow receptors to enter portions of the marsh beyond the existing waterway access areas evaluated for recreational receptor groups under the current land use scenarios. Future exposures will be evaluated qualitatively based on the current use evaluation.
	Sediment	Sediment	Surface sediment (0–15 cm) Mudflat at waterway access points, all reaches	Swimmer	Adult Older child (6 to <18)	Dermal contact Ingestion	Qualitative	Swimming not a current recreational activity in BCSA waterways. Future exposures will be evaluated qualitatively based on the current use Kayaker/Canoer exposure.
			Surface sediment (0–15 cm) Marsh at waterway access points, all reaches	Swimmer	Adult Older child (6 to <18)	Dermal contact Ingestion	Qualitative	Swimming not a current recreational activity in BCSA waterways. Future exposures will be evaluated qualitatively based on the current use Kayaker/Canoer exposure.
			Surface sediment (0–15 cm) Marsh at future recreational area	Hiker in marsh	Adult Older child (6 to <18)	Dermal contact Ingestion	Qualitative	Future recreational improvements to BCSA could allow receptors to contact marsh sediment beyond the existing waterway access areas evaluated for recreational receptor groups under the current land use scenarios. Future exposures will be evaluated qualitatively based on the current use evaluation.

Notes:
BCC = Berry's Creek Canal
BCSA = Berry's Creek Study Area
EPA = U.S. Environmental Protection Agency
RAGS = Risk Assessment Guidance for Superfund
UBC = Upper Berry's Creek

[a] Defined by EPA as the substance that is a potential source of contaminants in the exposure medium (the medium will sometimes equal the exposure medium) (USEPA 2001). Herein equal to the source medium.
[b] Defined by EPA as the contaminated environmental medium to which an individual may be exposed. This includes the transfer of contaminants from one medium to another (USEPA 2001).
[c] Defined by EPA as an exact location of potential contact between a person and a chemical within an exposure medium (USEPA 2001).

Source:
USEPA (2001)

Table 3-2. Chemicals of Potential Concern by Media

Chemical	Construction Worker	Recreator		
	Sediment (All Depths)	Surface Sediment	Surface Water	Tissue
Metals				
Aluminum	X	--	--	--
Antimony	X	X	--	X
Arsenic	X	X	X	--
Cadmium	X	X	--	--
Chromium (VI)	X	X	--	--
Cobalt	X	X	--	--
Copper	X	X	--	X
Iron	X	X	--	X
Manganese	X	X	--	X
Mercury [a]	X	X	--	X
Nickel	X	X	--	--
Selenium	--	--	--	X
Thallium	X	X	X	--
Vanadium	X	--	--	--
Zinc	X	X	--	--
Organometals				
Methyl mercury	--	--	--	X
PAHs				
Benz[a]anthracene	--	X	--	--
Benzo[a]pyrene	X	X	X	--
Benzo[b]fluoranthene	--	X	--	--
Dibenz[a,h]anthracene	X	X	X	--
Indeno[1,2,3-cd]pyrene	--	X	--	--
Pesticides				
Aldrin	X	X	--	--
Heptachlor	X	--	--	--
Heptachlor epoxide	X	X	--	--
PCBs				
PCBs (total Aroclors)	X	X	--	X
Volatiles				
Trichloroethene	X	--	--	--
Vinyl chloride	--	--	X	--
Total	***21***	***20***	***5***	***8***

Notes:

COPC = chemical of potential concern

PAH = polycylic aromatic hydrocarbon

PCB = polychlorinated biphenyl

-- = not selected as COPC for this media and receptor

[a] Also selected as COPC in air.

Table 3-3. Summary of Exposure Point Concentrations for Waterway Sediment, Tissue, Surface Water, and Air

Media	Chemical Class	COPC	Units	EPC					
				UPIC	UBC	MBC	BCC	LBC	Reference Sites
Surface Sediment (0–15 cm) Marsh and Mudflat at Access Points	Metals	Antimony	mg/kg	NA	1.3	1.2	1.8	1.8	5.7
		Arsenic	mg/kg	NA	50	19	12	15	34
		Cadmium	mg/kg	NA	34	3.5	2.1	1.8	3
		Chromium (VI)	mg/kg	NA	NA	NA	NA	NA	NA
		Cobalt	mg/kg	NA	15	19	11	13	24
		Copper	mg/kg	NA	350	130	120	110	330
		Iron	mg/kg	NA	29,000	35,000	31,000	36,000	29,000
		Manganese	mg/kg	NA	2,600	8,800	380	510	1,700
		Mercury	mg/kg	NA	280	24	13	4.6	3.3
		Nickel	mg/kg	NA	88	55	39	45	110
		Thallium	mg/kg	NA	3.1	10	3.4	1.7	1.9
		Zinc	mg/kg	NA	3,100	520	330	290	450
	PAHs	Benz[a]anthracene	mg/kg	NA	1.2	1.1	1.4	0.6	1.3
		Benzo[a]pyrene	mg/kg	NA	1.8	1.1	1.4	0.7	1.2
		Benzo[b]fluoranthene	mg/kg	NA	2.3	1.5	2	0.9	1.6
		Dibenz[a,h]anthracene	mg/kg	NA	0.68	0.37	0.55	0.17	0.29
		Indeno[1,2,3-cd]pyrene	mg/kg	NA	1.3	0.82	0.95	0.52	0.76
	Pesticides	Aldrin	mg/kg	NA	0.027	0.046	0.01	0.004	0.0042
		Heptachlor epoxide	mg/kg	NA	0.12	0.016	0.0071	0.0016	0.026
	PCBs	PCBs (total Aroclors)	mg/kg	NA	6.2	1.6	0.82	0.42	1.1
Surface Sediment (0–15 cm) Marsh at Access Points & All Mudflats	Metals	Antimony	mg/kg	NA	1.2	1.1	4.3	2.5	5.6
		Arsenic	mg/kg	NA	45	18	17	15	34
		Cadmium	mg/kg	NA	30	3.5	1.9	1.8	3
		Chromium (VI)	mg/kg	NA	NA	NA	NA	NA	NA
		Cobalt	mg/kg	NA	15	16	9.9	13	24
		Copper	mg/kg	NA	330	130	110	110	330
		Iron	mg/kg	NA	29,000	34,000	27,000	36,000	29,000
		Manganese	mg/kg	NA	2,100	6,600	380	490	1,700
		Mercury	mg/kg	NA	260	21	8.4	6.7	3.3
		Nickel	mg/kg	NA	81	50	37	42	110
		Thallium	mg/kg	NA	2.7	7.6	3.4	1.6	1.9
		Zinc	mg/kg	NA	2,700	500	310	290	450

Table 3-3. Summary of Exposure Point Concentrations for Waterway Sediment, Tissue, Surface Water, and Air

Media	Chemical Class	COPC	Units	EPC					
				UPIC	UBC	MBC	BCC	LBC	Reference Sites
Surface Sediment (0–15 cm) Marsh at Access Points & All Mudflats [cont.]	PAHs	Benz[a]anthracene	mg/kg	NA	1	0.94	1	0.61	1.3
		Benzo[a]pyrene	mg/kg	NA	1.5	1.4	0.81	0.66	1.2
		Benzo[b]fluoranthene	mg/kg	NA	1.5	1.4	1.1	0.86	1.6
		Dibenz[a,h]anthracene	mg/kg	NA	0.53	0.39	0.27	0.15	0.29
		Indeno[1,2,3-cd]pyrene	mg/kg	NA	1.1	0.78	0.52	0.49	0.76
	Pesticides	Aldrin	mg/kg	NA	0.041	0.014	0.0063	0.0038	0.0041
		Heptachlor epoxide	mg/kg	NA	0.087	0.014	0.0051	0.001	0.026
	PCBs	PCBs (total Aroclors)	mg/kg	NA	5.7	1.4	0.59	0.52	1.1
Surface and Deep Waterway Sediment[a]	Metals	Aluminum	mg/kg	16,000	11,000	15,000	14,000	14,000	NA
		Antimony	mg/kg	2.2	2.5	1.6	1.9	1.1	NA
		Arsenic	mg/kg	61	37	20	23	24	NA
		Cadmium	mg/kg	130	21	6.6	11	6.6	NA
		Chromium (VI)	mg/kg	NA	NA	3.8	NA	NA	NA
		Cobalt	mg/kg	19	12	14	13	16	NA
		Copper	mg/kg	2,700	390	160	210	150	NA
		Iron	mg/kg	34,000	26,000	37,000	38,000	45,000	NA
		Manganese	mg/kg	680	780	1,200	560	640	NA
		Mercury	mg/kg	280	200	70	27	12	NA
		Nickel	mg/kg	430	72	43	58	56	NA
		Thallium	mg/kg	3.8	2.4	1.4	2.8	2.3	NA
		Vanadium	mg/kg	61	41	39	48	47	NA
		Zinc	mg/kg	3,500	2,100	840	710	410	NA
	PAHs	Benzo[a]pyrene	mg/kg	1.2	1	2.2	1.2	1.4	NA
		Dibenz[a,h]anthracene	mg/kg	0.36	0.21	0.35	0.21	0.16	NA
	Pesticides	Aldrin	mg/kg	0.05	0.063	0.047	0.027	0.0089	NA
		Heptachlor	mg/kg	0.029	0.018	0.0047	NA	0.0011	NA
		Heptachlor epoxide	mg/kg	0.11	0.077	0.011	0.02	0.0015	NA
	PCBs	PCBs (total Aroclors)	mg/kg	11	3.6	8.6	2.5	0.89	NA
	Volatiles	Trichloroethene	mg/kg	27	0.0015	0.0012	NA	NA	NA
White Perch Fillet	Metals	Antimony	mg/kg	NA	NA	NA	0.47	NA	NA
		Copper	mg/kg	NA	1.8	1.3	1.2	1.1	NA
		Iron	mg/kg	NA	16	11	13	9	NA
		Manganese	mg/kg	NA	0.5	0.53	0.69	0.59	NA
		Mercury (inorganic)	mg/kg	NA	0.10	0.21	0.12	0.14	0.045
		Selenium	mg/kg	NA	0.79	0.84	0.95	0.75	0.82
	Organometals	Methyl mercury	mg/kg	NA	0.48	0.41	0.39	0.34	0.26
	PCBs	PCBs (total Aroclors)	mg/kg	NA	1.5	1.2	1.2	0.64	0.66

Table 3-3. Summary of Exposure Point Concentrations for Waterway Sediment, Tissue, Surface Water, and Air

Media	Chemical Class	COPC	Units	EPC					
				UPIC	UBC	MBC	BCC	LBC	Reference Sites
Blue Crab Muscle	Metals	Antimony	mg/kg	NA	NA	NA	NA	NA	NA
		Copper	mg/kg	NA	14	16	14	20	NA
		Iron	mg/kg	NA	11	34	18	260	NA
		Manganese	mg/kg	NA	35	62	13	6	NA
		Mercury (inorganic)	mg/kg	NA	0.01	0.14	0.052	0.079	0.02
		Selenium	mg/kg	NA	1	1.5	0.91	1.5	NA
	Organometals	Methyl mercury	mg/kg	NA	0.26	0.28	0.26	0.24	0.21
	PCBs	PCBs (total Aroclors)	mg/kg	NA	0.013	0.04	0.011	0.019	0.0059
Blue Crab Muscle + Hepatopancreas	Metals	Antimony	mg/kg	NA	NA	NA	NA	NA	NA
		Copper	mg/kg	NA	14	16	14	20	NA
		Iron	mg/kg	NA	11	34	18	260	NA
		Manganese	mg/kg	NA	35	62	13	6	NA
		Mercury (inorganic)	mg/kg	NA	0.013	0.12	0.093	0.022	0.029
		Selenium	mg/kg	NA	1	1.5	0.91	1.5	NA
	Organometals	Methyl mercury	mg/kg	NA	0.25	0.19	0.23	0.2	0.19
	PCBs	PCBs (total Aroclors)	mg/kg	NA	0.18	0.13	0.15	0.33	0.13
Surface Water	Metals	Arsenic	µg/L	NA	4	3.6	3.3	3.6	NA
		Thallium	µg/L	NA	0.44	0.56	0.48	5.5	NA
	PAHs	Benzo[a]pyrene	µg/L	NA	0.66	0.74	0.086	0.092	NA
		Dibenz[a,h]anthracene	µg/L	NA	3	4.7	0.22	0.13	NA
	Volatiles	Vinyl chloride	µg/L	NA	0.25	0.28	NA	NA	NA
Ambient Air	Metals	Mercury average	$\mu g/m^3$	NA	0.000000043	0.000000026	0.000000025	0.00000036	NA

Notes:

BCC = Berry's Creek Canal
COPC = chemical of potential concern
EPC = exposure point concentration
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek
UPIC = Upper Peach Island Creek

[a] Calculated using depth-weighted average concentrations from all sampling locations with data extending beyond 15 cm for COPCs with any available data, and using depth-weighted average concentrations from surface sediment (0–15 cm) for COPCs for which no deeper sediment was available.

Reference Sites included data from Bellman's Creek, Mill Creek, and Woodbridge River, as available.
UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

Table 3-4. Summary of Exposure Point Concentrations for Marsh Surface and Deep Sediment[a]

Chemical Class	COPC	EPC (mg/kg)										
		Nevertouch Marsh	Eight Day Swamp	Paterson Plank Marsh	Upper Peach Island Creek Marsh	Ackerman's East Marsh	Walden Swamp	Rutherford Marsh	Tollgate Marsh	Oritani Marsh	Berry's Creek Marsh	Former ENCAP Restoration Area
Metals	Aluminum	17,000	13,000	11,000	16,000	18,000	8,500	13,000	11,000	14,000	14,000	8,600
	Antimony	4.1	2.7	3.2	17	4.8	5.5	1.2	NA	3.2	2.2	NA
	Arsenic	67	41	40	190	23	47	16	9.2	23	27	15
	Cadmium	31	16	8.8	30	5	11	1.6	0.56	0.34	1.2	NA
	Chromium (VI)	NA	NA	NA	NA	17	NA	NA	NA	NA	NA	NA
	Cobalt	29	24	39	120	27	38	14	11	16	18	6.8
	Copper	550	580	230	4100	90	190	140	66	67	130	110
	Iron	28,000	21,000	25,000	30,000	28,000	24,000	22,000	28,000	34,000	30,000	14,000
	Manganese	3,300	2,700	6,900	3,700	2,700	13,000	4,600	1,100	530	800	160
	Mercury	180	57	44	320	61	74	14	13	2.5	6.1	3.7
	Nickel	200	180	200	860	68	310	71	38	40	94	42
	Thallium	4	5.9	5.9	6.6	NA	5.7	5.6	2.4	NA	2.6	NA
	Vanadium	93	75	91	160	57	130	55	29	63	66	78
	Zinc	17,000	1,400	1,300	510	420	2,100	360	170	160	390	140
PAHs	Benzo[a]pyrene	0.14	0.18	0.42	0.55	0.06	0.14	0.32	0.27	0.2	0.3	0.35
	Dibenz[a,h]anthracene	0.022	0.03	0.085	0.11	0.015	0.031	0.059	0.062	NA	0.077	NA
Pesticides	Aldrin	0.26	0.02	0.005	0.045	0.0044	0.018	0.0056	0.0078	NA	NA	0.0016
	Heptachlor	0.21	0.012	NA	0.021	NA	0.0058	NA	NA	0.0012	NA	NA
	Heptachlor epoxide	0.29	0.016	NA	0.0091	NA	0.0033	0.0027	NA	0.0023	0.0015	0.002
PCBs	PCBs (total Aroclors)	11	5.1	3.3	1.7	0.58	4.5	0.5	0.44	0.016	0.14	0.2
Volatiles	Trichloroethene	NA	NA	NA	NA	0.033	NA	NA	NA	NA	NA	NA

Notes:

COPC = chemical of potential concern
EPC = exposure point concentration
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl

[a] Calculated using depth-weighted average concentrations from all sampling locations with data extending beyond 15 cm for COPCs with any available data, and using depth-weighted average concentrations from surface sediment (0–15 cm) for COPCs for which no deeper sediment was available.

Upper Peach Island Creek is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

Table 3-5. Summary of Exposure Factors

Exposure Pathway/Parameter	Adult Angler/Crabber		Older Child Angler/Crabber		Younger Child Angler/ Crabber		Current Adult Kayaker		Current Older Child Kayaker		Future Adult Kayaker		Future Older Child Kayaker		Construction Worker	
	RME	CTE	RME	CTE	RME	CTE	RME	CTE	RME	CTE	RME	CTE	RME	CTE	RME	CTE
Common Parameters																
Exposure frequency (days/year)	27	15	27	--	27	--	18	9	18	--	39	19	39	--	40	10
Exposure duration (years)	8	12	12	--	6	--	8	12	12	--	8	12	12	--	1	1
Body weight (kg)	80	80	48.8	--	15	--	80	80	48.8	--	80	80	48.8	--	80	80
Averaging time for cancer (days)	25,550	25,550	25,550	--	25,550	--	25,550	25,550	25,550	--	25,550	25,550	25,550	--	25,550	25,550
Averaging time for noncancer (days)	2,920	4,380	4,380	--	2,190	--	2,920	4,380	4,380	--	2,920	4,380	4,380	--	365	365
Fish/Crab Ingestion																
Fish/crab ingestion rate (g/day)	22	5	14.7	--	7.3	--	--	--	--	--	--	--	--	--	--	--
Incidental Ingestion of Sediment																
Sediment ingestion rate (mg/day)	100	20	100	--	--	--	100	20	100	--	100	20	100	--	330	100
Fraction ingested	1	1	1	--	--	--	1	1	1	--	1	1	1	--	1	1
Dermal Contact with Sediment																
Skin surface area (cm^2)	4,760	4,760	3,108	--	--	--	4,760	4,760	3,108	--	4,760	4,760	3,108	--	3,470	3,470
Soil to skin adherence factor (mg/cm^2-event)	0.3	0.3	0.2	--	--	--	0.3	0.3	0.2	--	0.3	0.3	0.2	--	0.3	0.3
Event frequency (event/day)	1	1	1	--	--	--	1	1	1	--	1	1	1	--	1	1
Incidental Ingestion of Surface Water																
Water ingestion rate (L/hour)	--	--	--	--	--	--	0.05	0.05	0.05	--	0.05	0.05	0.05	--	--	--
Event duration (hour/event)	--	--	--	--	--	--	0.25	0.08	0.25	--	0.25	0.08	0.25	--	--	--
Event frequency (event/day)	--	--	--	--	--	--	1	1	1	--	1	1	1	--	--	--
Dermal Contact with Surface Water																
Skin surface area (cm^2)	4,760	4,760	3,108	--	--	--	20,900	20,900	14,180	--	20,900	20,900	14,180	--	--	--
Event duration (hour/event)	2.4	0.4	2.4	--	--	--	0.25	0.08	0.25	--	0.25	0.08	0.25	--	--	--
Event frequency (event/day)	1	1	1	--	--	--	1	1	1	--	1	1	1	--	--	--
Inhalation																
Exposure time (hour/day)	9.5	3.5	9.5	--	--	--	4	2	4	--	4	2	4	--	8	8

Notes:
CTE = central tendency exposure
RME = reasonable maximum exposure
-- = pathway not relevant for receptor

Table 4-1. Availability of Cancer and Noncancer Toxicity Criteria for COPCs by Exposure Pathway

COPC	Cancer Toxicity Criteria			Noncancer Toxicity Criteria		
Metals						
Aluminum	O	D		O	D	
Antimony	O	D		O	D	
Arsenic	O	D		O	D	
Cadmium	O	D		O	D	
Chromium (VI)	O	D		O	D	
Cobalt	O	D		O	D	
Copper	O	D		O	D	
Iron	O	D		O	D	
Manganese	O	D		O	D	
Mercury (inorganic)	O	D	I	O	D	I
Nickel	O	D		O	D	
Selenium	O	D		O	D	
Thallium	O	D		O	D	
Vanadium	O	D		O	D	
Zinc	O	D		O	D	
Organometals						
Methyl mercury	O	D		O	D	
PAHs						
Benz[a]anthracene	O	D		O	D	
Benzo[a]pyrene	O	D		O	D	
Benzo[b]fluoranthene	O	D		O	D	
Dibenz[a,h]anthracene	O	D		O	D	
Indeno[1,2,3-cd]pyrene	O	D		O	D	
Pesticides						
Aldrin	O	D		O	D	
Heptachlor	O	D		O	D	
Heptachlor epoxide	O	D		O	D	
PCBs						
PCBs (total Aroclors)	O	D		O	D	
Volatiles						
Trichloroethene	O	D		O	D	
Vinyl chloride	O	D		O	D	

Notes:

BHHRA = baseline human health risk assessment
COPC = chemical of potential concern
D = dermal pathway
I = inhalation pathway
O = oral pathway
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl

Letters indicate exposure pathways evaluated in the BHHRA for the COPC.
Shaded cells indicate the availability of a toxicity criterion to evaluate the exposure pathway and endpoint.

Table 4-2. Cancer Slope Factors

COPC	Oral CSF (per mg/kg-day)	Oral Absorption Efficiency for Dermal [a]	Dermal CSF (per mg/kg-day)	WOE/Cancer Guideline Description	Source for CSF and WOE Description	Web Site Link to Toxicity Profile
Metals						
Arsenic	1.5E+00	1.0	1.5E+00	A	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0278_summary.pdf
Chromium (VI)	5.0E-01	0.025	2.0E+01	D	NJDEP, IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/toxreviews/0144tr.pdf
PAHs						
Benz[a]anthracene	7.3E-01	1.0	7.3E-01	B2	IRIS	https://semspub.epa.gov/work/03/2218700.pdf
Benzo[a]pyrene	7.3E+00	1.0	7.3E+00	B2	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0136_summary.pdf
Benzo[b]fluoranthene	7.3E-01	1.0	7.3E-01	B2	IRIS	https://semspub.epa.gov/work/03/2218700.pdf
Dibenz[a,h]anthracene	7.3E+00	1.0	7.3E+00	B2	IRIS	https://semspub.epa.gov/work/03/2218700.pdf
Indeno[1,2,3-cd]pyrene	7.3E-01	1.0	7.3E-01	B2	IRIS	https://semspub.epa.gov/work/03/2218700.pdf
Pesticides						
Aldrin	1.7E+01	1.0	1.7E+01	B2	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0130_summary.pdf
Heptachlor	4.5E+00	1.0	4.5E+00	B2	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0243_summary.pdf
Heptachlor epoxide	9.1E+00	1.0	9.1E+00	B2	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0160_summary.pdf
PCBs						
PCBs (total Aroclors)	2.0E+00	1.0	2.0E+00	B2	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0294_summary.pdf
Volatiles						
Trichloroethene	4.6E-02	1.0	4.6E-02	A	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/toxreviews/0199tr/Chapter7_0199tr.pdf
Vinyl chloride	7.2E-01	1.0	7.2E-01	A	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/toxreviews/1001tr.pdf

Notes:

A = human carcinogen
B2 = probable human carcinogen
COPC = chemical of potential concern
CSF = cancer slope factor
D = not classifiable as to human carcinogenicity for the oral route
IRIS = Integrated Risk Information System (http://www.epa.gov/iris/)
NJDEP = New Jersey Department of Environmental Protection
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RAGS = Risk Assessment Guidance for Superfund
WOE = weight-of-evidence

[a] Source is USEPA (2004) - RAGS Part E, Section 4.2 and Exhibit 4-1. Follows recommendations for CSF adjustments. If RAGS E recommends no adjustment be made, an oral absorption efficiency of 1 was adopted.

Source:

NJDEP (2009)
USEPA (2004)
USEPA (2016)

Table 4-3. Chronic Noncancer Toxicity Criteria

COPC	Oral RfD (mg/kg-day)	Oral Absorption Efficiency for Dermal [a]	Dermal RfD (mg/kg-day)	Primary Target Organ(s) for Oral and Dermal Exposures	Source of RfD	Web Site Link to Toxicity Profile
Metals						
Aluminum	1.0E+00	1.0	1.0E+00	Nervous system	PPRTV	https://hhpprtv.ornl.gov/issue_papers/Aluminum.pdf
Antimony	4.0E-04	0.15	6.0E-05	Hematological	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0006_summary.pdf
Arsenic	3.0E-04	1.0	3.0E-04	Cardiovascular, Dermal	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0278_summary.pdf
Cadmium	1.0E-03	0.025	2.5E-05	Kidney	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0141_summary.pdf
Chromium (VI)	3.0E-03	0.025	7.5E-05	-- [b]	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/toxreviews/0144tr.pdf
Cobalt	3.0E-04	1.0	3.0E-04	Thyroid	PPRTV	https://hhpprtv.ornl.gov/issue_papers/Cobalt.pdf
Copper	4.0E-02	1.0	4.0E-02	Gastrointestinal	HEAST	Not available
Iron	7.0E-01	1.0	7.0E-01	Gastrointestinal	PPRTV	https://hhpprtv.ornl.gov/issue_papers/IronandCompounds.pdf
Manganese	1.4E-01	1.0	1.4E-01	Nervous system	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0373_summary.pdf
Mercury (inorganic) [c, d]	3.0E-04	0.070	2.1E-05	Immunological	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0692_summary.pdf
Nickel	2.0E-02	0.040	8.0E-04	Body [e]	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0271_summary.pdf
Selenium	5.0E-03	1.0	5.0E-03	Nervous system, Hematological, Dermal [f]	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0472_summary.pdf
Thallium	1.0E-05	1.0	1.0E-05	Hair	PPRTV	https://hhpprtv.ornl.gov/issue_papers/ThalliumSolubleSalts.pdf
Vanadium [g]	5.0E-03	0.026	1.3E-04	Dermal	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0125_summary.pdf
Zinc	3.0E-01	1.0	3.0E-01	Hematological, Immunological	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/toxreviews/0426tr.pdf
Organometals						
Methyl mercury	1.0E-04	1.0	1.0E-04	Nervous system, Developmental	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0073_summary.pdf
Pesticides						
Aldrin	3.0E-05	1.0	3.0E-05	Liver	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0130_summary.pdf
Heptachlor	5.0E-04	1.0	5.0E-04	Liver	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0243_summary.pdf
Heptachlor epoxide	1.3E-05	1.0	1.3E-05	Liver	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0160_summary.pdf
PCBs						
PCBs (total Aroclors) [h]	2.0E-05	1.0	2.0E-05	Immunological, Dermal, Ocular	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0389_summary.pdf
Volatiles						
Trichloroethene	5.0E-04	1.0	5.0E-04	Cardiovascular, Developmental, Immunological	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/toxreviews/0199tr/Chapter7_0199tr.pdf
Vinyl chloride	3.0E-03	1.0	3.0E-03	Liver	IRIS	https://cfpub.epa.gov/ncea/iris/iris_documents/documents/toxreviews/1001tr.pdf

Notes:

COPC = chemical of potential concern
EPA = U.S. Environmental Protection Agency
HEAST = Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PPRTV = provisional peer reviewed toxicity values
RAGS = Risk Assessment Guidance for Superfund
RfC = reference concentration
RfD = reference dose
-- = no value available

[a] Source is USEPA (2004) - RAGS Part E, Section 4.2 and Exhibit 4-1. Follows recommendations for RfD adjustments. If RAGS E recommends no adjustment be made, an oral absorption efficiency of 1.0 was adopted.

[b] IRIS lists target organ as "None" as the RfD is based on a no-observed-adverse-effects level with no identified lowest-observed-adverse-effects level.

[c] Values are based on mercuric chloride.

[d] An inhalation RfC for mercury of 0.0003 mg/m^3 (IRIS) was applied for evaluating the inhalation pathway for the baseline human health risk assessment. The primary target organ is the nervous system.

Table 4-3. Chronic Noncancer Toxicity Criteria

COPC	Oral RfD (mg/kg-day)	Oral Absorption Efficiency for Dermal [a]	Dermal RfD (mg/kg-day)	Primary Target Organ(s) for Oral and Dermal Exposures	Source of RfD	Web Site Link to Toxicity Profile

[e] Critical effect is decreased body and organ weights.

[f] Clinical signs observed included the characteristic "garlic odor" of excess selenium excretion in the breath and urine, thickened and brittle nails, hair and nail loss, lowered hemoglobin levels, mottled teeth, skin lesions and central nervous system abnormalities (peripheral anesthesia, acroparesthesia, and pain in the extremities).

[g] Based on oral RfD for vanadium pentoxide multiplied by 56%.

[h] Values are based on Aroclor 1254.

Sources:
USEPA (1997)
USEPA (2004)
USEPA (2015)
USEPA (2016)

Table 5-1. Summary of Excess Lifetime Cancer Risk and Noncancer Hazards

Exposure Unit	Receptor	RME Excess Lifetime Cancer Risk	RME Younger Child HI [a]	RME Older Child HI [a]	RME Adult HI [a]	CTE Excess Lifetime Cancer Risk	CTE Adult HI [a]
UPIC	Construction worker	7E-07	--	--	1	8E-08	0.1
UBC	Angler	3E-05	3	2	2	2E-06	0.2
	Crabber (muscle only)	7E-06	0.1	0.4	0.3	1E-06	0.07
	Crabber (muscle & hepatopancreas)	1E-05	0.4	0.6	0.5	1E-06	0.08
	Kayaker/Canoer (current)	4E-06	--	0.2	0.1	5E-07	0.03
	Kayaker/Canoer (future)	9E-06	--	0.4	0.3	1E-06	0.07
	Construction Worker	4E-07	--	--	0.6	4E-08	0.06
Nevertouch Marsh	Construction worker	7E-07	--	--	1	8E-08	0.1
Eight Day Swamp	Construction worker	4E-07	--	--	0.7	4E-08	0.06
Paterson Plank Marsh	Construction worker	4E-07	--	--	0.6	4E-08	0.05
Upper Peach Island Creek Marsh	Construction worker	1E-06	--	--	1	1E-07	0.1
MBC	Angler	2E-05	2	2	1	1E-06	0.1
	Crabber (muscle only)	4E-06	0.2	0.4	0.3	5E-07	0.04
	Crabber (muscle & hepatopancreas)	6E-06	0.4	0.5	0.4	5E-07	0.05
	Kayaker/Canoer (current)	3E-06	--	0.1	0.08	3E-07	0.01
	Kayaker/Canoer (future)	6E-06	--	0.3	0.2	6E-07	0.03
	Construction worker	5E-07	--	--	0.5	6E-08	0.06
Walden Swamp	Construction worker	4E-07	--	--	0.7	4E-08	0.06
Ackerman's East Marsh	Construction worker	2E-07	--	--	0.2	2E-08	0.02
Rutherford Marsh	Construction worker	1E-07	--	--	0.4	1E-08	0.03
BCC	Angler	3E-05	2	2	1	1E-06	0.1
	Crabber (muscle only)	4E-06	0.1	0.2	0.1	4E-07	0.02
	Crabber (muscle & hepatopancreas)	6E-06	0.4	0.3	0.3	5E-07	0.04
	Kayaker/Canoer (current)	2E-06	--	0.06	0.04	2E-07	0.006
	Kayaker/Canoer (future)	4E-06	--	0.1	0.08	4E-07	0.01
	Construction Worker	3E-07	--	--	0.3	3E-08	0.03
Tollgate Marsh	Construction Worker	9E-08	--	--	0.2	1E-08	0.02
LBC	Angler	1E-05	1	0.9	0.8	7E-07	0.08
	Crabber (muscle only)	2E-06	0.2	0.2	0.2	3E-07	0.03
	Crabber (muscle & hepatopancreas)	8E-06	0.7	0.5	0.5	5E-07	0.06
	Kayaker/Canoer (current)	1E-06	--	0.06	0.04	2E-07	0.008
	Kayaker/Canoer (future)	3E-06	--	0.1	0.09	3E-07	0.02
	Construction worker	3E-07	--	--	0.3	3E-08	0.03
Oritani Marsh	Construction worker	2E-07	--	--	0.09	2E-08	0.008
Berry's Creek Marsh	Construction worker	2E-07	--	--	0.2	2E-08	0.02
Former ENCAP Restoration Area	Construction worker	1E-07	--	--	0.06	1E-08	0.005

Table 5-1. Summary of Excess Lifetime Cancer Risk and Noncancer Hazards

Exposure Unit	Receptor	RME Excess Lifetime Cancer Risk	RME Younger Child HI [a]	RME Older Child HI [a]	RME Adult HI [a]	CTE Excess Lifetime Cancer Risk	CTE Adult HI [a]
Reference Sites	Angler	2E-05	1	0.9	0.8	9E-07	0.08
	Crabber (muscle only)	4E-06	0.09	0.1	0.1	5E-07	0.02
	Crabber (muscle & hepatopancreas)	6E-06	0.3	0.3	0.2	6E-07	0.03
	Kayaker/Canoer (current)	3E-06	--	0.06	0.04	3E-07	0.008
	Kayaker/Canoer (future)	6E-06	--	0.1	0.09	7E-07	0.02
	Construction worker	--	--	--	--	--	--

Notes:
CTE = central tendancy exposure
HI = hazard index
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
RME = reasonable maximum exposure
UBC = Upper Berry's Creek
UPIC = Upper Peach Island Creek
-- = not evaluated

[a] Endpoint specific hazards are discussed in the main text .

Reference Sites included data from Bellman's Creek, Mill Creek, and Woodbridge River, as available.
UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

Table 5-2. RME Excess Lifetime Cancer Risks by Exposure Pathway

		Dermal		Ingestion					Inhalation
Exposure Unit	**Receptor**	**Sediment**	**Surface Water Total**	**White Perch Fillet**	**Blue Crab Muscle**	**Blue Crab Muscle & Hepatopancreas**	**Sediment**	**Surface Water Total**	**Ambient Air**
UBC	Angler	2.9E-06	3.0E-07	2.7E-05	--	--	3.9E-06	--	--
	Crabber (muscle only)	2.9E-06	3.0E-07	--	2.3E-07	--	3.9E-06	--	--
	Crabber (muscle & hepatopancreas)	2.9E-06	3.0E-07	--	--	3.3E-06	3.9E-06	--	--
	Kayaker/Canoer (current)	1.6E-06	3.1E-07	--	--	--	2.2E-06	2.5E-07	--
	Kayaker/Canoer (future)	3.5E-06	3.2E-07	--	--	--	4.8E-06	4.8E-07	--
MBC	Angler	1.4E-06	3.2E-07	2.1E-05	--	--	1.8E-06	--	--
	Crabber (muscle only)	1.4E-06	3.2E-07	--	7.4E-07	--	1.8E-06	--	--
	Crabber (muscle & hepatopancreas)	1.4E-06	3.2E-07	--	--	2.4E-06	1.8E-06	--	--
	Kayaker/Canoer (current)	1.0E-06	3.3E-07	--	--	--	1.3E-06	3.3E-07	--
	Kayaker/Canoer (future)	2.2E-06	3.5E-07	--	--	--	2.8E-06	6.7E-07	--
BCC	Angler	1.6E-06	1.6E-08	2.2E-05	--	--	1.9E-06	--	--
	Crabber (muscle only)	1.6E-06	1.6E-08	--	2.1E-07	--	1.9E-06	--	--
	Crabber (muscle & hepatopancreas)	1.6E-06	1.6E-08	--	--	2.8E-06	1.9E-06	--	--
	Kayaker/Canoer (current)	6.9E-07	4.9E-09	--	--	--	9.3E-07	3.0E-08	--
	Kayaker/Canoer (future)	1.5E-06	1.1E-08	--	--	--	2.0E-06	6.5E-08	--
LBC	Angler	8.4E-07	1.7E-08	1.2E-05	--	--	1.2E-06	--	--
	Crabber (muscle only)	8.4E-07	1.7E-08	--	3.6E-07	--	1.2E-06	--	--
	Crabber (muscle & hepatopancreas)	8.4E-07	1.7E-08	--	--	6.0E-06	1.2E-06	--	--
	Kayaker/Canoer (current)	5.5E-07	5.4E-09	--	--	--	7.5E-07	2.8E-08	--
	Kayaker/Canoer (future)	1.2E-06	1.2E-08	--	--	--	1.6E-06	6.0E-08	--
Reference Sites	Angler	1.6E-06	--	1.2E-05	--	--	2.3E-06	--	--
	Crabber (muscle only)	1.6E-06	--	--	1.1E-07	--	2.3E-06	--	--
	Crabber (muscle & hepatopancreas)	1.6E-06	--	--	--	2.4E-06	2.3E-06	--	--
	Kayaker/Canoer (current)	1.1E-06	--	--	--	--	1.5E-06	--	--
	Kayaker/Canoer (future)	2.3E-06	--	--	--	--	3.3E-06	--	--

Notes:

BCC = Berry's Creek Canal
EPA = U.S. Environmental Protection Agency
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
RME = reasonable maximum exposure
UBC = Upper Berry's Creek
-- = not evaluated

Receptors with cumulative lifetime cancer risks <1.0E-06 for all exposure units are not shown.
Reference Sites included data from Bellman's Creek, Mill Creek, and Woodbridge River, as available.

Table 5-3. RME Noncancer Hazards by Exposure Pathway

Exposure Unit	Receptor	Age Group	Dermal		Ingestion		Inhalation
			Sediment	Surface Water Total	White Perch Fillet	Sediment	Ambient Air
UBC	Angler	Older child	0.047	0.00066	1.8	0.28	0.0040
		Younger child	--	--	2.8	--	--
MBC		Older child	0.012	0.00078	1.4	0.21	0.0024
		Younger child	--	--	2.3	--	--
BCC		Older child	0.0066	0.00067	1.4	0.083	0.0024
		Younger child	--	--	2.3	--	--
LBC		Older child	0.0043	0.0064	0.81	0.053	0.033
		Younger child	--	--	1.3	--	--
Reference Sites		Older child	0.010	--	0.80	0.075	--
		Younger child	--	--	1.3	--	--

Notes:

BCC = Berry's Creek Canal
EPA = U.S. Environmental Protection Agency
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
RME = reasonable maximum exposure
UBC = Upper Berry's Creek
-- = not evaluated

Receptors with cumulative noncancer hazards <1.0 for all exposure units are not shown. Angler risks are greater for older child age class than for adult age class; therefore, adult angler is not shown. Younger child exposure is limited to tissue ingestion.
Reference Sites included data from Bellman's Creek, Mill Creek, and Woodbridge River, as available.

Table 5-4. RME Risk Results for Ingestion of White Perch Fillet, Individual COPCs

Exposure Unit	Receptor	Younger Child Noncancer HQ				Excess Lifetime Cancer Risk
		Mercury (Inorganic)	Methyl Mercury	PCBs (Total Aroclors)	Antimony	PCBs (Total Aroclors)
UBC	Angler	0.012	0.17	2.6	ND	2.7E-05
MBC		0.025	0.15	2.1	ND	2.1E-05
BCC		0.015	0.14	2.1	0.042	2.2E-05
LBC		0.017	0.12	1.2	ND	1.2E-05
Reference Sites		0.0054	0.094	1.2	--	1.2E-05

Notes:

BCC = Berry's Creek Canal
COPC = chemical of potential concern
EPA = U.S. Environmental Protection Agency
HQ = hazard quotient
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
ND = not detected
PCB = polychlorinated biphenyl
RME = reasonable maximum exposure
UBC = Upper Berry's Creek
-- = not evaluated

COPCs with HQs <0.010 for all exposure units are not shown, as these do not contribute significantly to cumulative noncancer risk. Age group with highest risk from tissue ingestion is shown.

Reference Sites included data from Bellman's Creek, Mill Creek, and Woodbridge River, as available.

Table 5-5. RME Excess Lifetime Cancer Risks for Anglers/Crabbers from Exposure to Sediment, Individual COPCs [a]

Exposure Unit	Receptor	Arsenic	Benz[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Dibenz[a,h]anthracene	Indeno[1,2,3-cd]pyrene	PCBs (Total Aroclors)
UBC	Angler/Crabber	2.4E-06	1.3E-07	2.0E-06	2.6E-07	7.8E-07	1.5E-07	9.9E-07
MBC		8.8E-07	1.2E-07	1.3E-06	1.8E-07	4.2E-07	9.4E-08	2.5E-07
BCC		5.8E-07	1.6E-07	1.6E-06	2.3E-07	6.3E-07	1.1E-07	1.3E-07
LBC		7.1E-07	6.9E-08	8.0E-07	1.0E-07	1.9E-07	5.9E-08	6.8E-08
Reference Sites		1.6E-06	1.5E-07	1.4E-06	1.8E-07	3.3E-07	8.8E-08	1.7E-07

Notes:
BCC = Berry's Creek Canal
COPC = chemical of potential concern
EPA = U.S. Environmental Protection Agency
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
RME = reasonable maximum exposure
UBC = Upper Berry's Creek

[a] Includes incidential ingestion and dermal contact exposures

COPCs with cancer risks <5.0E-08 for all exposure units are not shown, as these do not contribute significantly to cumulative cancer risks.
Reference Sites included data from Bellman's Creek, Mill Creek, and Woodbridge River, as available.

Table 5-6. RME Lifetime Cancer Risks for Kayakers/Canoers from Exposure to Sediment, Individual COPCs [a]

Exposure Unit	Receptor	Arsenic	Benz[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Dibenz[a,h]anthracene	Indeno[1,2,3-cd]pyrene	PCBs (Total Aroclors)
UBC	Kayaker/Canoer (current)	1.4E-06	7.7E-08	1.1E-06	1.1E-07	4.1E-07	8.8E-08	6.1E-07
	Kayaker/Canoer (future)	3.0E-06	1.7E-07	2.4E-06	2.5E-07	8.9E-07	1.9E-07	1.3E-06
MBC	Kayaker/Canoer (current)	5.5E-07	7.2E-08	1.0E-06	1.1E-07	3.0E-07	5.9E-08	1.5E-07
	Kayaker/Canoer (future)	1.2E-06	1.6E-07	2.3E-06	2.4E-07	6.4E-07	1.3E-07	3.3E-07
BCC	Kayaker/Canoer (current)	5.2E-07	7.7E-08	6.2E-07	8.7E-08	2.1E-07	4.0E-08	6.3E-08
	Kayaker/Canoer (future)	1.1E-06	1.7E-07	1.3E-06	1.9E-07	4.5E-07	8.6E-08	1.4E-07
LBC	Kayaker/Canoer (current)	4.7E-07	4.6E-08	5.1E-07	6.6E-08	1.2E-07	3.7E-08	5.5E-08
	Kayaker/Canoer (future)	1.0E-06	1.0E-07	1.1E-06	1.4E-07	2.5E-07	8.1E-08	1.2E-07
Reference Sites	Kayaker/Canoer (current)	1.1E-06	9.9E-08	9.1E-07	1.2E-07	2.2E-07	5.8E-08	1.2E-07
	Kayaker/Canoer (future)	2.3E-06	2.1E-07	2.0E-06	2.6E-07	4.8E-07	1.3E-07	2.5E-07

Notes:
BCC = Berry's Creek Canal
COPC = chemical of potential concern
EPA = U.S. Environmental Protection Agency
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
RME = reasonable maximum exposure
UBC = Upper Berry's Creek

[a] Includes incidential ingestion and dermal contact exposures

COPCs with cancer risks <5.0E-08 for all exposure units are not shown, as these do not contribute significantly to cumulative cancer risks.
Reference Sites included data from Bellman's Creek, Mill Creek, and Woodbridge River, as available.

Table 5-7. Summary of Uncertainties for the BHHRA

Uncertainty Category/Source	Effect Direction	Magnitude	Comments
Data			
Inclusion of J flagged data.	Increase/Decrease	Low	J flags indicate uncertainty in quantification.
Difference in analytical sensitivity for methods used to measure total mercury and methyl mercury in tissue.	Increase/Decrease	Low	See Appendix K of the RI Report.
COPC Selection			
Chemicals without toxicity data or an appropriate surrogate were not selected as COPCs.	Decrease	Low	Only 3 chemicals had no toxicity data or an appropriate surrogate. These were detected at a low frequency.
Toxicity			
CSFs assume no threshold for dose-response models used to evaluate cancer effects.	Increase	High	This assumption may lead to high risk estimates for chemicals that cause cancer by a nonlinear mode of action.
Toxicity criteria for different isomers or for a derivative used to represent toxicity of COPC.	Increase/Decrease	Low	Toxicology likely similar in most cases.
Use of chronic toxicity values for estimating exposures to construction workers.	Increase	Low/Medium	Noncancer HIs for construction workers were less than 1. Use of subchronic values would result in lower His.
Exposure (i.e., CSM, EPCs, Exposure Parameters)			
EPCs for some exposure units/media were based on small sample sizes.	Increase/Decrease	Low/Medium	The true concentrations of COPCs in media may not be fully characterized.
Used upper end concentrations as EPCs.	Increase	Low/Medium	EPCs were designed to overestimate, not underestimate average concentrations.
Sediment data included in EPC calculations for recreators (i.e., anglers/crabbers and kayakers/canoers) based on best professional judgement.	Increase	Low	In the majority of cases, EPCs used in the baseline risk assessment for risk driving chemicals were equal to or higher than EPCs calculated based on all surface sediment data. See text.
Temporal variability in analytical data for tissue.	Increase/Decrease	Medium	Calculated EPCs may overestimate or underestimate concentrations of COPCs to which individuals are exposed.
Use of default exposure parameters for calculating exposures.	Increase	Medium	Exposure factors, including ingestion rates for sediment and surface water, were EPA defaults. These factors are designed to be conservative, and not underestimate exposures.
Lack of sediment adherence factors for dermal contact pathway.	Increase/Decrease	Low	Available studies indicate wide variation in adherence among different sediment types and among different parts of the body.
No site-specific data with which to ascertain the relative mass of hepatopancreas and muscle.	Increase/Decrease	Medium	PCB concentrations were higher in hepatopancreas compared to muscle tissue. In the case that hepatopancreas makes up a smaller or larger proportion of the crab than assumed, resulting risks would be smaller or greater, respectively.
No chemical-specific dermal absorption factors for sediment COPCs (mercury and other metals, pesticides).	Decrease	Low	Dermal absorption for metals expected to be low. Dermal absorption of organochlorine pesticides will be partly reduced by the sorption of these compounds to organic carbon in sediment.

Table 5-7. Summary of Uncertainties for the BHHRA

Uncertainty Category/Source	Effect Direction	Magnitude	Comments
Use of Aroclor data for total PCBs compared to use of congener data.	Decrease	Medium/High	Exposures and resulting risks for congeners were 1.5 to 2.3 times, and 1.3 to 19 times, greater than for Aroclors for perch and crab, respectively.
Lack of physical chemical parameters to estimate dermal exposure to PAHs in surface water.	Decrease	Unknown	Dermal exposure and associated risks from PAHs in surface water were not calculated. Sufficient data with which to predict dermal absorption with acceptable confidence is not available.
Use of perch fillet of target size (i.e., 150–190 mm) compared to use of large white perch fillet (i.e., >200 mm).	Increase/Decrease	Low	No significant difference in PCBs (risk driver in tissue) in larger fillet compared to smaller fillet.
Use of fillet data only; not considering consumption of whole body fish (e.g., scenario where anglers consume stew prepared with whole fish).	Decrease	Medium	PCBs concentrations were greater in whole body fish compared to fillet. Consumption of whole fish is a low probability behavior.
Total concentrations of COPCs in surface water were used for estimating dermal exposures.	Increase	Low	Absolute and relative risks from COPCs in surface water were small.
Exposure estimates for RME case do not consider cooking loss for lipophilic chemicals.	Increase	Medium	Preparation and cooking methods likely reduce PCB concentrations in fish tissues. Risks from PCBs in tissue may be overestimated by 20 to 50 percent.
Lack of air data with which to characterize inhalation exposure for construction workers in UPIC and marshes.	Decrease	Low	Inhalation of mercury in air present in waterways was not risk significant. Concentrations of mercury in air in the marshes are not anticipated to be greater than over the waterways.
Risk Characterization			
Total risks for site were estimated by summing COPC-specific results.	Increase/Decrease	Low	Chemicals may interact to increase risks (synergy) or decrease risks (antagonism).
Total risks/hazards for each receptor/exposure unit combination were determined by summing across all exposure pathways.	Increase	Low	Summing the RME risks/hazards across multiple exposure pathways will tend to overestimate the total. An individual does not necessarily experience RME exposures through all pathways.
Dioxins and furans not evaluated as part of baseline risks.	Decrease	Medium	Regional sources of dioxins and furans will contribute to cumulative risks.

Notes:

BHHRA = baseline human health risk assessment
COPC = chemical of potential concern
CSF = cancer slope factor
CSM = conceptual site model
EPA = U.S. Environmental Protection Agency
EPC = exposure point concentration
HI = hazard index
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RME = reasonable maximum exposure
UPIC = Upper Peach Island Creek

UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

Table 5-8. Comparison of EPCs for Risk Drivers in Whole Body and Fillet

Exposure Unit	Chemical	Whole Body EPC (mg/kg) [a]	Fillet EPC (mg/kg) [b]
UBC	Methyl mercury	0.38	0.48
	PCBs (total Aroclors)	8.3	1.5
MBC	Methyl mercury	0.37	0.41
	PCBs (total Aroclors)	6.6	1.2
BCC	Methyl mercury	0.24	0.39
	PCBs (total Aroclors)	2.9	1.2
LBC	Methyl mercury	0.26	0.34
	PCBs (total Aroclors)	2.4	0.64
Reference Sites	Methyl mercury	0.20	0.26
	PCBs (total Aroclors)	1.7	0.66

Notes:
BCC = Berry's Creek Canal
EPC = exposure point concentration
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek

[a] Whole body white perch (150–190 mm) were collected in 2009, 2010, 2012, 2013, and 2014 and were analyzed as composite samples.

[b] White perch fillet (150–190mm) were collected annually from 2009 to 2015 and were analyzed as composite samples.

Reference Sites included data from Bellman's Creek, Mill Creek, and Woodbridge River, as available.

Table 5-9. EPCs for COPCs in Whole Body Fillet

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	Metals	Mercury (inorganic)	22	12	55	0.02	0.16	0.063	NA	Normal	95% KM (t) UCL	0.05	0.05	(1)
	Organometals	Methyl mercury	27	27	100	0.16 J	0.55 J	0.35	0.00055–0.0064	Normal	95% Student's-t UCL	0.38	0.38	(1)
	PCBs	PCBs (total Aroclors)	27	27	100	1.7	16 J	5.4	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	8.3	8.3	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39–0.39	None	Not detected	--	--	(2)
		Copper	3	3	100	1.2 J	4.9 J	2.9	0.74–0.74	None	Maximum concentration	4.9	4.9	(4)
		Iron	3	3	100	9.5 J	29 J	18	4.9–4.9	None	Maximum concentration	29	29	(4)
		Manganese	3	3	100	1.6 J	2.3 J	2.0	0.074–0.074	None	Maximum concentration	2.3	2.3	(4)
		Selenium	13	13	100	0.64 J	1.4	1.0	0.34–0.45	Normal	95% Student's-t UCL	1.1	1.1	(1)
MBC	Metals	Mercury (inorganic)	24	14	58	0.02	0.15	0.062	NA	Normal	95% KM (t) UCL	0.049	0.049	(1)
	Organometals	Methyl mercury	29	29	100	0.13 J	0.73 J	0.33	0.00055–0.0064	Normal	95% Student's-t UCL	0.37	0.37	(1)
	PCBs	PCBs (total Aroclors)	29	29	100	1.6	20 J	5.4	NA	Normal	95% Student's-t UCL	6.6	6.6	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39–0.39	None	Not detected	--	--	(2)
		Copper	3	3	100	3.2 J	5.4 J	4.5	0.74–0.74	None	Maximum concentration	5.4	5.4	(4)
		Iron	3	3	100	11 J	14 J	12	4.9–4.9	None	Maximum concentration	14	14	(4)
		Manganese	3	3	100	1.6 J	3.4 J	2.4	0.074–0.074	None	Maximum concentration	3.4	3.4	(4)
		Selenium	13	13	100	0.81 J	1.4	1.1	0.36–0.45	Normal	95% Student's-t UCL	1.2	1.2	(1)
BCC	Metals	Mercury (inorganic)	24	12	50	0.007	0.14 J	0.061	NA	Normal	95% KM (t) UCL	0.044	0.044	(1)
	Organometals	Methyl mercury	27	27	100	0.053 J	0.35	0.22	0.00033–0.0063	Normal	95% Student's-t UCL	0.24	0.24	(1)
	PCBs	PCBs (total Aroclors)	27	27	100	0.54 J	4.4 J	2.6	NA	Normal	95% Student's-t UCL	2.9	2.9	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39–0.39	None	Not detected	--	--	(2)
		Copper	3	2	67	2.3 J	5.7 J	4.0	0.74–0.74	None	Maximum concentration	5.7	5.7	(4)
		Iron	3	3	100	12 J	25 J	20	4.9–4.9	None	Maximum concentration	25	25	(4)
		Manganese	3	3	100	1.1 J	2.9 J	1.8	0.074–0.074	None	Maximum concentration	2.9	2.9	(4)
		Selenium	13	13	100	0.75 J	1.5	1.1	0.34–0.45	Normal	95% Student's-t UCL	1.2	1.2	(1)
LBC	Metals	Mercury (inorganic)	25	15	60	0.01	0.12 J	0.049	NA	normal	95% KM (t) UCL	0.041	0.041	(1)
	Organometals	Methyl mercury	28	28	100	0.16 J	0.40 J	0.24	0.00055–0.0064	Approximate normal	95% Modified Student's-t UCL	0.26	0.26	(1)
	PCBs	PCBs (total Aroclors)	28	28	100	0.74	4.7 J	2.1	NA	Normal	95% Student's-t UCL	2.4	2.4	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39–0.39	None	Not detected	--	--	(2)
		Copper	3	3	100	3.9 J	5.3 J	4.4	0.74–0.74	None	Maximum concentration	5.3	5.3	(4)
		Iron	3	3	100	9.8 J	35 J	18	4.9–4.9	None	Maximum concentration	35	35	(4)
		Manganese	3	3	100	1.6 J	2.1 J	1.9	0.074–0.074	None	Maximum concentration	2.1	2.1	(4)
		Selenium	13	13	100	0.48 J	1.8	1.0	0.35–0.45	Normal	95% Student's-t UCL	1.2	1.2	(1)

Table 5-9. EPCs for COPCs in Whole Body Fillet

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Reference Sites	Metals	Mercury (inorganic)	42	18	43	0.01	0.09 J	0.036	NA	Nonparametric	95% KM (t) UCL	0.022	0.022	(1)
	Organometals	Methyl mercury	49	49	100	0.072 J	0.33	0.19	0.00055–0.0064	Normal	95% Student's-t UCL	0.20	0.20	(1)
	PCBs	PCBs (total Aroclors)	49	49	100	0.46 J	3.0 J	1.6	NA	Normal	95% Student's-t UCL	1.7	1.7	(1)
	Metals	Antimony	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Copper	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Iron	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Manganese	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Selenium	19	19	100	0.50 J	1.5	0.99	0.34–0.45	Normal	95% Student's-t UCL	1.1	1.1	(1)

Notes:
BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = no data/not applicable

(1) The 95 UCL is selected as the exposure point concentration.
(2) Not detected.
(4) Less than 4 detected values; therefore, the maximum concentration is selected as the exposure point concentration.
(5) Input data has fewer than 10 distinct values.
(6) No available data.

Reference Sites included data from Bellman's Creek, Mill Creek, and Woodbridge River, as available.

Table 5-10. Comparison of Methyl Mercury and PCBs (Aroclors) in Large White Perch and Perch of Target Size

Chemical	Exposure Unit	Perch of Target Size					Large White Perch				
		n	FOD (n Detect/n)	Minimum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg) [a]	Maximum (Detect) (mg/kg)	n	FOD (n Detect/n)	Minimum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg) [b]	Maximum (Detect) (mg/kg)
Methyl Mercury	UBC	52	52/52	0.038	0.40	1.2 J	6	6/6	0.29	0.68	1.1
	MBC	59	59/59	0.040	0.37	0.99 J	7	7/7	0.060	0.37	0.80
	BCC	59	59/59	0.013	0.30	0.76	5	5/5	0.30	0.48	0.59
	LBC	57	57/57	0.056	0.31	0.69	5	5/5	0.097	0.29	0.43
	Reference Sites	125	125/125	0.017	0.25	0.48	21	21/21	0.22	0.47	0.85
PCBs (total Aroclors)	UBC	52	52/52	0.13	0.98	3.4	6	6/6	0.18	0.79	2.4
	MBC	59	59/59	0.11	0.80	3.2 J	7	7/7	0.010 J	0.58	1.3
	BCC	59	59/59	0.056 J	0.81	2.9	5	5/5	0.053	0.14	0.31
	LBC	57	57/57	0.036	0.43	1.7 J	5	5/5	0.17	0.32	0.56
	Reference Sites	125	125/125	0.027 J	0.51	2.1	21	21/21	0.063 J	0.72	1.6

Notes:
BCC = Berry's Creek Canal
FOD = frequency of detection
J = estimated value
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek

[a] White perch fillet of target size (150–190 mm) were collected annually from 2009 to 2015 and were analyzed as composite samples.

[b] Large white perch fillet (>200mm) were collected in 2014 and 2015 and analyzed individaully.

Table 5-11. Comparison of PCB Total Aroclors and PCB Total Congeners in Tissue

Media	Exposure Unit	PCB (total Aroclor)					PCB (total Congeners)				
		n	FOD (n Detect/n)	Minimum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Maximum (Detect) (mg/kg)	n	FOD (n Detect/n)	Minimum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Maximum (Detect) (mg/kg)
White Perch Fillet	UBC	52	52/52	0.13	0.98	3.4	8	8/8	1.3 J	2.0	2.5 J
	MBC	59	59/59	0.11	0.80	3.2 J	8	8/8	0.64 J	1.7	3.2 J
	BCC	59	59/59	0.056 J	0.81	2.9	8	8/8	0.48 J	1.4	2.2 J
	LBC	57	57/57	0.036	0.43	1.7 J	8	8/8	0.26 J	1.1	2.2 J
	Reference Sites	125	125/125	0.027 J	0.51	2.1	24	24/24	0.31 J	0.75	1.2 J
Crab Muscle	UBC	13	10/13	0.0024 J	0.010	0.025	5	5/5	0.054 J	0.17	0.27 J
	MBC	14	11/14	0.0019 J	0.017	0.047	5	5/5	0.072 J	0.13	0.26 J
	BCC	14	11/14	0.0016 J	0.010	0.021	5	5/5	0.052 J	0.077	0.12 J
	LBC	13	11/13	0.0020 J	0.0082	0.038	5	5/5	0.045 J	0.057	0.080 J
	Reference Sites	39	27/39	0.0016 J	0.0064	0.017 J	16	16/16	0.054 J	0.077	0.13 J
Crab Muscle and Hepatopancreas	UBC	9	9/9	0.099	0.15	0.25 J	5	5/5	0.40 J	0.69	1.0 J
	MBC	9	9/9	0.0064 J	0.097	0.17	5	5/5	0.44 J	0.60	1.0 J
	BCC	8	8/8	0.065	0.13	0.18 J	5	5/5	0.33 J	0.39	0.47 J
	LBC	8	8/8	0.024 J	0.14	0.42 J	5	5/5	0.30 J	0.37	0.43 J
	Reference Sites	27	27/27	0.039 J	0.11	0.21	16	16/16	0.29 J	0.47	0.75 J

Notes:
BCC = Berry's Creek Canal
FOD = frequency of detection
J = estimated value
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek

Table 5-12. Comparison of EPCs for Risk Drivers in Surface Sediment

Exposure Unit	Chemical	EPC Calculated for Anglers/Crabbers (mg/kg)	EPC Calculated for Kayaker/Canoers (mg/kg)	EPC Using All Marsh and Mudflat Surface Sediment Locations (mg/kg)
UBC	Arsenic	50	45	38
	Benzo[a]pyrene	1.8	1.5	1.3
	PCBs (total Aroclors)	6.2	5.7	4.1
MBC	Arsenic	19	18	19
	Benzo[a]pyrene	1.1	1.4	0.91
	PCBs (total Aroclors)	1.6	1.4	1.1
BCC	Arsenic	12	17	16
	Benzo[a]pyrene	1.4	0.81	0.75
	PCBs (total Aroclors)	0.82	0.59	0.51
LBC	Arsenic	15	15	18
	Benzo[a]pyrene	0.70	0.66	0.59
	PCBs (total Aroclors)	0.42	0.52	0.48
Reference Sites	Arsenic	34	34	34
	Benzo[a]pyrene	1.2	1.2	1.2
	PCBs (total Aroclors)	1.1	1.1	1.1

Notes:
BCC = Berry's Creek Canal
EPC = exposure point concentration
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek

Reference Sites included data from Bellman's Creek, Mill Creek, and Woodbridge River, as available.

Table 5-13. EPCs for COPCs in Surface Sediment, All Marsh and Mudflat Samples

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	Metals	Mercury	145	145	100	0.53 J	1,400 J	92	0.014–30	Nonparametric	95% Chebyshev (Mean, SD) UCL	160	160	(1)
	PCBs	PCBs (total Aroclors)	121	121	100	0.030 J	24 J	2.5	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	4.1	4.1	(1)
	Metals	Antimony	78	23	29	0.71 J	7.7 J	2.7	0.53–21	Normal	95% KM (t) UCL	1.6	1.6	(1)
		Arsenic	78	78	100	4.9	130 J	26	0.40–3.0	Nonparametric	95% Chebyshev (Mean, SD) UCL	38	38	(1)
		Cadmium	78	78	100	0.78 J	120 J	13	0.049–1.9	Nonparametric	95% Chebyshev (Mean, SD) UCL	23	23	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	78	77	99	5.1 J	54 J	16	0.22–7.6	Approximate normal	95% KM (t) UCL	18	18	(1)
		Copper	78	78	100	36 J	850 J	240	1.0–5.9	Nonparametric	95% Chebyshev (Mean, SD) UCL	320	320	(1)
		Iron	90	90	100	12,000	39,000 J	27,000	6.6–38.8	Normal	95% Student's-t UCL	28,000	28,000	(1)
		Manganese	90	90	100	130	29,000 J	3,700	0.10–4.0	Nonparametric	95% Chebyshev (Mean, SD) UCL	6,400	6,400	(1)
		Nickel	78	78	100	16	350 J	79	0.36–6.1	Lognormal	95% Chebyshev (Mean, SD) UCL	110	110	(1)
		Thallium	78	35	45	0.94 J	60 J	11	0.60–29.6	Lognormal	95% KM (BCA) UCL	7.5	7.5	(1)
		Zinc	78	78	100	150 J	11,000 J	1,600	1.3–53.8	Nonparametric	95% Chebyshev (Mean, SD) UCL	2,500	2,500	(1)
	PAHs	Benz[a]anthracene	40	40	100	0.047 J	3.3 J	0.69	0.0022–0.042	Lognormal	95% Chebyshev (Mean, SD) UCL	1.1	1.1	(1)
		Benzo[a]pyrene	40	40	100	0.063 J	3.2 J	0.78	0.0017–0.055	Lognormal	95% Chebyshev (Mean, SD) UCL	1.3	1.3	(1)
		Benzo[b]fluoranthene	40	40	100	0.094 J	3.6 J	1.0	0.0027–0.048	Lognormal	95% Chebyshev (Mean, SD) UCL	1.6	1.6	(1)
		Dibenz[a,h]anthracene	40	39	98	0.012 J	1.3 J	0.25	0.0019–0.044	Lognormal	95% KM (Chebyshev) UCL	0.45	0.45	(1)
		Indeno[1,2,3-cd]pyrene	40	40	100	0.046 J	2.4 J	0.62	0.0018–0.045	Lognormal	95% Chebyshev (Mean, SD) UCL	0.99	0.99	(1)
	Pesticides	Aldrin	33	15	45	0.0014 J	0.23 J	0.044	0.000043–0.0080	Lognormal	95% KM (BCA) UCL	0.034	0.034	(1)
		Heptachlor epoxide	33	28	85	0.0010 J	0.19 J	0.044	0.000047–0.0087	Lognormal	97.5% KM (Chebyshev) UCL	0.091	0.091	(1)
MBC	Metals	Mercury	143	143	100	0.49	86	20	0.014–4.1	Gamma	95% Approximate Gamma UCL	23	23	(1)
	PCBs	PCBs (total Aroclors)	123	119	97	0.029 J	6.1 J	0.98	NA	Gamma	95% KM (Approximate Gamma) UCL	1.1	1.1	(1)
	Metals	Antimony	80	21	26	0.78 J	5.8 J	2.9	0.46–16	Lognormal	95% KM (t) UCL	1.6	1.6	(1)
		Arsenic	80	80	100	2.9	48 J	18	0.35–13	Approximate normal	95% Modified Student's-t UCL	19	19	(1)
		Cadmium	80	77	96	0.21 J	11	3.9	0.043–3.2	Gamma	95% KM (Approximate Gamma) UCL	4.3	4.3	(1)
		Chromium (VI)	1	1	100	45	45	45	3.4–3.4	Normal	Maximum concentration	45	45	(4)
		Cobalt	80	74	92	4.6 J	95 J	17	0.19–32	Nonparametric	95% KM (BCA) UCL	19	19	(1)
		Copper	80	80	100	29	250 J	130	0.88–16	Normal	95% Student's-t UCL	140	140	(1)
		Iron	91	91	100	10,000	84,000 J	28,000	5.8–80	Approximate normal	95% Modified Student's-t UCL	30,000	30,000	(1)
		Manganese	91	91	100	140	38,000 J	4,100	0.088–12	Nonparametric	95% Chebyshev (Mean, SD) UCL	7,400	7,400	(1)
		Nickel	80	80	100	13	260 J	76	0.32–26	Nonparametric	95% Chebyshev (Mean, SD) UCL	110	110	(1)
		Thallium	80	30	38	0.57 J	100 J	15	0.53–14.5	Nonparametric	95% KM (BCA) UCL	10	10	(1)
		Zinc	80	80	100	53	1,800 J	530	1.2–13	Lognormal	95% Chebyshev (Mean, SD) UCL	670	670	(1)
	PAHs	Benz[a]anthracene	34	32	94	0.053 J	2.5 J	0.49	0.00053–0.059	Lognormal	95% KM (Chebyshev) UCL	0.85	0.85	(1)
		Benzo[a]pyrene	34	30	88	0.071	2.6 J	0.58	0.0013–0.055	Lognormal	95% KM (Chebyshev) UCL	0.91	0.91	(1)
		Benzo[b]fluoranthene	34	30	88	0.10	3.7 J	0.80	0.0022–0.060	Lognormal	95% KM (Chebyshev) UCL	1.3	1.3	(1)
		Dibenz[a,h]anthracene	34	27	79	0.013 J	0.67 J	0.17	0.0011–0.061	Lognormal	97.5% KM (Chebyshev) UCL	0.31	0.31	(1)
		Indeno[1,2,3-cd]pyrene	34	30	88	0.051 J	2.0 J	0.44	0.0013–0.063	Lognormal	95% KM (Chebyshev) UCL	0.70	0.70	(1)
	Pesticides	Aldrin	24	12	50	0.00074 J	0.046 J	0.017	0.000060–0.0027	Lognormal	97.5% KM (Chebyshev) UCL	0.025	0.025	(1)
		Heptachlor epoxide	23	13	57	0.0015 J	0.034 J	0.013	0.000053–0.0030	Normal	95% KM (t) UCL	0.011	0.011	(1)

Table 5-13. EPCs for COPCs in Surface Sediment, All Marsh and Mudflat Samples

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
BCC	Metals	Mercury	37	37	100	0.19 J	18 J	5.5	0.0162–0.49	Gamma	95% Adjusted Gamma UCL	7.2	7.2	(1)
	PCBs	PCBs (total Aroclors)	30	28	93	0.010 J	1.4 J	0.40	NA	Gamma	95% KM (Adjusted Gamma) UCL	0.51	0.51	(1)
	Metals	Antimony	22	2	9	1.8 J	4.3 J	3.1	0.57–3.5	None	Maximum concentration	4.3	4.3	(4)
		Arsenic	22	22	100	9.3 J	38 J	14	0.43–2.7	Approximate normal	95% Modified Student's-t UCL	16	16	(1)
		Cadmium	22	22	100	0.24 J	3.3 J	1.4	0.052–0.32	Normal	95% Student's-t UCL	1.7	1.7	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	22	21	95	3.2 J	22 J	10	0.23–1.4	Normal	95% KM (t) UCL	11	11	(1)
		Copper	22	22	100	21 J	140 J	97	1.1–6.6	Normal	95% Student's-t UCL	110	110	(1)
		Iron	24	24	100	9,600 J	38,000 J	26,000	7.1–44	Normal	95% Student's-t UCL	28,000	28,000	(1)
		Manganese	24	24	100	160 J	2,200 J	630	0.11–0.66	Nonparametric	95% Chebyshev (Mean, SD) UCL	1,100	1,100	(1)
		Nickel	22	22	100	18 J	110 J	39	0.39–2.4	Approximate normal	95% Modified Student's-t UCL	46	46	(1)
		Thallium	22	7	32	1.6 J	3.6 J	2.7	0.80–4.9	Normal	95% KM (t) UCL	2.0	2.0	(1)
		Zinc	22	22	100	86 J	430 J	260	1.4–8.9	Normal	95% Student's-t UCL	290	290	(1)
	PAHs	Benz[a]anthracene	17	17	100	0.016 J	1.7 J	0.49	0.0045–0.028	Gamma	95% Adjusted Gamma UCL	0.92	0.92	(1)
		Benzo[a]pyrene	17	16	94	0.061 J	1.7 J	0.60	0.0036–0.049	Normal	95% KM (t) UCL	0.75	0.75	(1)
		Benzo[b]fluoranthene	17	16	94	0.082 J	2.3 J	0.83	0.0056–0.036	Normal	95% KM (t) UCL	1.0	1.0	(1)
		Dibenz[a,h]anthracene	17	14	82	0.019 J	0.55 J	0.14	0.0040–0.039	Lognormal	95% KM (Chebyshev) UCL	0.25	0.25	(1)
		Indeno[1,2,3-cd]pyrene	17	16	94	0.044 J	1.2 J	0.38	0.0016–0.0096	Normal	95% KM (t) UCL	0.48	0.48	(1)
	Pesticides	Aldrin	17	8	47	0.0030 J	0.020 J	0.0087	0.00010–0.0020	Normal	95% KM (t) UCL	0.0061	0.0061	(1)
		Heptachlor epoxide	15	9	60	0.0021 J	0.011 J	0.0053	0.00011–0.0022	Normal	95% KM (t) UCL	0.0045	0.0045	(1)
LBC	Metals	Mercury	72	71	99	0.26 J	23 J	3.7	0.00439–0.49	Nonparametric	95% KM (BCA) UCL	4.4	4.4	(1)
	PCBs	PCBs (total Aroclors)	60	59	98	0.014 J	1.3 J	0.33	NA	Lognormal	95% KM (Chebyshev) UCL	0.48	0.48	(1)
	Metals	Antimony	44	14	32	1.0 J	3.8 J	2.3	0.58–3.5	Normal	95% KM (t) UCL	1.5	1.5	(1)
		Arsenic	44	44	100	10 J	39 J	16	0.44–2.7	Approximate normal	95% Modified Student's-t UCL	18	18	(1)
		Cadmium	44	37	84	0.25 J	2.9 J	1.5	0.053–0.32	Normal	95% KM (t) UCL	1.4	1.4	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	44	44	100	3.9 J	18 J	12	0.24–1.4	Normal	95% Student's-t UCL	12	12	(1)
		Copper	44	44	100	49 J	150 J	100	1.1–6.6	Normal	95% Student's-t UCL	110	110	(1)
		Iron	47	47	100	9,800 J	52,000 J	29,000	3.7–43.5	Normal	95% Student's-t UCL	31,000	31,000	(1)
		Manganese	47	47	100	97 J	4,500 J	610	0.097–0.80	Nonparametric	95% Chebyshev (Mean, SD) UCL	1,000	1,000	(1)
		Nickel	44	44	100	25 J	89 J	43	0.40–2.4	Approximate normal	95% Modified Student's-t UCL	47	47	(1)
		Thallium	44	14	32	1.7 J	3.4 J	2.2	0.81–4.9	Normal	95% KM (t) UCL	1.7	1.7	(1)
		Zinc	44	44	100	120 J	380 J	240	1.5–8.9	Normal	95% Student's-t UCL	260	260	(1)
	PAHs	Benz[a]anthracene	30	30	100	0.044 J	1.2 J	0.45	0.0024–0.020	Normal	95% Student's-t UCL	0.53	0.53	(1)
		Benzo[a]pyrene	30	30	100	0.056 J	1.1 J	0.50	0.0019–0.030	Normal	95% Student's-t UCL	0.59	0.59	(1)
		Benzo[b]fluoranthene	30	30	100	0.085 J	1.4 J	0.66	0.0030–0.025	Normal	95% Student's-t UCL	0.77	0.77	(1)
		Dibenz[a,h]anthracene	30	23	77	0.0083 J	0.30 J	0.13	0.0021–0.024	Normal	95% KM (t) UCL	0.13	0.13	(1)
		Indeno[1,2,3-cd]pyrene	30	30	100	0.034 J	0.86 J	0.36	0.0020–0.016	Normal	95% Student's-t UCL	0.43	0.43	(1)
	Pesticides	Aldrin	30	19	63	0.0016 J	0.0079 J	0.0040	0.00014–0.00081	Normal	95% KM (t) UCL	0.0032	0.0032	(1)
		Heptachlor epoxide	23	7	30	0.0015 J	0.0037 J	0.0025	0.00015–0.00088	Normal	95% KM (t) UCL	0.0011	0.0011	(1)

Table 5-13. EPCs for COPCs in Surface Sediment, All Marsh and Mudflat Samples

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Reference Sites	Metals	Mercury	76	72	95	0.030 J	14 J	2.9	0.00548–0.68	Gamma	95% KM (Approximate Gamma) UCL	3.3	3.3	(1)
	PCBs	PCBs (total Aroclors)	59	52	88	0.011 J	7.0 J	0.50	NA	Lognormal	95% KM (Chebyshev) UCL	1.1	1.1	(1)
	Metals	Antimony	59	15	25	0.50 J	88 J	8.5	0.41–7.0	Nonparametric	95% KM (BCA) UCL	5.7	5.7	(1)
		Arsenic	59	59	100	2.6 J	150 J	20	0.32–7.0	Lognormal	95% Chebyshev (Mean, SD) UCL	34	34	(1)
		Cadmium	59	42	71	0.065 J	17 J	2.0	0.038–1.8	Lognormal	95% KM (Chebyshev) UCL	3.0	3.0	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	59	54	92	2.7 J	98 J	15	0.17–18	Lognormal	95% KM (Chebyshev) UCL	24	24	(1)
		Copper	59	59	100	16	1,100 J	190	0.79–8.8	Lognormal	95% Chebyshev (Mean, SD) UCL	330	330	(1)
		Iron	59	59	100	7,500 J	72,000 J	26,000	5.2–43.1	Normal	95% Student's-t UCL	29,000	29,000	(1)
		Manganese	59	59	100	71 J	7,400 J	820	0.079–5.3	Nonparametric	95% Chebyshev (Mean, SD) UCL	1,700	1,700	(1)
		Nickel	59	59	100	6.1 J	420 J	63	0.29–14	Lognormal	95% Chebyshev (Mean, SD) UCL	110	110	(1)
		Thallium	59	18	31	1.5	8.9 J	3.7	0.59–4.8	Lognormal	95% KM (t) UCL	1.9	1.9	(1)
		Zinc	58	58	100	51 J	1,100 J	320	1.1–8.8	Lognormal	95% Chebyshev (Mean, SD) UCL	450	450	(1)
	PAHs	Benz[a]anthracene	47	45	96	0.044 J	4.0	0.74	0.0022–0.033	Lognormal	95% KM (Chebyshev) UCL	1.3	1.3	(1)
		Benzo[a]pyrene	47	45	96	0.049 J	3.5 J	0.72	0.0017–0.038	Lognormal	95% KM (Chebyshev) UCL	1.2	1.2	(1)
		Benzo[b]fluoranthene	47	45	96	0.037 J	4.1	0.96	0.0027–0.034	Lognormal	95% KM (Chebyshev) UCL	1.6	1.6	(1)
		Dibenz[a,h]anthracene	47	39	83	0.018 J	0.81 J	0.20	0.0019–0.035	Lognormal	95% KM (Chebyshev) UCL	0.29	0.29	(1)
		Indeno[1,2,3-cd]pyrene	47	44	94	0.049 J	2.0 J	0.49	0.0018–0.035	Lognormal	95% KM (Chebyshev) UCL	0.76	0.76	(1)
	Pesticides	Aldrin	40	11	28	0.00079 J	0.041 J	0.0068	0.000049–0.0012	Lognormal	95% KM (BCA) UCL	0.0044	0.0044	(1)
		Heptachlor epoxide	39	13	33	0.00053 J	0.096 J	0.018	0.000053–0.0013	Nonparametric	97.5% KM (Chebyshev) UCL	0.026	0.026	(1)

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = no data/not applicable

(1) The 95 UCL is selected as the exposure point concentration.
(4) Less than 4 detected values; therefore, the maximum concentration is selected as the exposure point concentration.
(5) Input data has fewer than 10 distinct values.
(6) No available data.

Reference Sites included data from Bellman's Creek, Mill Creek, and Woodbridge River, as available.

Table 5-14. Comparison of Construction Worker Risks in Marshes Using All Data

Exposure Unit	Cancer Risk Sediment (Baseline Assessment [a])	Cancer Risk (All Samples)	HI Sediment (Baseline Assessment [a])	HI (All Samples)
Nevertouch Marsh	7E-07	4E-07	1	1
Eight Day Swamp	4E-07	3E-07	0.7	1
Paterson Plank Marsh	4E-07	4E-07	0.6	0.8
Upper Peach Island Creek Marsh	1E-06	1E-06	1	2
Walden Swamp	4E-07	3E-07	0.7	2
Ackerman's East Marsh	2E-07	3E-07	0.2	5
Rutherford Marsh	1E-07	1E-07	0.4	0.4
Tollgate Marsh	9E-08	1E-07	0.2	0.3
Oritani Marsh	2E-07	2E-07	0.09	0.3
Berry's Creek Marsh	2E-07	2E-07	0.2	0.2
Former ENCAP Restoration Area	1E-07	1E-07	0.06	0.07

Notes:

HI = hazard index

[a] Calculated using depth-weighted average concentrations from all sampling locations with data extending beyond 15 cm for COPCs with any available data, and using depth-weighted average concentrations from surface sediment (0–15 cm) for COPCs for which no deeper sediment was available.

Shaded cells indicate noncancer HI > 1. Any HIs exceeding 1 are evaluated on an endpoint-specific basis (see text).
Upper Peach Island Creek is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

Table 5-15. Comparison of Construction Worker Risks in Waterways Using All Data

Exposure Unit	Cancer Risk Sediment (Baseline Assessment [a])	Cancer Risk (All Samples)	HI Sediment (Baseline Assessment [a])	HI (All Samples)
UPIC	7E-07	6E-07	1	1
UBC	4E-07	4E-07	0.6	0.5
MBC	5E-07	3E-07	0.5	0.3
BCC	3E-07	2E-07	0.3	0.2
LBC	3E-07	3E-07	0.3	0.2

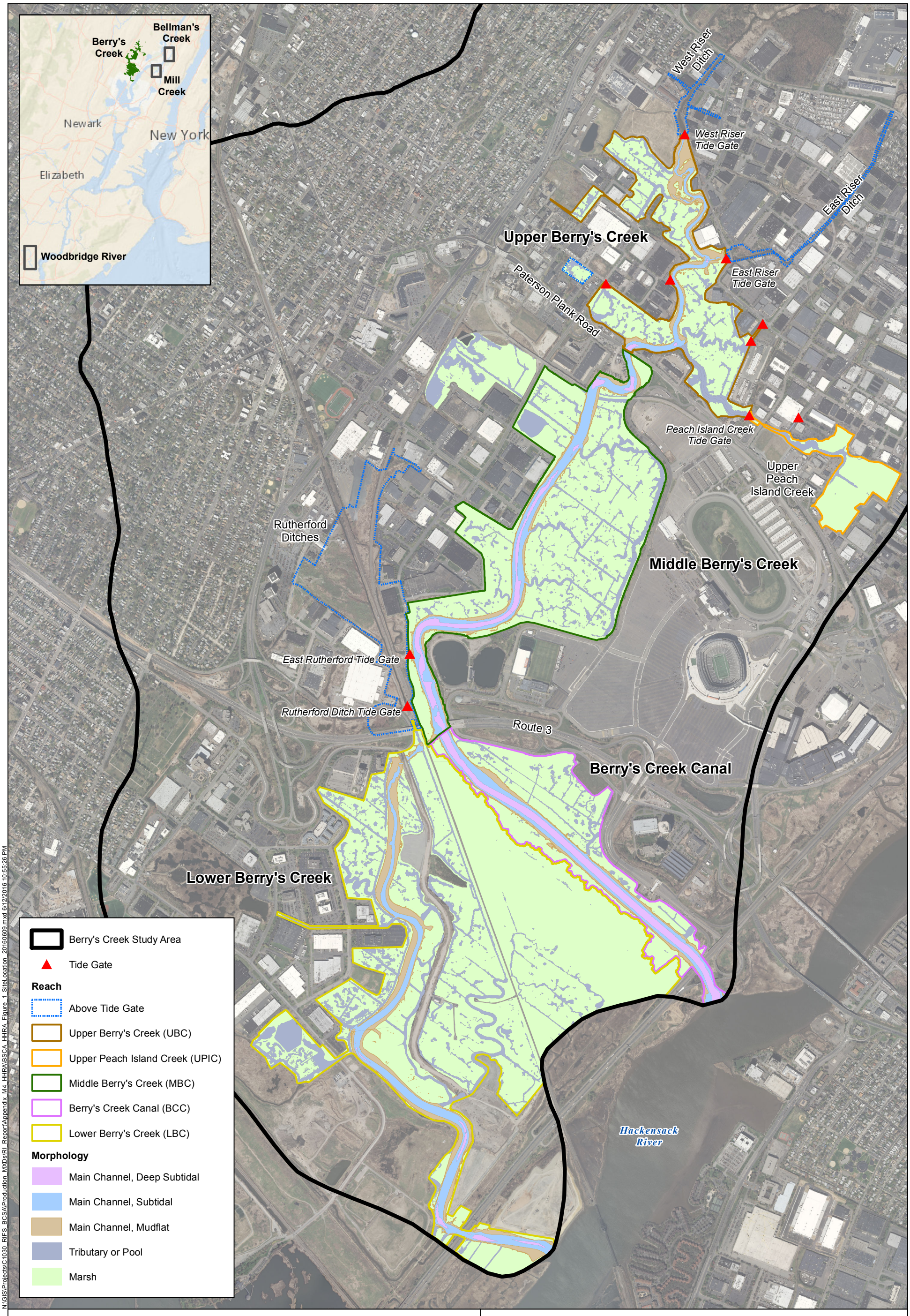
Notes:

BCC = Berry's Creek Canal
HI = hazard index
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
UBC = Upper Berry's Creek
UPIC = Upper Peach Island Creek

[a] Calculated using depth-weighted average concentrations from all sampling locations with data extending beyond 15 cm for COPCs with any available data, and using depth-weighted average concentrations from surface sediment (0–15 cm) for COPCs for which no deeper sediment was available.

UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

FIGURES



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Notes: UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.
Aerial Source: NJ Imagery, Natural, 2012.

0 1,000 2,000 Feet

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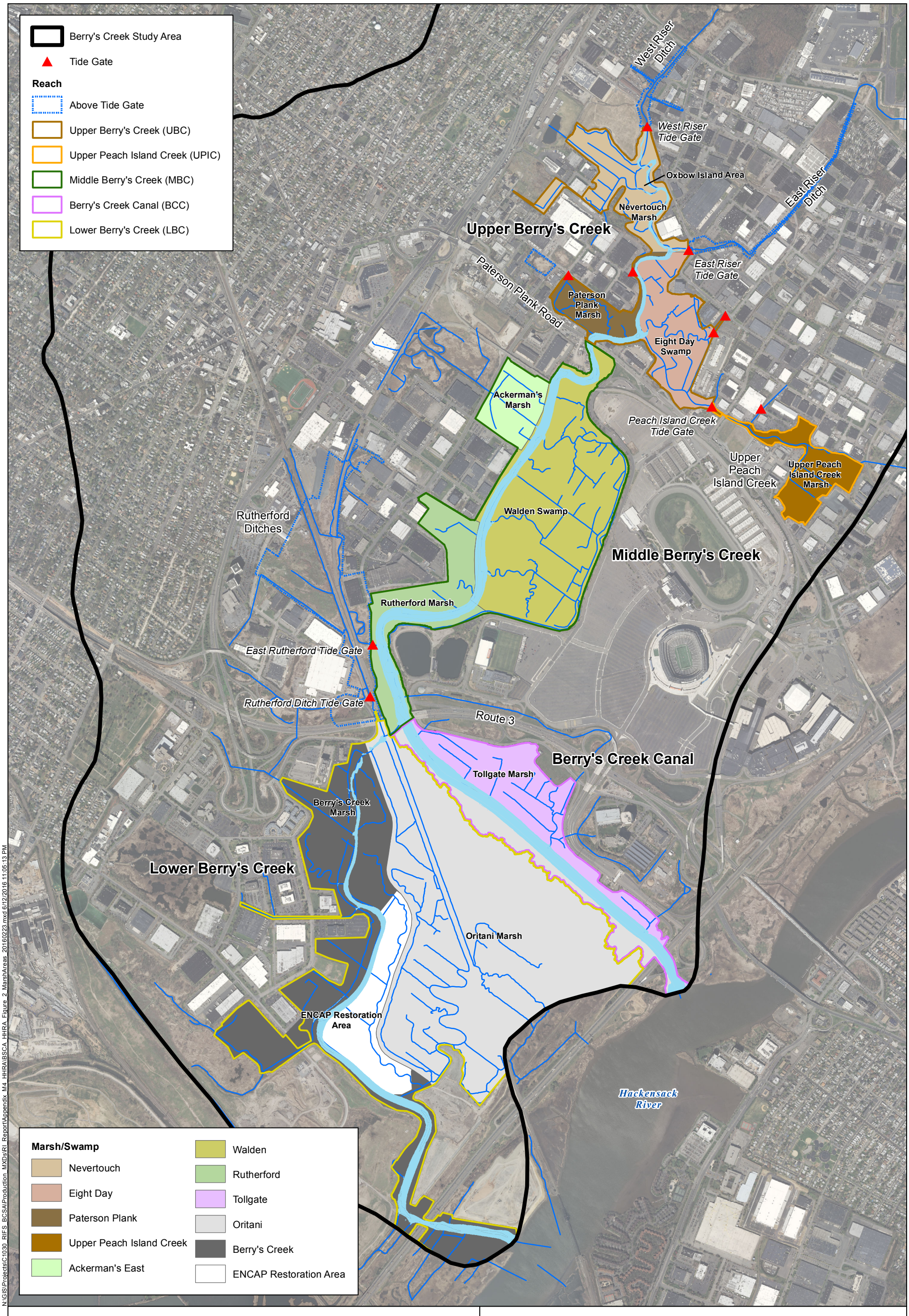
BCSA Tidal Zone Reaches and Above Tide Gate Areas

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **2-1**



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Notes: UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.
Aerial Source: NJ Imagery, Natural, 2012. Hydrography Source: U.S. Geological Survey National Hydrography Dataset (NHD), 2014.

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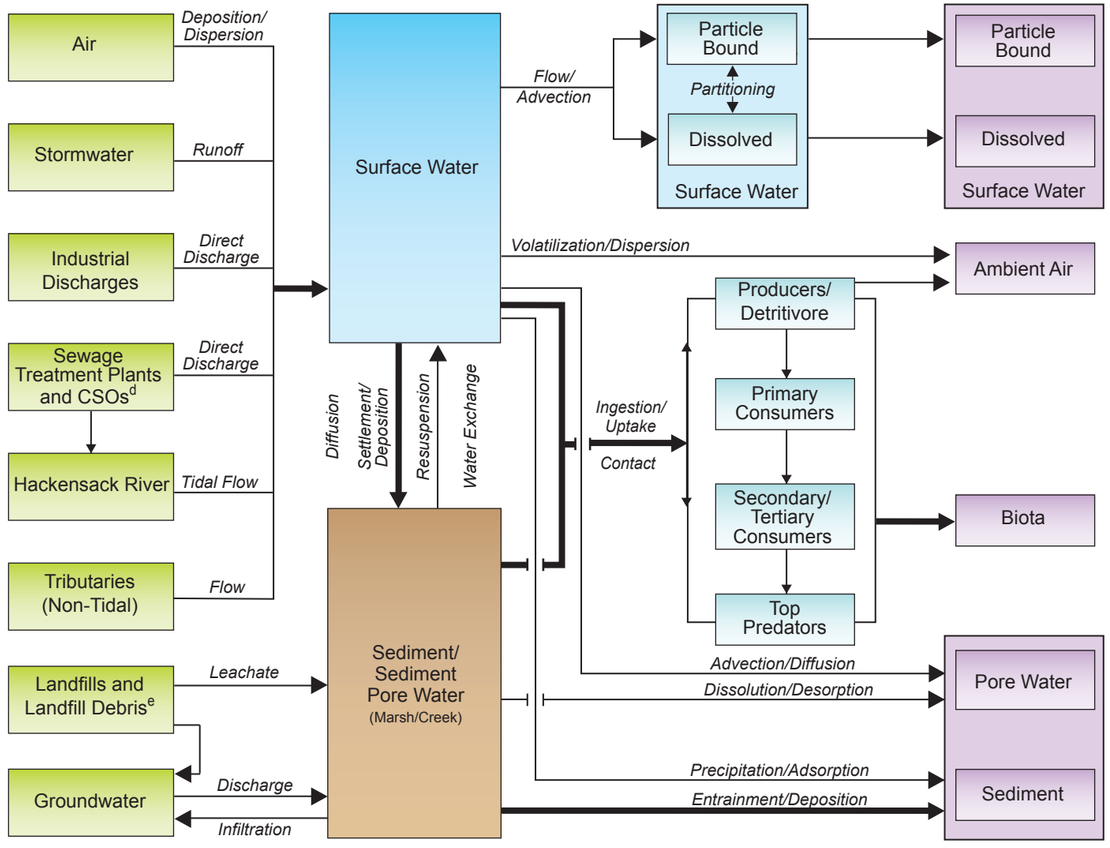
BCSA Marsh Areas

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **2-2**



EXPOSURE ROUTES	POTENTIAL RECEPTORS [b] — WATERWAYS: Angler/Crabber	Kayaker/Canoer	Worker [c]	Future Recreator (Swimmer)	MARSH: Angler/Crabber (@ waterway access points)	Kayaker/Canoer (@ waterway access points)	Worker [c]	Future Recreator (Hiker)
Ingestion	—	✓	—	✓	—	—	—	—
Dermal Contact	✓	✓	✓	✓	—	—	✓	—
Inhalation	✓	✓	✓	✓	✓	✓	✓	✓
Ingestion	✓	—	✓	—	—	—	—	—
Ingestion	✓	✓	✓	✓	✓	✓	✓	✓
Dermal Contact	✓	✓	✓	✓	✓	✓	✓	✓

Notes:

— Incomplete exposure pathway

✓ Potentially complete exposure pathway

Darker arrows indicate predominant processes (based on current understanding).

[a] Includes current and historical sources. Not all listed sources exist at present time. Most of the pathways from primary sources in BCSA have been eliminated or substantially reduced compared to past.

[b] Receptor groups include local residents who recreate and/or work in the BCSA. Receptors under current and future conditions, unless otherwise noted.

[c] Workers include local workers engaged in non-intrusive activities and construction workers.

[d] No sewage treatment plants currently discharge directly to Berry's Creek.

[e] Landfill leachate likely no longer significant because in recent years containment walls have been installed and landfills have been capped with low permeability material.

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Conceptual Site Model Showing Sources, Pathways, Exposure Routes, and Potential Receptors

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **2-3**

Surface Sediment Samples (0-15 cm) Included in Angler/Crabber Exposure Point Concentrations

- Marsh
- Mudflat

Potential Waterway Access Point

- Potential/observed human use
- Fish Consumption Advisory sign location

West Riser Ditch
West Riser Tide Gate
East Riser Ditch
East Riser Tide Gate
Upper Berry's Creek
Paterson Plank Road
Peach Island Creek Tide Gate
Upper Peach Island Creek
Rutherford Ditches
Middle Berry's Creek
East Rutherford Tide Gate
Rutherford Ditch Tide Gate
Route 3
Berry's Creek Canal
Lower Berry's Creek
Hackensack River

- Berry's Creek Study Area
- Tide Gate

Reach

- Above Tide Gate
- Upper Berry's Creek (UBC)
- Upper Peach Island Creek (UPIC)
- Middle Berry's Creek (MBC)
- Berry's Creek Canal (BCC)
- Lower Berry's Creek (LBC)

Morphology

- Main Channel, Deep Subtidal
- Main Channel, Subtidal
- Main Channel, Mudflat
- Tributary or Pool
- Marsh

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Notes:
Aerial Source: NJ Imagery, Natural, 2012.

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Selected Marsh and Mudflat Surface Sediment Locations for Angler/Crabber BCSA Exposure Point Concentrations

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **3-1**

Surface Sediment Samples (0-15 cm) Included in Kayaker/Canoer Exposure Point Concentrations

- Marsh
- Mudflat

Potential Waterway Access Point

- Potential/observed human use
- Fish Consumption Advisory sign location

West Riser Ditch
West Riser Tide Gate
East Riser Ditch
East Riser Tide Gate
Upper Berry's Creek
Paterson Plank Road
Peach Island Creek Tide Gate
Upper Peach Island Creek
Rutherford Ditches
Middle Berry's Creek
East Rutherford Tide Gate
Rutherford Ditch Tide Gate
Route 3
Berry's Creek Canal
Lower Berry's Creek
Hackensack River

- Berry's Creek Study Area
- Tide Gate

Reach

- Above Tide Gate
- Upper Berry's Creek (UBC)
- Upper Peach Island Creek (UPIC)
- Middle Berry's Creek (MBC)
- Berry's Creek Canal (BCC)
- Lower Berry's Creek (LBC)

Morphology

- Main Channel, Deep Subtidal
- Main Channel, Subtidal
- Main Channel, Mudflat
- Tributary or Pool
- Marsh

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Notes:
Aerial Source: NJ Imagery, Natural, 2012.

0 1,000 2,000 Feet

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Selected Marsh and Mudflat Surface Sediment Locations for Kayaker/Canoer BCSA Exposure Point Concentrations

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
3-2

Surface Sediment Samples (0-15 cm) Included in Recreator Exposure Point Concentrations

Notes:
Aerial Source: NJ Imagery, Natural, 2012.

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Surface Sediment Locations for Recreator Exposure Point Concentrations at Reference Sites

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
3-3

Sediment Samples Included in Construction Worker Exposure Point Concentrations

- Marsh (0-15 cm only)
- Marsh (Extending beyond 15 cm)
- Waterway (Extending beyond 15 cm)

West Riser Ditch
West Riser Tide Gate
East Riser Ditch
East Riser Tide Gate
Upper Berry's Creek
Paterson Plank Road
Peach Island Creek Tide Gate
Upper Peach Island Creek
Rutherford Ditches
Middle Berry's Creek
East Rutherford Tide Gate
Rutherford Ditch Tide Gate
Route 3
Berry's Creek Canal
Lower Berry's Creek
Hackensack River

- Berry's Creek Study Area
- Tide Gate

Reach

- Above Tide Gate
- Upper Berry's Creek (UBC)
- Upper Peach Island Creek (UPIC)
- Middle Berry's Creek (MBC)
- Berry's Creek Canal (BCC)
- Lower Berry's Creek (LBC)

Morphology

- Main Channel, Deep Subtidal
- Main Channel, Subtidal
- Main Channel, Mudflat
- Tributary or Pool
- Marsh

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Notes:
Aerial Source: NJ Imagery, Natural, 2012.

0 1,000 2,000 Feet

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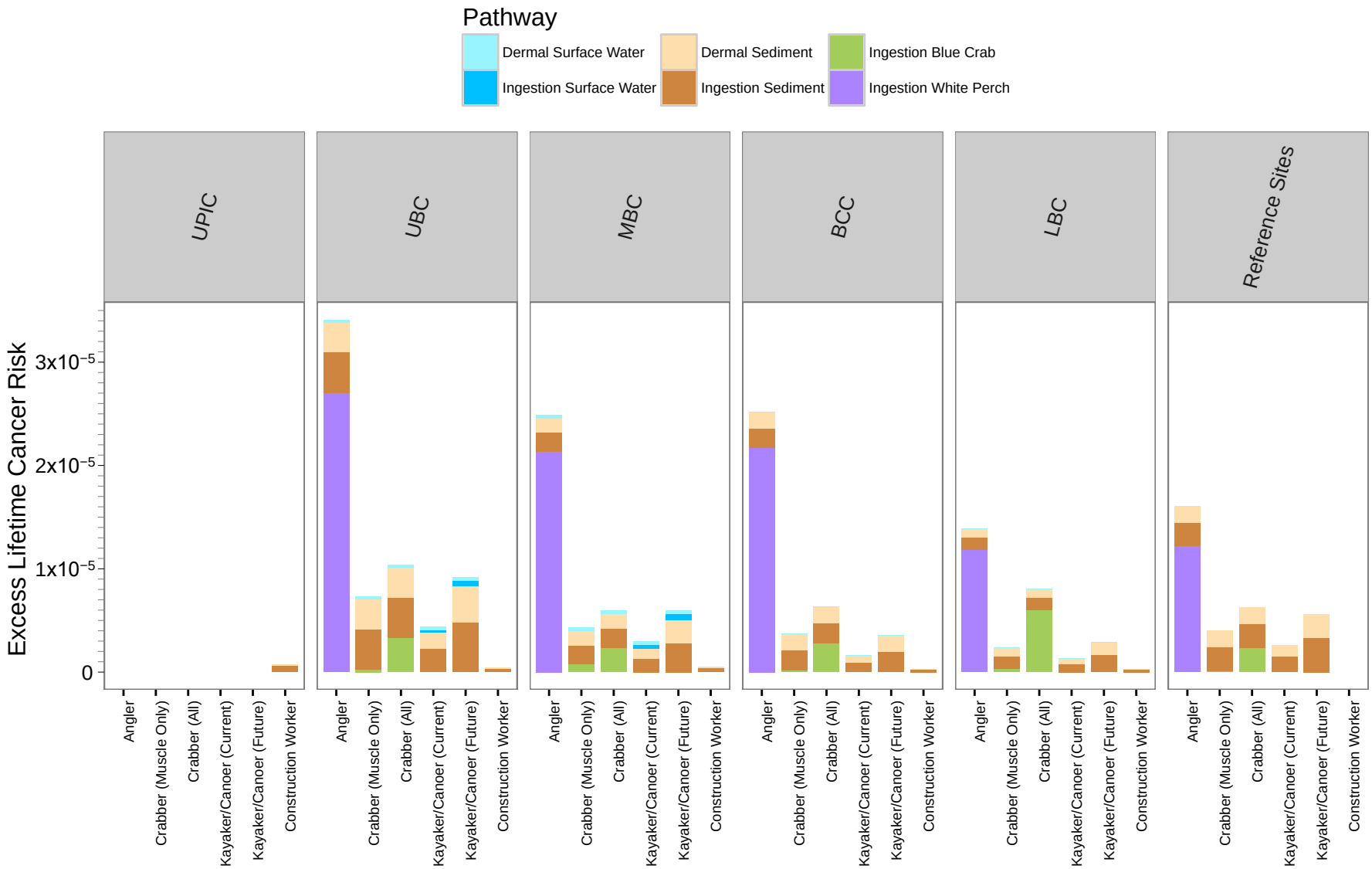
Marsh and Waterway Sediment Locations for Construction Worker Exposure Point Concentrations

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **3-4**



Notes: No surface water or air data for reference sites. Crabber (all) includes blue crab muscle & hepatopancreas. Minor breaks denote intervals of $1x10^{-6}$.

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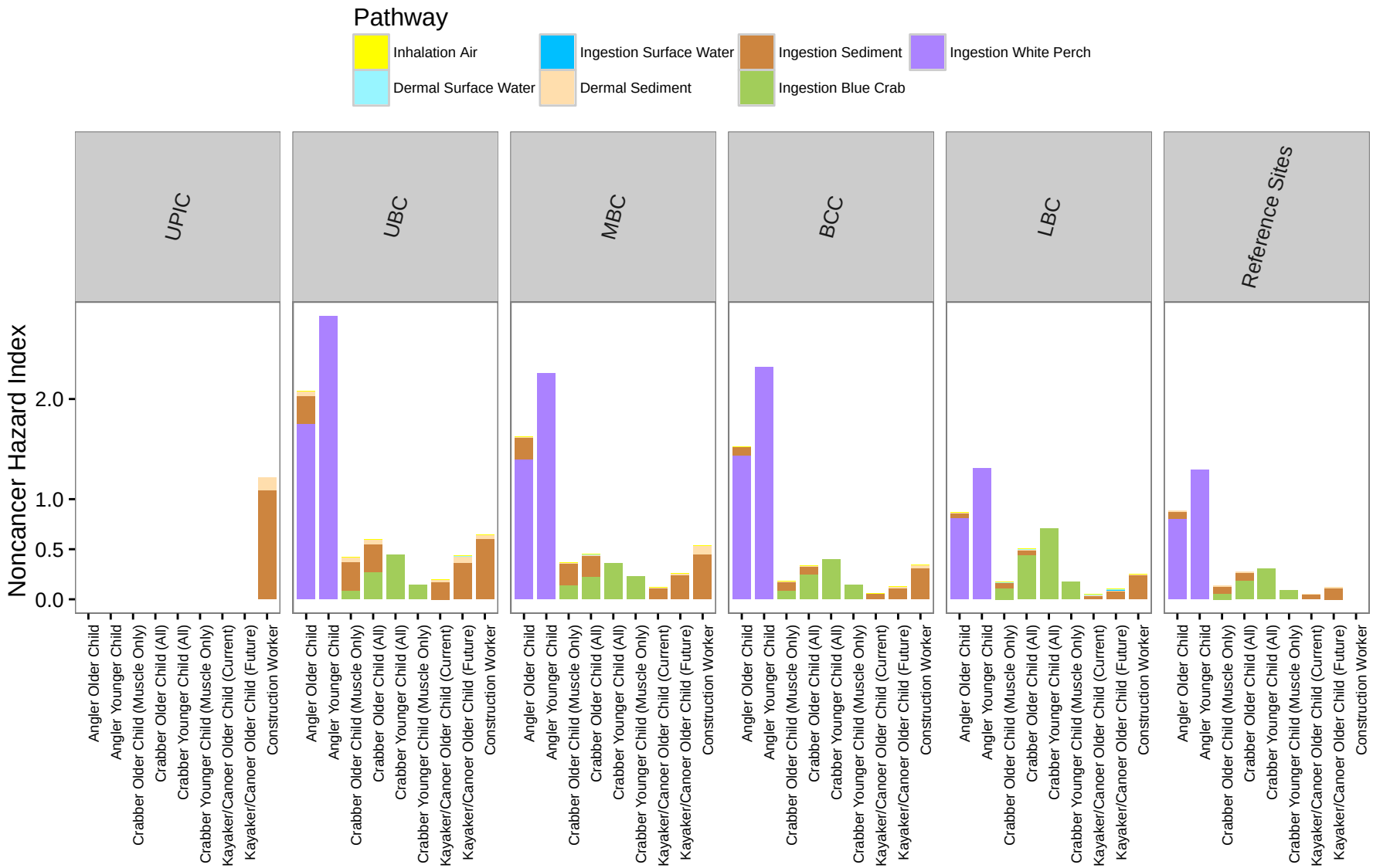
RME Excess Lifetime Cancer Risk by Exposure Unit – Waterways

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5–1



Notes: Noncancer hazards are greater for older child than adults so adult age class is not depicted for angler and crabber scenarios. Younger child exposure is limited to tissue ingestion. No surface water or air data for reference sites. Crabber (all) includes blue crab muscle & hepatopancreas.

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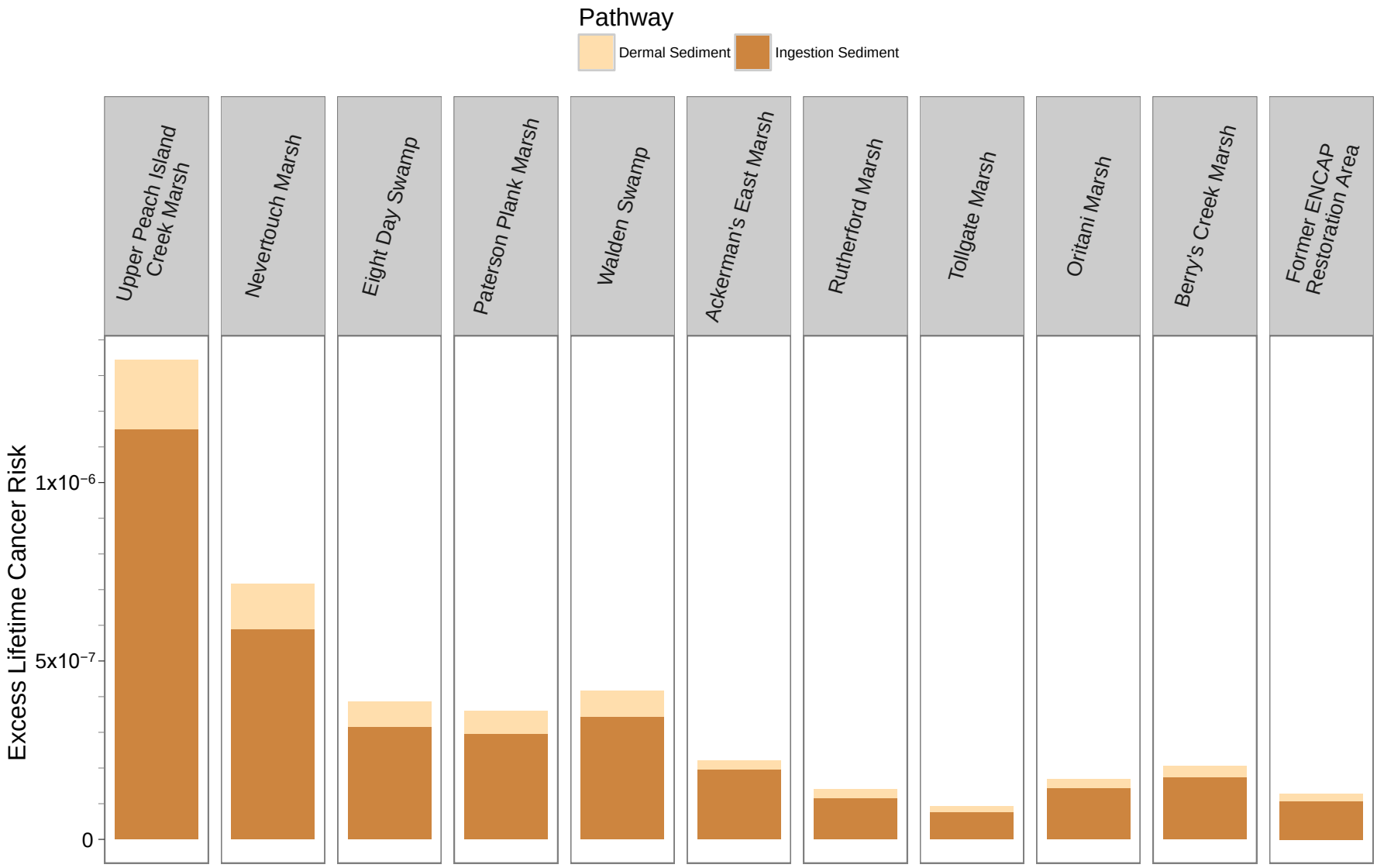
RME Noncancer Hazards by Exposure Unit − Waterways

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5−2



Notes: Minor breaks denote intervals of $1x10^{-7}$.

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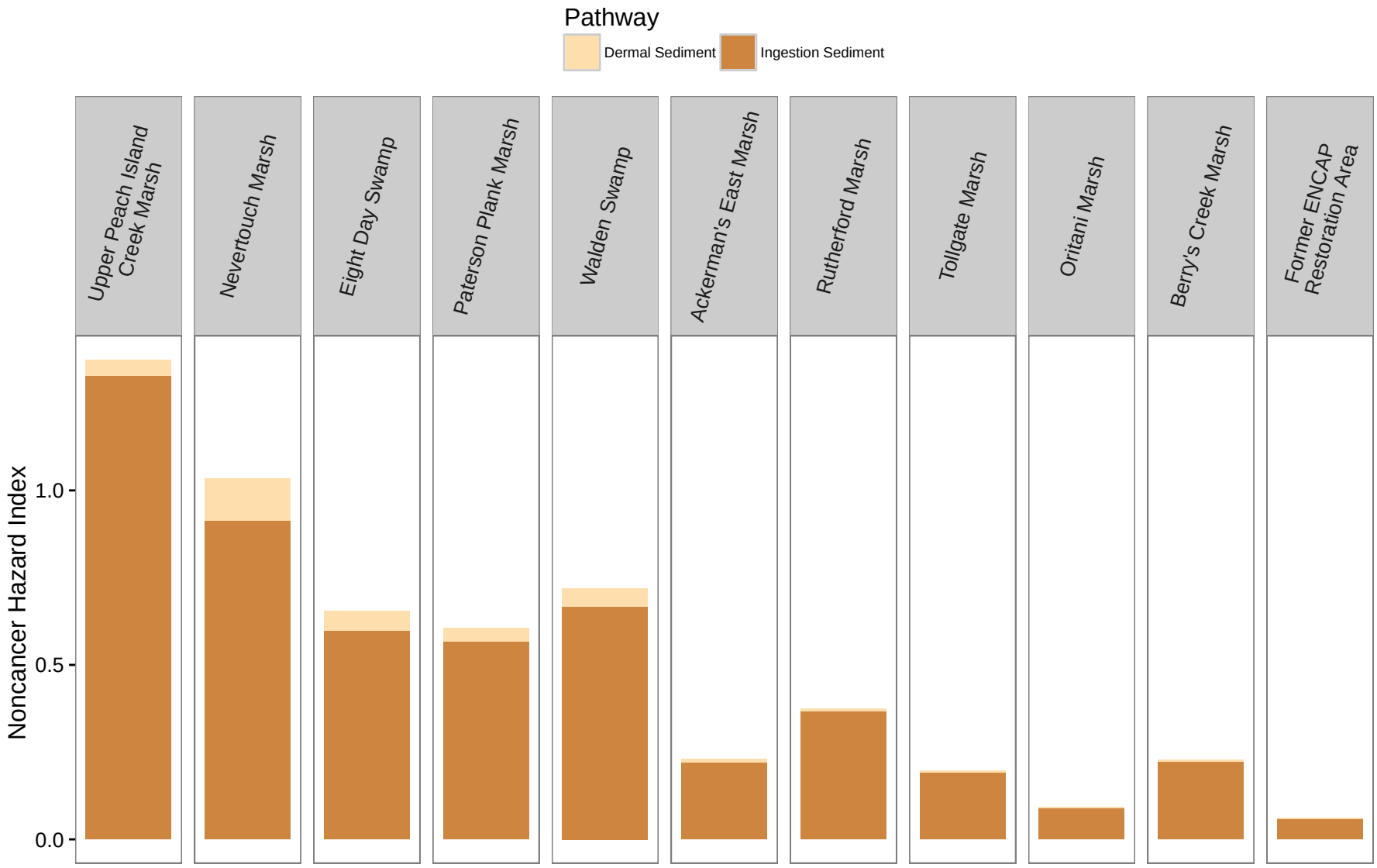
RME Excess Lifetime Cancer Risk for Construction Workers by Exposure Unit − Marshes

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5−3



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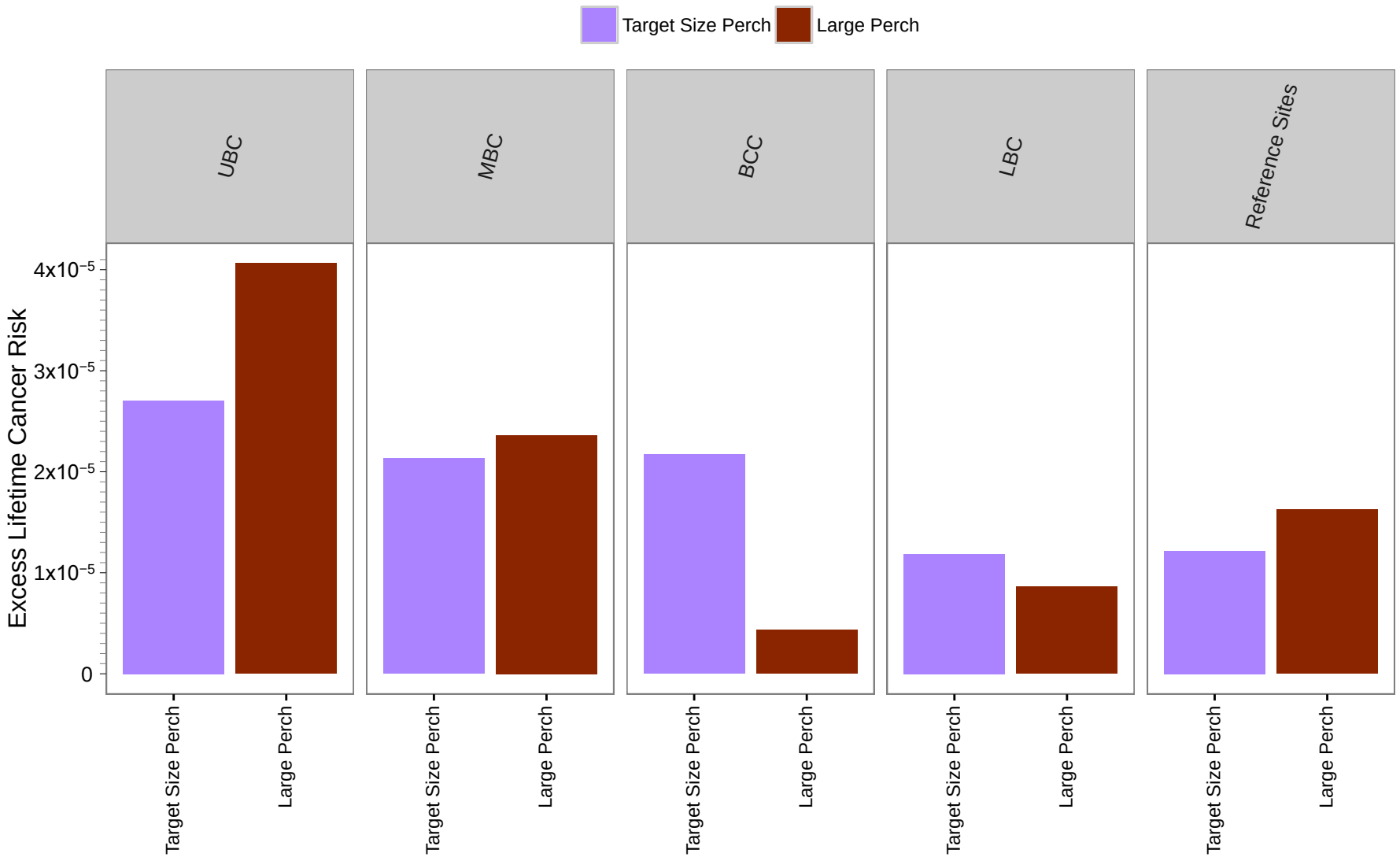
RME Noncancer Hazards for Construction Workers by Exposure Unit − Marshes

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5−4



Notes: Target white perch are composite samples consisting of fish primarily between 150−190 mm. Large white perch are individual samples of fish >200 mm. Minor breaks denote intervals of $1x10^{-6}$.

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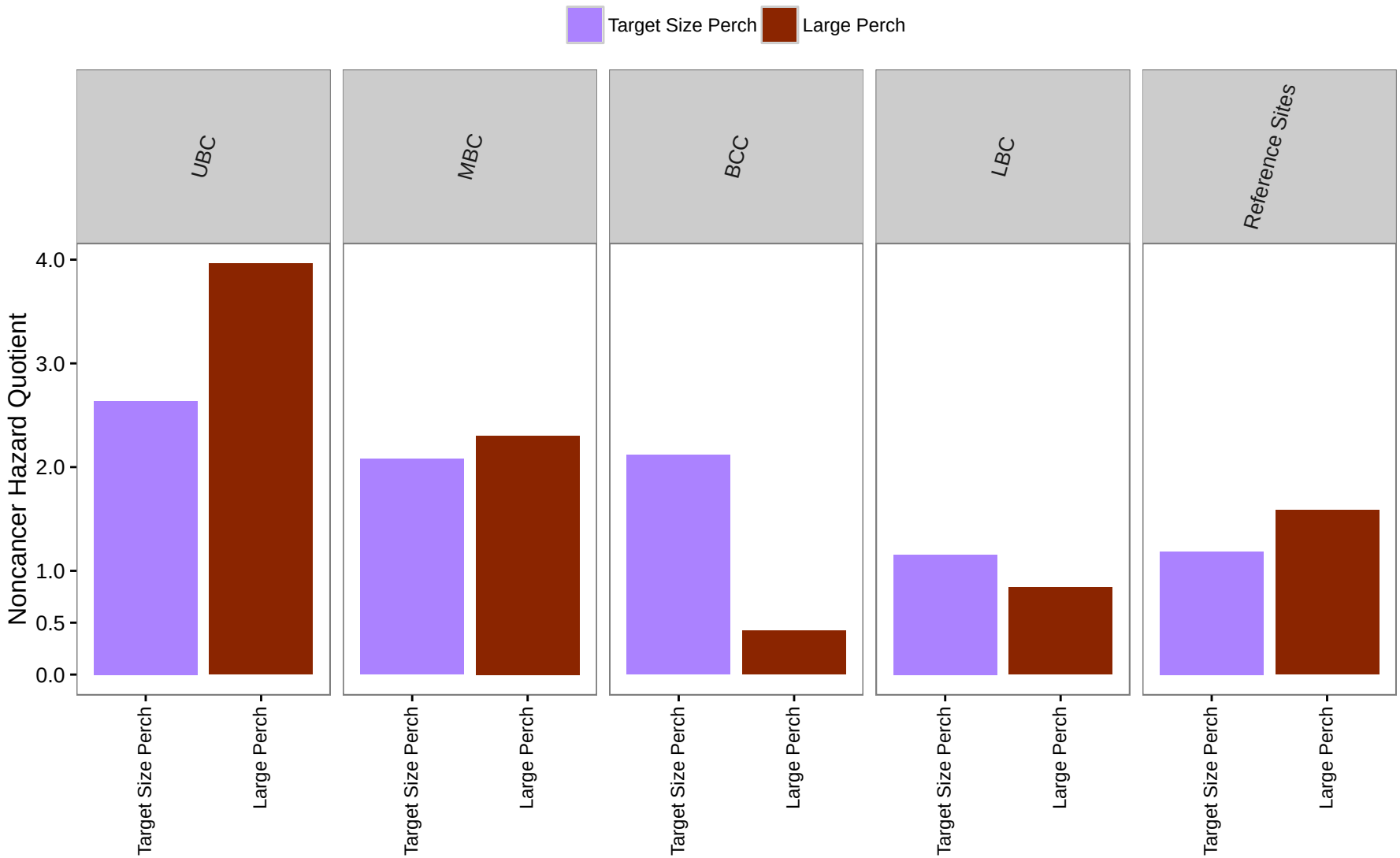
Excess Lifetime Cancer Risk for PCBs in Large White Perch and Perch of Target Size by Exposure Unit − Waterways

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5−5



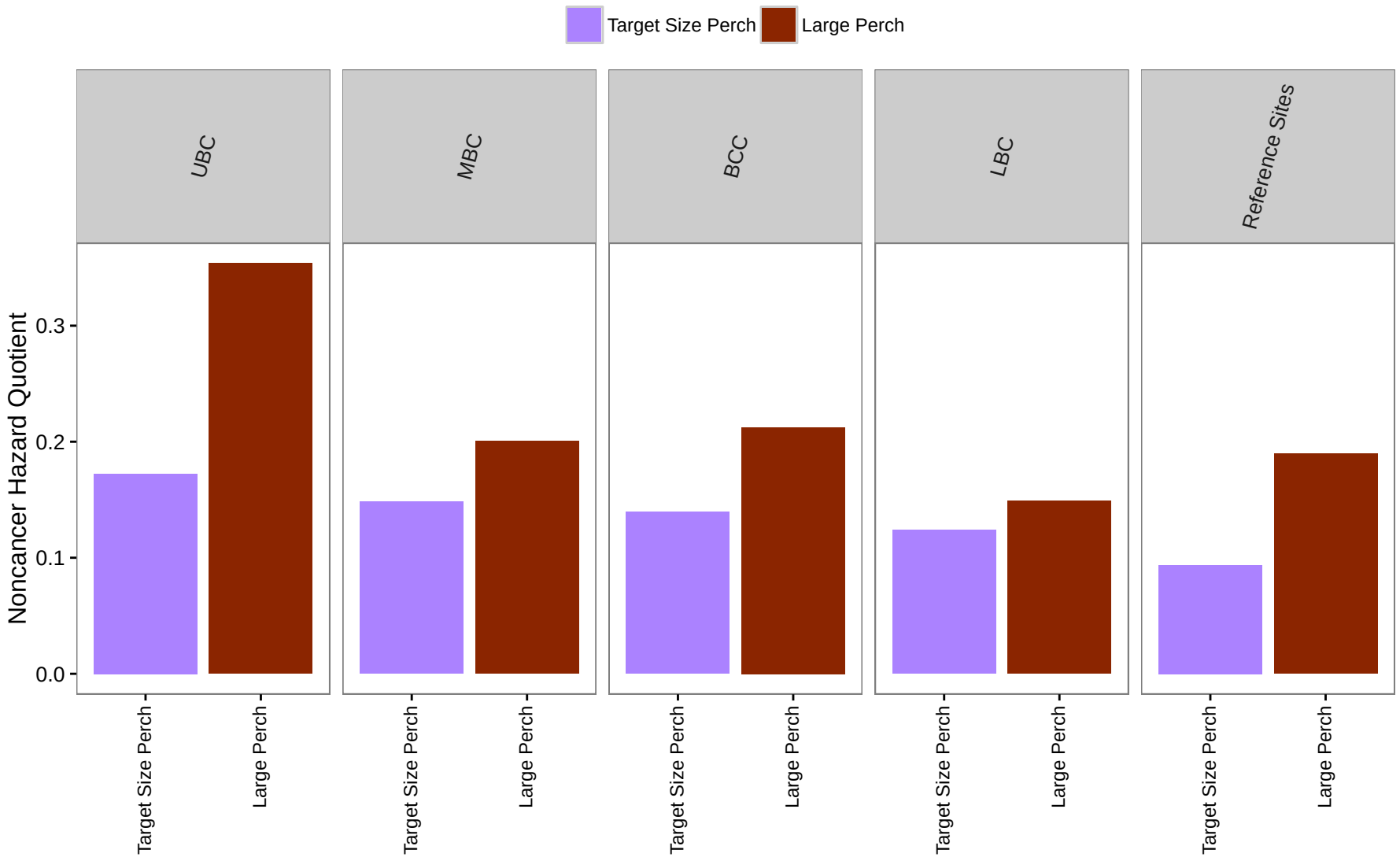
Notes: Target white perch are composite samples consisting of fish primarily between 150−190 mm. Large white perch are individual samples of fish >200 mm.

Noncancer Hazards for PCBs in Large White Perch and Perch of Target Size by Exposure Unit − Waterways

DRAFT

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5−6



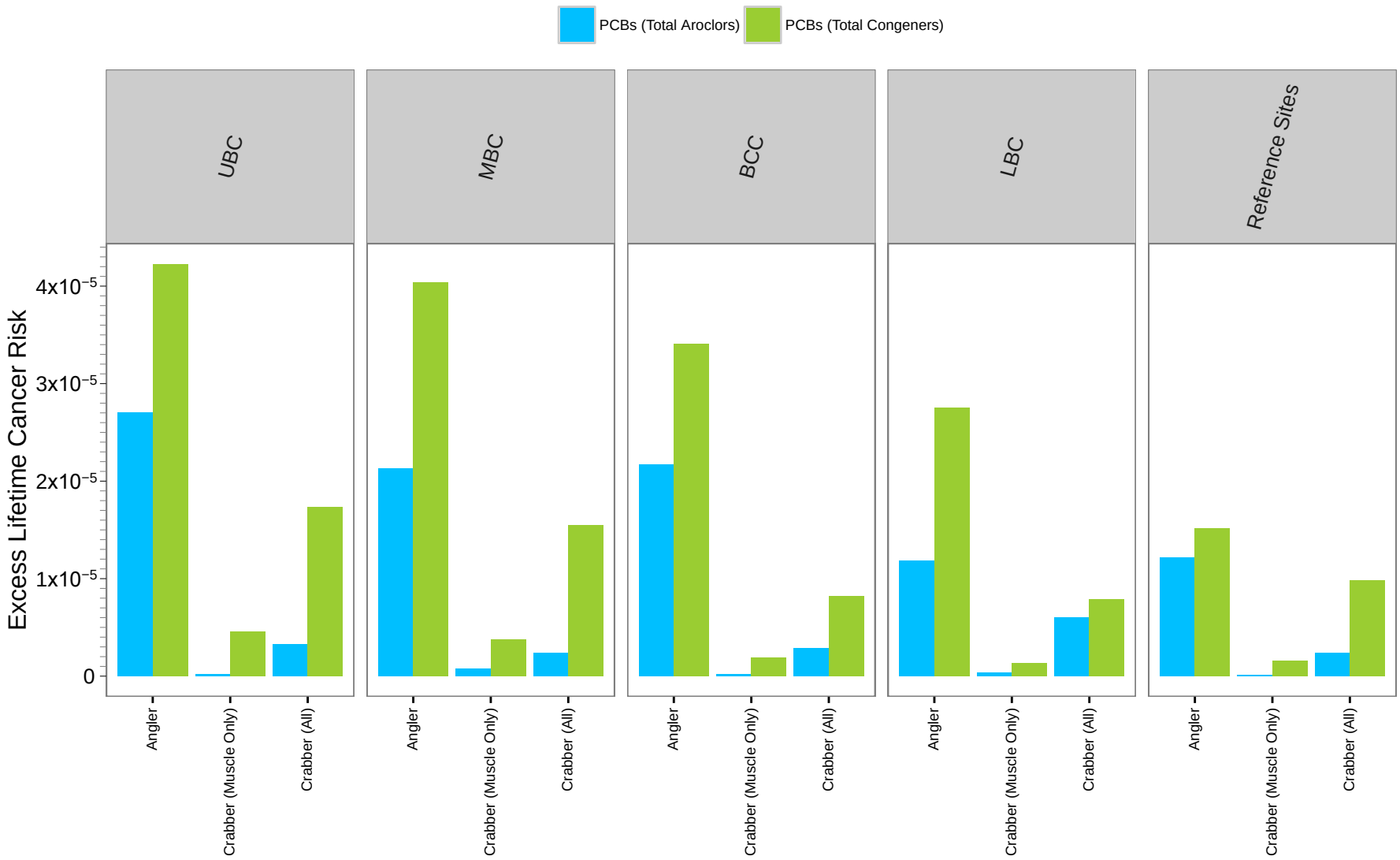
Notes: Target white perch are composite samples consisting of fish primarily between 150−190 mm. Large white perch are individual samples of fish >200 mm.

Noncancer Hazards for Methyl Mercury in Large White Perch and Perch of Target Size by Exposure Unit − Waterways

DRAFT

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5−7



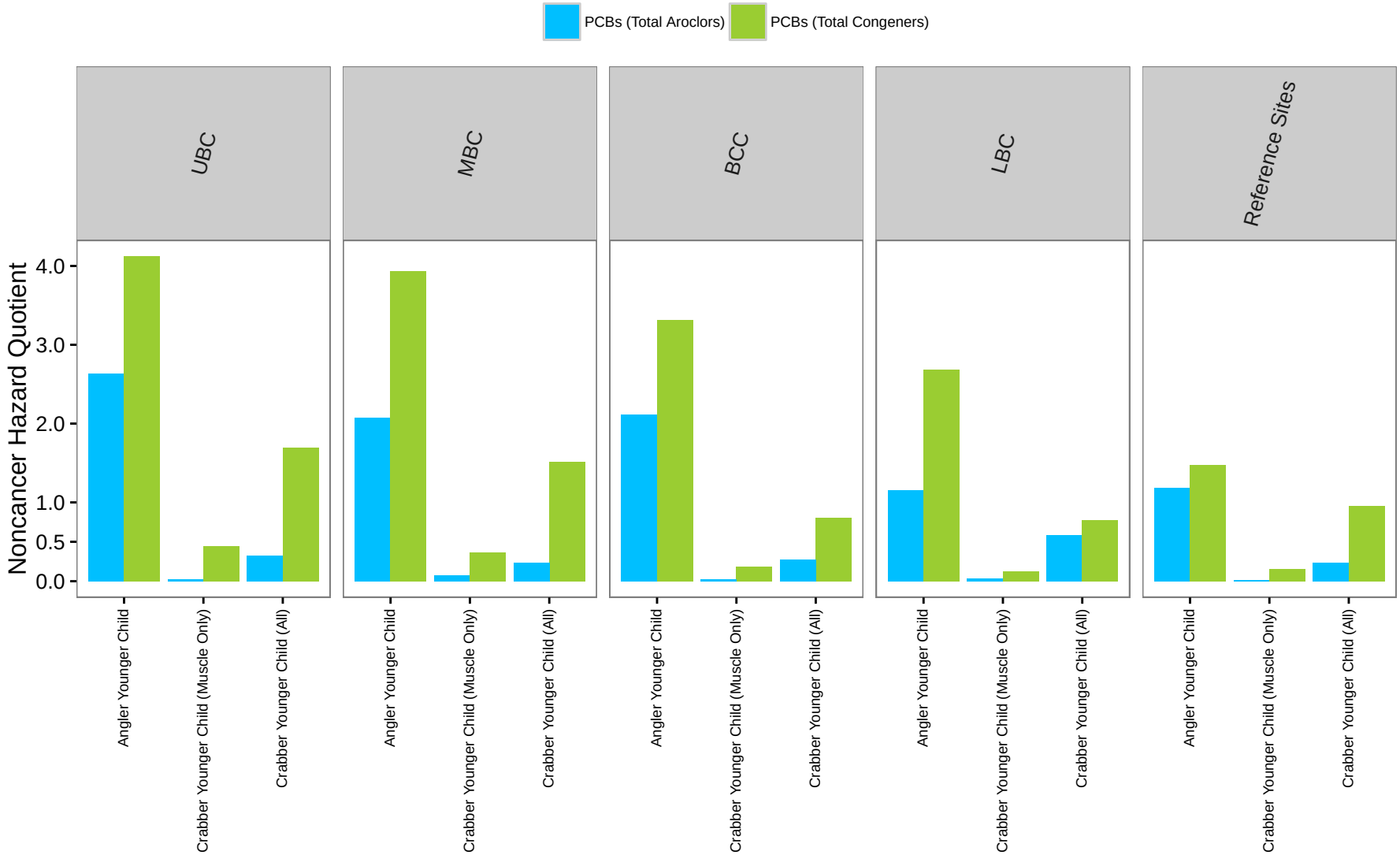
DRAFT

Notes:
Includes only dietary ingestion pathway. No PCBs (total congeners) data available for sediment.
Crabber (all) = blue crab muscle & hepatopancreas. Minor breaks denote intervals of $1x10^{-6}$.

Excess Lifetime Cancer Risks for Aroclor and Congener PCBs by Exposure Unit – Waterways

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5-8



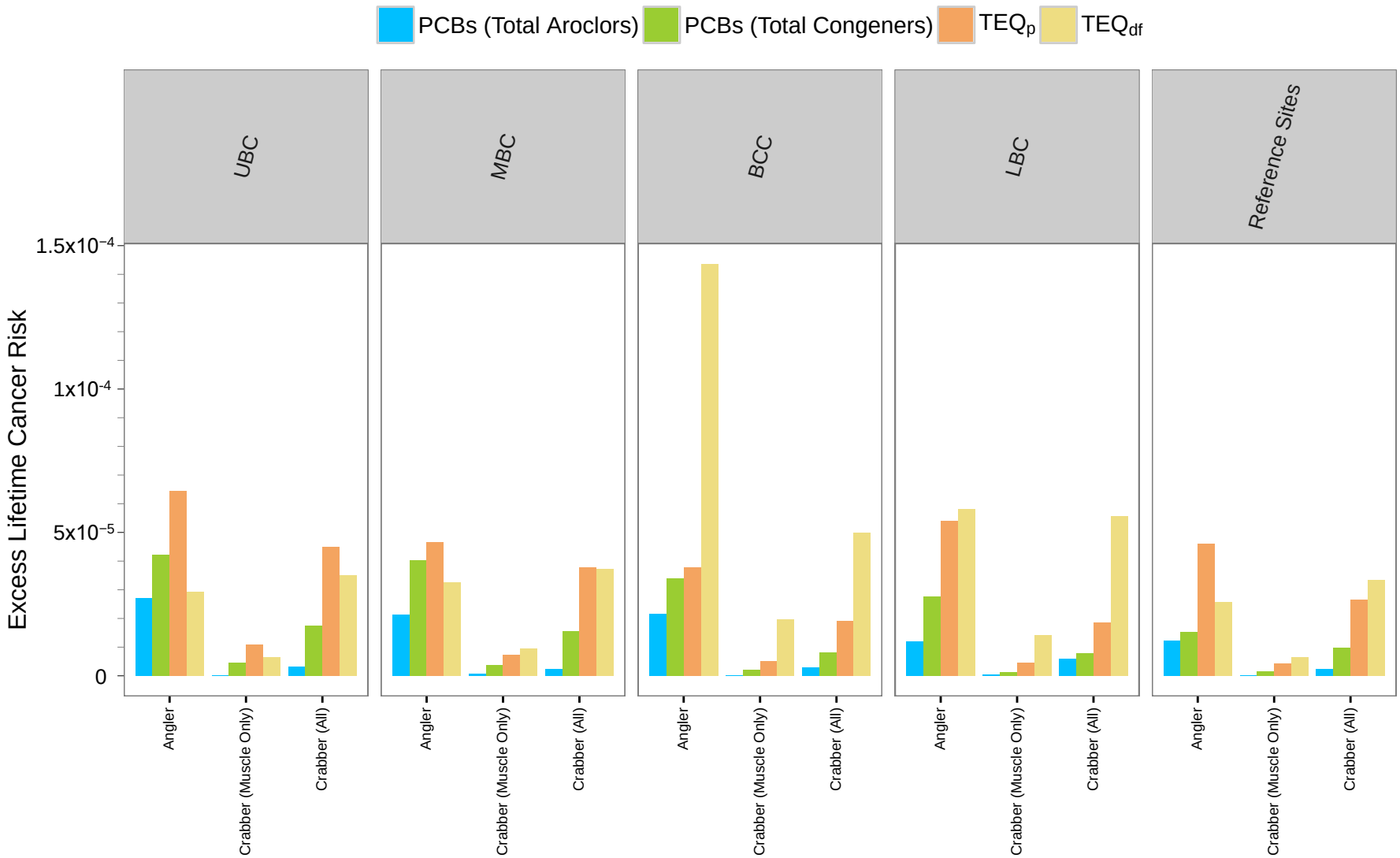
DRAFT

Notes:
Includes only dietary ingestion pathway. No PCBs (total congeners) data available for sediment.
Crabber (all) = blue crab muscle & hepatopancreas. Showing age class with maximum risk from tissue ingestion (younger child).

Noncancer Hazards for Aroclor and Congener PCBs by Exposure Unit – Waterways

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5–9



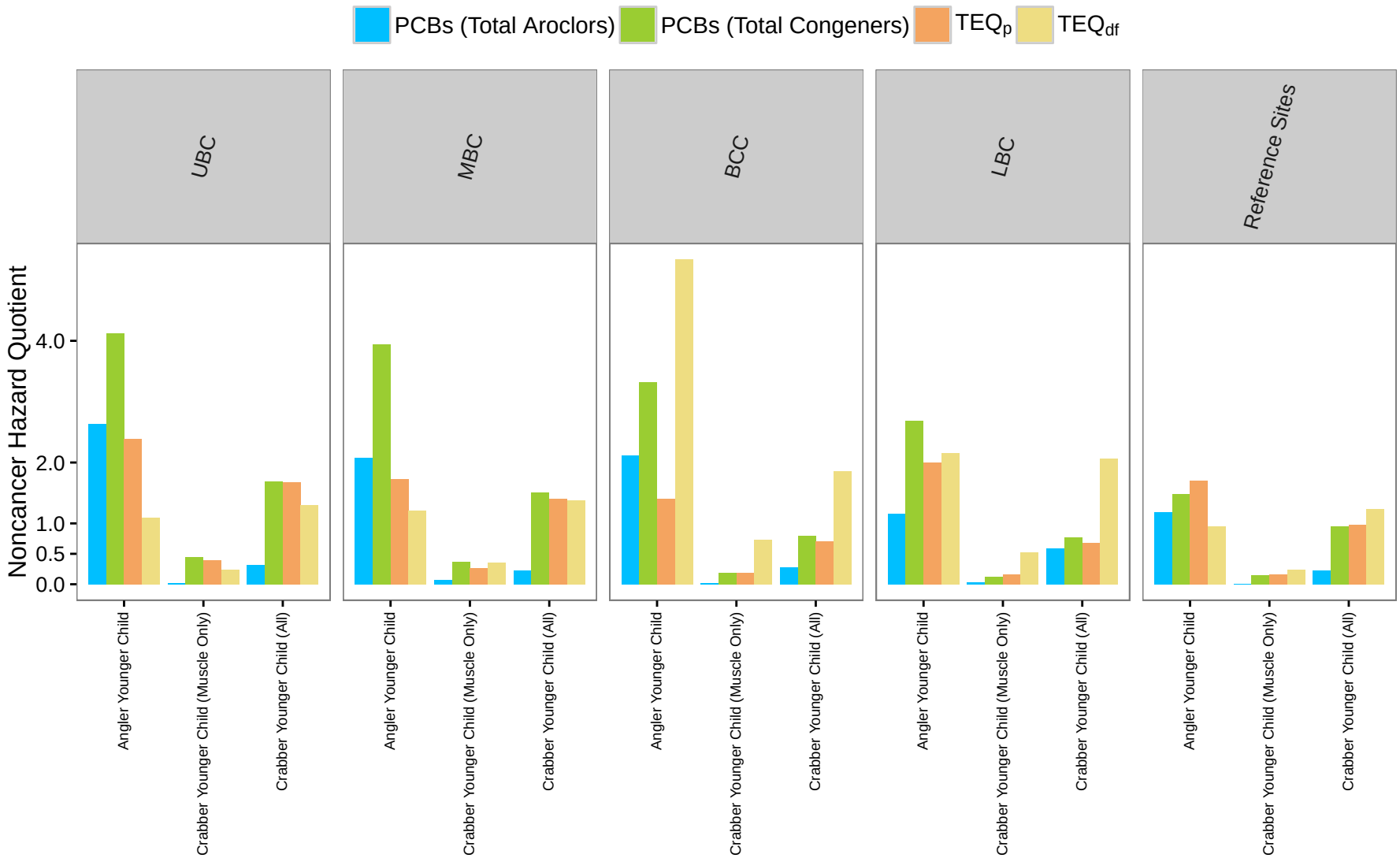
DRAFT

Notes:
Includes only ingestion pathway. Crabber (all) = blue crab muscle & hepatopancreas. Minor breaks denote intervals of $1x10^{-5}$.

Excess Lifetime Cancer Risks for Dioxins, Furans, and PCBs by Exposure Unit − Waterways

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5−10



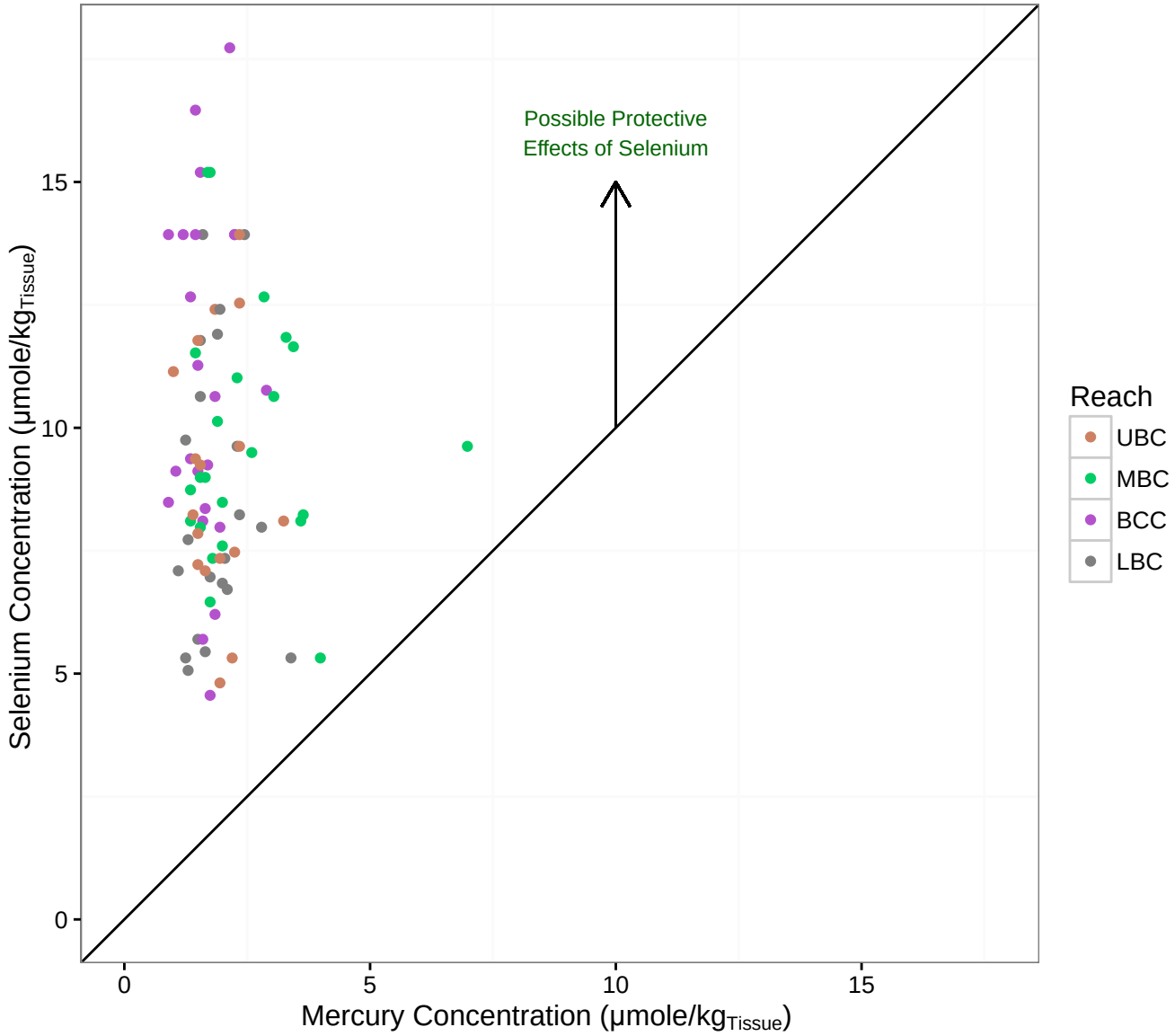
DRAFT

Notes:
Includes only ingestion pathway. Crabber (all) = blue crab muscle & hepatopancreas. Showing age class with maximum risk from tissue ingestion (younger child).

Noncancer Hazards for Dioxins, Furans, and PCBs by Exposure Unit – Waterways

Appendix M: Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5–11



Selenium:Mercury Molar Ratios in BCSA White Perch Fillet

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Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5−12

Draft
Attachment M1: COPC Selection
Baseline Human Health Risk Assessment

Berry's Creek Study Area
Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

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SUMMARY

Chemicals of potential concern (COPCs) were selected to support the baseline human health risk assessment (BHHRA) being conducted as part of the overall remedial investigation (RI) of the Berry's Creek Study Area (BCSA). COPCs were selected for each media being evaluated in the BHHRA by comparing the maximum detected concentration of each chemical detected in relevant media to site-specific risk-based screening levels developed for the exposure scenarios identified for the BHHRA. Mercury, methyl mercury, and polychlorinated biphenyls (PCBs) were identified as COPCs, along with other target analyte list (TAL) metals, pesticides, polycyclic aromatic hydrocarbons (PAHs) and two volatile compounds (i.e., trichloroethene and vinyl chloride). Each COPC was evaluated quantitatively in the BHHRA to determine the nature, extent, and magnitude of potential risks from exposure.

Summary of Key Findings

- All chemicals detected were screened.
- COPCs were selected for evaluation in the BHHRA.
- Mercury, methyl mercury, and PCBs, which have been the focus of the RI, were selected as COPCs.
- TAL metals, pesticides, PAHs, and two volatile compounds also were selected.

INTRODUCTION

A baseline human health risk assessment (BHHRA) was conducted as part of the remedial investigation (RI) for the Berry's Creek Study Area (BCSA). Chemical analytical data collected during Phase 1 (2009), Phase 2 (2010–2011), and Phase 3 (2012–2015) of the RI were evaluated to identify chemicals of potential concern (COPCs) for further evaluation in the BHHRA. COPCs were selected for each exposure medium by comparing the maximum detected concentration of each chemical detected in relevant media (sediment, tissue, and surface water) to risk-based screening levels (RBSLs) developed to reflect the exposure pathways and conditions at the site (note that lead was evaluated somewhat differently). The COPC selection process was presented to and agreed upon by U.S. Environmental Protection Agency (EPA) in the *Updated Pathway Analysis Report* (BCSA Group 2015b). A chemical was selected as a COPC if the maximum detected concentration in the exposure media across the site exceeded the site-specific RBSL. The site-specific RBSLs, screening methodology, and results of the COPC screening are described below.

SITE-SPECIFIC RISK-BASED SCREENING LEVELS

Site-specific RBSLs were derived for surface sediment, sediment of all depths, tissue, and surface water. RBSLs were derived to reflect the receptors and exposure pathways identified in the *Updated Memorandum on Human Exposure Scenarios and Assumptions* (MESA) (BCSA Group 2015a). Media-specific RBSLs were calculated for the following receptors and exposure pathways:

- Sediment—Surface (0 to 15 cm)
  - Incidental ingestion and dermal contact
    - Angler/crabber adult and older child age groups
    - Kayaker/canoer adult and older child age groups
- Sediment—All Depths
  - Incidental ingestion and dermal contact
    - Construction worker
- Tissue (i.e., white perch; blue crab muscle and hepatopancreas)
  - Ingestion
    - Angler/crabber adult, older child, and younger child age groups

- Surface Water[1]
  - Incidental Ingestion
    - Kayaker/canoer adult and older child age groups.

The lowest chemical-specific RBSL was used for screening COPCs in each media with multiple receptors and/or age groups. Site-specific RBSLs were not derived for chemicals in ambient air. Mercury was the sole chemical measured in ambient air and was identified as a COPC in air without completing a comparison of site-concentrations to a risk-based level.

The RBSLs were calculated using the methods presented in EPA's *Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites* (USEPA 2015b). Exposure assumptions presented in the BCSA MESA were used in place of EPA default values to calculate the site-specific RBSLs. Toxicological criteria and other chemical-specific factors including the fraction of contaminant absorbed in the gastrointestinal tract in the critical study (GIABS) and dermal absorption fraction (ABS_d) were obtained from USEPA's (2015b) RSLs. Table 1 lists the chemical-specific values used in the RBSL calculations. In some instances, toxicity criteria for a chemical were based on an isomer, parent compound, or derivative within the same chemical family as identified in Table 1.

The site-specific RBSLs were calculated for noncarcinogens using a target hazard quotient of 0.01, and for potential carcinogens using a target excess lifetime cancer risk level of 1×10^{-7}. These risk targets are an order of magnitude lower than those typically used for COPC screening (USEPA 2015b). The lowered risk targets were requested by EPA to add an extra level of safety to the COPC selection given that site-specific RBSLs were being used rather than default screening levels.

Total mercury concentrations in all media were used for screening inorganic mercury. This is a conservative approach for tissue because the majority of mercury present in tissue is methyl mercury.

Total chromium concentrations in all media were evaluated using toxicity criteria for chromium (III). Site-specific laboratory analysis indicates that chromium exists predominantly in the reduced (trivalent) state in both aqueous and solid phases. Details on the redox conditions at BCSA are provided in Section 6.2 of the RI Report.

Arsenic in tissue was assumed to be organic arsenic, a nontoxic form of arsenic, and was not selected as a COPC in tissue. Site-specific analysis of arsenic in fish tissue documented that

[1] Dermal contact with surface water is also identified as a complete exposure pathway for recreational receptors; however, this pathway was not considered in the derivation of the site-specific RBSLs used in the COPC screening because its contribution to the cumulative exposure from surface water is small.

organic arsenic was the predominant form in tissue. Inorganic arsenic was detected in only 5 of 35 fillet samples analyzed and at low concentrations relative to total arsenic concentrations.[2]

For lead exposures, EPA evaluates health effects in terms of the blood lead concentration (PbB) produced by an assumed exposure using biokinetic modeling rather than the dose-based toxicity criteria described above. For screening lead concentration in media at the BCSA, the following approach was used:

- Surface sediments—An EPA biokinetic model was used with site-specific exposure assumptions to calculate the soil concentration that is protective of human health for recreational receptors. Details of the analysis are provided below.

- Sediment across all depths—The EPA RSL of 800 mg/kg for industrial soils was used as the screening value to reflect the assumed construction worker exposure for this media segment.

- Tissue—An historical U.S. Food and Drug Administration (FDA 2001) guidance value of 1.5 mg/kg for lead in Crustacea was used to screen blue crab muscle and hepatopancreas. Lead was not detected in BCSA white perch fillets.

- Surface water—The EPA RSL of 15 µg/L for tapwater ingestion was used to evaluate the incidental ingestion of surface water associated with kayaker/canoer receptors. This value is EPA's action level for lead in drinking water systems.

For surface sediments, the RBSL for recreational receptors was calculated using the EPA's Adult Lead Methodology (ALM). EPA recommends the ALM for non-residential settings when exposures to children under the age of seven are not expected at the site, as is the case for the BCSA where the assumed receptors for surface sediment exposures are adult and older child recreators (i.e., angler/crabbers and kayakers/canoers). The ALM uses a technical approach derived by Bowers et al. (1994) that predicts the PbB in an exposed individual with a site-related lead exposure by summing the "baseline" blood lead (i.e., which occurs in the absence of any site-related exposures) with the incremental increase in PbB that is predicted from exposure to lead at the site (USEPA 2003b). The assumed baseline PbB used in this analysis includes consideration of a normal dietary exposure to lead in fish.

For lead, USEPA (2003a) defines impact to the fetus as the most health-sensitive endpoint for individuals of child-bearing age. The ALM calculates risk-based standards such that there is no more than a 5 percent probability that fetuses exposed to lead would exceed a PbB target level of 10 µg/dL. RBSLs for lead in surface sediments were calculated using ALM for both adult and older child (6 to <18 years of age) age groups in accordance with USEPA (2015a)

[2] Appendix L to the RI presents the results of the arsenic speciation analysis from each sample and additional analysis of the results.

recommendations. The lead absorption value in the ALM was set to the upper end of the range to account for the potential increased absorption during the adolescence stage of the older child age group, as suggested by USEPA (2015a). Site-specific exposure factors for each receptor group were used for the sediment ingestion rate, exposure frequency, and averaging time to calculate individual RBSLs for angler/crabbers for current and future conditions, kayaker/canoers for current conditions, and kayakers/canoers under future conditions. The lowest of the three RBSLs was used for screening lead in surface sediments.

The details of the RBSL calculations are provided in Tables 1–14 of this attachment. Table 1 summarizes the chemical-specific factors, including the toxicological criteria for cancer and noncancer endpoints, GIABS, and ABS_d, as well as an indicator of whether the chemical is a mutagen. Table 2 summarizes the site-specific values used for characterizing the exposure scenarios for each of the pathways and receptor groups described above. Table 3 provides a summary of age-dependent adjustment factors (ADAFs) used for estimating exposure for mutagenic chemicals. Tables 4 through 10 show the resulting RBSLs for cancer and noncancer endpoints for each medium and receptor combination. Tables 11 through 13 summarize the lower of the cancer and noncancer RBSLs for each medium, by receptor, and indicate the lowest of the values to be used as the medium-specific RBSL for selecting COPCs. Table 14 shows the input parameters and final RBSLs for lead.

SCREENING METHODS

Maximum concentrations of chemicals detected in site sediment, surface water, and tissue were compared to final RBSLs. The exception is for lead; in line with EPA guidance (USEPA 2003a, 2007), the mean detected concentration of lead in each medium was compared to the respective RBSL for the metal. If the maximum detected concentration exceeded the site-specific RBSL, the chemical was selected as a COPC for that medium and carried forward for evaluation in the BHHRA.

The following describes the site data that were used to identify the maximum media concentration evaluated in the COPC screening[3]:

- Surface Sediment (0 to 15 cm)—Data collected from within top 15 cm (6 in.) of surface from waterway and marsh sediments in all reaches

- Sediment All Depths—Data collected from all depths within waterway and marsh sediments of all reaches

[3] Details on data treatment and summation rules are presented in Appendix K of the RI Report.

- Tissue—White perch fillet, and blue crab muscle and hepatopancreas data from all reaches; no large (i.e., >200 mm) or whole body white perch

- Surface Water—Total concentration data for all reaches.

The environmental data for all detected chemicals are summarized in RAGS D Tables along with the relevant RBSL from Tables 11 through 13 for each of the media types described above.

SELECTED COPCS

The RAGS D Tables, presented in Exhibit 1, indicate which chemicals were retained as COPCs as a result of the maximum concentration exceeding the respective RBSL, and Table 15 provides a summary of the selected COPCs by media:

- Surface Sediment COPCs are presented in RAGS D Table 2.1. These COPCs were used in the BHHRA to evaluate dermal contact and incidental ingestion exposures for recreators.

- All Depth Sediment COPCs are presented in RAGS D Table 2.2. These COPCs were used in the BHHRA to evaluate dermal contact and incidental ingestion exposures for construction workers.

- Tissue COPCs are presented in RAGS D Table 2.3. These COPCs were used in the BHHRA to evaluate ingestion of white perch for anglers, and blue crab ingestion for crabbers.

- Surface Water COPCs are presented in RAGS D Table 2.4. These COPCs were used in the BHHRA to evaluate dermal contact for angler/crabbers, and dermal contact plus incidental ingestion for kayaker/canoers.

Screening criteria could not be developed for a few detected chemicals. Analytes not included in the COPC screening are listed in Table 16 and will be discussed in the uncertainty analysis of the BHHRA.

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TABLES

Table 1. Chemical-Specific Factors Used for Calculating Site-Specific RBSLs [a]

Chemical	CAS Number	Mutagen?	VOC?	Oral SF $(mg/kg\text{-}day)^{-1}$	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	RfD (mg/kg-day)	RfC (mg/m^3)	GIABS	ABS_d
Metals									
Aluminum	7429905	No	No	--	--	1.0	0.0050	1.0	--
Antimony	7440360	No	No	--	--	0.00040	--	0.15	--
Arsenic	7440382	No	No	1.5	0.0043	0.00030	0.000015	1.0	0.030
Barium	7440393	No	No	--	--	0.20	0.00050	0.070	--
Beryllium	7440417	No	No	--	0.0024	0.0020	0.000020	0.0070	--
Cadmium	7440439	No	No	--	0.0018	0.0010	0.000010	0.025	0.0010
Chromium (VI)	18540299	Yes	No	0.50	0.084	0.0030	0.00010	0.025	--
Chromium (total)	7440473	No	No	--	--	1.5	--	0.013	--
Cobalt	7440484	No	No	--	0.0090	0.00030	0.000006	1.0	--
Copper	7440508	No	No	--	--	0.040	--	1.0	--
Iron	7439896	No	No	--	--	0.70	--	1.0	--
Lead	7439921	No	No	--	--	--	--	1.0	--
Manganese	7439965	No	No	--	--	0.14	0.000050	1.0	--
Mercury	7439976	No	No	--	--	0.00030	0.00030	0.070	--
Nickel	7440020	No	No	--	0.00026	0.020	0.000090	0.040	--
Selenium	7782492	No	No	--	--	0.0050	0.020	1.0	--
Silver	7440224	No	No	--	--	0.0050	--	0.040	--
Thallium	7440280	No	No	--	--	0.000010	--	1.0	--
Vanadium	7440622	No	No	--	--	0.0050	0.00010	0.026	--
Zinc	7440666	No	No	--	--	0.30	--	1.0	--
Organometals									
Dimethylarsinic acid	75605	No	No	--	--	0.020	--	1.0	0.10
Methyl mercury	22967926	No	No	--	--	0.00010	--	1.0	--
PAHs									
Acenaphthene	83329	No	Yes	--	--	0.060	--	1.0	0.13
Acenaphthylene	208968	--	--	--	--	0.060	-	1.0	0.13
Anthracene	120127	No	Yes	--	--	0.30	--	1.0	0.13
Benz[a]anthracene	56553	Yes	Yes	0.73	0.00011	--	--	1.0	0.13
Benzo[a]pyrene	50328	Yes	No	7.3	0.0011	--	--	1.0	0.13
Benzo[b]fluoranthene	205992	Yes	No	0.73	0.00011	--	--	1.0	0.13
Benzo[g,h,i]perylene	191242	--	--	--	--	0.030	-	1.0	0.13
Benzo[k]fluoranthene	207089	Yes	No	0.073	0.00011	--	--	1.0	0.13
Chrysene	218019	Yes	No	0.0073	0.000011	--	--	1.0	0.13

Table 1. Chemical-Specific Factors Used for Calculating Site-Specific RBSLs [a]

Chemical	CAS Number	Mutagen?	VOC?	Oral SF $(mg/kg\text{-}day)^{-1}$	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	RfD (mg/kg-day)	RfC (mg/m^3)	GIABS	ABS_d
Dibenz[a,h]anthracene	53703	Yes	No	7.3	0.0012	--	--	1.0	0.13
Dibenzofuran	132649	No	Yes	--	--	0.0010	--	1.0	0.03
Fluoranthene	206440	No	No	--	--	0.040	--	1.0	0.13
Fluorene	86737	No	Yes	--	--	0.040	--	1.0	0.13
Indeno[1,2,3-cd]pyrene	193395	Yes	No	0.73	0.00011	--	--	1.0	0.13
2-methylnaphthalene	91576	No	Yes	--	--	0.0040	--	1.0	0.13
Naphthalene	91203	No	Yes	--	0.000034	0.020	0.0030	1.0	0.13
Phenanthrene	85018	--	--	--	--	0.30	--	1.0	0.13
Pyrene	129000	No	Yes	--	--	0.030	--	1.0	0.13
Pesticides									
Aldrin	309002	No	Yes	17	0.0049	0.000030	--	1.0	--
Carbazole	86748	--	--	0.02	--	--	--	-	--
alpha-Chlordane	5103719	--	--	0.35	0.00050	1.0	0.00070	1.0	--
gamma-Chlordane	5566347	--	--	0.35	0.00050	1.0	0.00070	1.0	--
4,4'-DDD	72548	No	No	0.24	0.000069	--	--	1.0	0.10
4,4'-DDE	72559	No	Yes	0.34	0.000097	--	--	1.0	--
4,4'-DDT	50293	No	No	0.34	0.000097	0.00050	--	1.0	0.030
Dieldrin	60571	No	No	16	0.0046	0.00005	-	1.0	0.100
Endosulfan I	959988	--	--	--	--	0.0060	--	1.0	--
Endosulfan II	33213659	--	--	--	--	0.0060	--	1.0	--
Endosulfan sulfate	1031078	--	--	--	--	0.0060	--	1.0	--
Endrin	72208	No	No	--	--	0.00030	--	1.0	0.10
Endrin aldehyde	7421934	--	--	--	--	0.00030	--	1.0	--
Endrin ketone	53494705	--	--	--	--	0.00030	--	1.0	--
Heptachlor	76448	No	Yes	4.5	0.0013	0.00050	--	1.0	--
Heptachlor epoxide	1024573	No	Yes	9.1	0.0026	0.000013	--	1.0	--
alpha-HCH	319846	No	No	6.3	0.0018	0.008	-	1.0	0.10
beta-HCH	319857	No	No	1.8	0.00053	-	-	1.0	0.10
delta-HCH	319868	--	--	1.8	--	1.0	--	1.0	--
gamma-HCH (Lindane)	58899	No	No	1.1	0.00031	0.00030	--	1.0	0.040
Methoxychlor	72435	No	No	--	--	0.0050	--	1.0	0.10
Semivolatiles									
Acetophenone	98862	No	Yes	--	--	0.10	--	1.0	--
Benzaldehyde	100527	No	Yes	--	--	0.10	--	1.0	--
1,1'-biphenyl	92524	No	Yes	0.0080	--	0.50	0.00040	1.0	--

Table 1. Chemical-Specific Factors Used for Calculating Site-Specific RBSLs [a]

Chemical	CAS Number	Mutagen?	VOC?	Oral SF $(mg/kg\text{-}day)^{-1}$	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	RfD (mg/kg-day)	RfC (mg/m^3)	GIABS	ABS_d
Butyl benzyl phthalate	85687	No	No	0.0019	--	0.20	--	1.0	0.10
Caprolactam	105602	No	No	--	--	0.50	0.0022	1.0	0.10
4-chloroaniline	106478	No	No	0.20	--	0.0040	--	1.0	0.10
2-chlorophenol	95578	No	Yes	--	--	0.0050	--	1.0	--
3,3'-dichlorobenzidine	91941	No	No	0.45	0.00034	--	--	1.0	0.10
2,4-dichlorophenol	120832	No	No	--	--	0.0030	--	1.0	0.10
2,4-dimethylphenol	105679	No	No	--	--	0.020	--	1.0	0.10
2,4-dinitrophenol	51285	No	No	--	--	0.0020	--	1.0	0.10
2,4-dinitrotoluene	121142	No	No	0.31	0.000089	0.0020	--	1.0	0.10
2,6-dinitrotoluene	606202	No	No	1.5	--	0.00030	--	1.0	0.099
Hexachlorobenzene	118741	No	Yes	1.6	0.00046	0.00080	--	1.0	--
Isophorone	78591	No	No	0.00095	--	0.20	2.0	1.0	0.10
2-methylphenol	95487	No	No	--	--	0.050	0.60	1.0	0.10
4-methylphenol	106445	No	No	--	--	0.10	0.60	1.0	0.10
4-chloro-3-methylphenol	59507	No	No	--	--	0.10	--	1.0	0.10
4,6-dinitro-2-methylphenol	534521	No	No	--	--	0.000080	--	1.0	0.10
2-nitroaniline	88744	No	No	--	--	0.010	0.000050	1.0	0.10
3-nitroaniline	99092	--	--	0.020	0.0040	1.0	0.0060	1.0	--
4-nitroaniline	100016	No	No	0.020	--	0.0040	0.0060	1.0	0.10
N-nitrosodiphenylamine	86306	No	No	0.0049	0.0000026	-	-	1.0	0.10
Pentachlorophenol	87865	No	No	0.40	0.0000051	0.0050	--	1.0	0.25
Phenol	108952	No	No	-	-	0.30	0.20	1.0	0.10
bis(2-ethylhexyl)phthalate	117817	No	No	0.014	0.0000024	0.020	--	1.0	0.10
Diethyl phthalate	84662	No	No	--	--	0.80	--	1.0	0.10
Dimethyl phthalate	131113	--	--	--	--	0.80	--	1.0	--
Di-*n*-butyl phthalate	84742	No	No	--	--	0.10	--	1.0	0.10
Di-*n*-octylphthalate	117840	No	No	--	--	0.010	--	1.0	0.10
2,4,6-trichlorophenol	88062	No	No	0.011	0.0000031	0.0010	--	1.0	0.10
PCBs									
PCBs (total Aroclors)	(blank)	No	Yes	2.0	0.00057	0.000020	--	1.0	0.14
Volatiles									
Acetone	67641	No	Yes	--	--	0.90	31	1.0	--
Benzene	71432	No	Yes	0.055	0.0000078	0.0040	0.030	1.0	--
bis(2-chloroethyl)ether	111444	No	Yes	1.1	0.00033	--	--	1.0	--

Table 1. Chemical-Specific Factors Used for Calculating Site-Specific RBSLs [a]

Chemical	CAS Number	Mutagen?	VOC?	Oral SF $(mg/kg\text{-}day)^{-1}$	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	RfD (mg/kg-day)	RfC (mg/m^3)	GIABS	ABS_d
Bromodichloromethane	75274	No	Yes	0.062	0.000037	0.020	--	1.0	--
2-butanone	78933	No	Yes	--	--	0.60	5.0	1.0	--
Carbon disulfide	75150	No	Yes	--	--	0.10	0.70	1.0	--
Chlorobenzene	108907	No	Yes	--	--	0.020	0.050	1.0	--
Chloroethane	75003	No	Yes	--	--	0.10	10	1.0	--
Chloroform	67663	No	Yes	0.031	0.000023	0.010	0.098	1.0	--
Chloromethane	74873	No	Yes	0.013	0.0000018	--	0.090	1.0	--
1,2-dichlorobenzene	95501	No	Yes	--	--	0.090	0.20	1.0	--
1,3-dichlorobenzene	541731	--	--	--	--	0.020	--	--	--
1,4-dichlorobenzene	106467	No	Yes	0.0054	0.000011	0.070	0.80	1.0	--
Dichlorobenzenes (total)	106467	No	Yes	0.0054	0.000011	0.070	0.80	1.0	--
1,1-dichloroethane	75343	No	Yes	0.0057	0.0000016	0.20	--	1.0	--
1,2-dichloroethane	107062	No	Yes	0.091	0.000026	0.0060	0.0070	1.0	--
1,1-dichloroethene	75354	No	Yes	--	--	0.050	0.20	1.0	--
cis -1,2-dichloroethene	156592	No	Yes	--	--	0.0020	--	1.0	--
trans -1,2-dichloroethene	156605	No	Yes	--	--	0.020	--	1.0	--
Ethylbenzene	100414	No	Yes	0.011	0.0000025	0.10	1.0	1.0	--
2-hexanone	591786	No	Yes	--	--	0.0050	0.030	1.0	--
Isopropylbenzene	98828	No	Yes	--	--	0.10	0.40	1.0	--
Methyl acetate	79209	No	Yes	--	--	1.0	--	1.0	--
4-methyl-2-pentanone	108101	No	Yes	--	--	0.080	3.0	1.0	--
Methylene chloride	75092	Yes	Yes	0.0020	0.000000010	0.0060	0.60	1.0	--
Styrene	100425	No	Yes	--	--	0.20	1.0	1.0	--
Tetrachloroethene	127184	No	Yes	0.0021	0.00000026	0.0060	0.040	1.0	--
Toluene	108883	No	Yes	--	--	0.080	5.0	1.0	--
1,2,3-trichlorobenzene	87616	No	Yes	--	--	0.00080	--	1.0	--
1,2,4-trichlorobenzene	120821	No	Yes	0.029	--	0.010	0.0020	1.0	--
1,1,1-trichloroethane	71556	No	Yes	--	--	2.0	5.0	1.0	--
Trichloroethene	79016	Yes	Yes	0.046	0.0000041	0.00050	0.0020	1.0	--
Trichlorotrifluoroethane	76131	No	Yes	--	--	30	30	1.0	--
Vinyl chloride	75014	Yes	Yes	0.72	0.0000044	0.0030	0.10	1.0	--
m,p -xylenes	13302070	--	--	--	--	0.20	--	1.0	--
o -xylene	95476	No	Yes	--	--	0.20	0.10	1.0	--
Xylenes	1330207	No	Yes	--	--	0.20	0.10	1.0	--

Table 1. Chemical-Specific Factors Used for Calculating Site-Specific RBSLs [a]

Chemical	CAS Number	Mutagen?	VOC?	Oral SF $(mg/kg\text{-}day)^{-1}$	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	RfD (mg/kg-day)	RfC (mg/m^3)	GIABS	ABS_d

Notes:

ABS_d = dermal absorption factor
CAS = chemical abstract service
EPA = Environmental Protection Agency
GIABS = gastrointestinal absorption factor
HCH = hexachlorocyclohexane
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RBSL = risk-based screening level
RfC = inhalation reference concentration
RfD = oral reference dose
SF = slope factor
-- no data available

[a] Data from EPA Regional Screening Levels database (www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm). Downloaded August 31, 2015.
1,3-dichlorobenzene RfD value is based on the Agency for Toxic Substances and Disease Registry subchronic minimal risk level.
Carbazole oral SF is based on the health effects assessment summary table (HEAST) value.
Chloroethane RfD value is based on the provisional peer reviewed toxicity values (PPRTV) subchronic RfD.
Chloromethane oral SF and inhalation unit risk is based on the HEAST value.
Chromium values are based on toxicity criterion for chromium (III) as a surrogate.
Mercury values are based on toxicity criterion for mercuric chloride as a surrogate.
The cancer slope value for PCBs is based on the toxicity value for total PCBs.
Toxicity criteria for 3-nitroaniline are based on 4-nitroaniline as a surrogate.
Toxicity criteria for acenaphthylene are based on acenaphthene as a surrogate.
Toxicity criteria for alpha-chlordane are based on chlordane as a surrogate.
Toxicity criteria for benzo[g,h,i]perylene are based on pyrene as a surrogate.
Toxicity criteria for delta-HCH are based on technical HCH as a surrogate.
Toxicity criteria for dichlorobenzenes (total) are based on 1,4-dichlorobenzene as a surrogate.
Toxicity criteria for dimethyl phthalate are based on diethyl phthalate as a surrogate.
Toxicity criteria for endosulfan I are based on endosulfan as a surrogate.
Toxicity criteria for endosulfan II are based on endosulfan as a surrogate.
Toxicity criteria for endosulfan sulfate are based on endosulfan as a surrogate.
Toxicity criteria for endrin aldehyde are based on endrin as a surrogate.
Toxicity criteria for endrin ketone are based on endrin as a surrogate.
Toxicity criteria for gamma-chlordane are based on chlordane as a surrogate.
Toxicity criteria for *m,p* -xylenes are based on xylenes as a surrogate.
Toxicity criteria for phenanthrene are based on anthracene as a surrogate.

Table 2. Exposure Factors Used for Calculating Site-Specific RBSLs

Variable Description	Variable Name	Value	Units	Notes
Target Risk Level	TR	1.0E-07	Non-dimensional	Target risk level requested by EPA in Comment Letter (April, 2013)
Hazard Quotient	HQ	0.01	Non-dimensional	Target HQ requested by EPA in Comment Letter (April, 2013)
Lifetime	LT	70	years	USEPA (2014a) default value for lifetime
Adult Angler/Crabber Exposure Duration	ED_{ar}	26	years	USEPA (2014a) default residential exposure duration
Older Child Angler/Crabber Exposure Duration (6 to <18 years old)	ED_{ocr}	12	years	Site-specific assumption
Younger Child Angler/Crabber Exposure Duration (0 to <6 years old)	ED_{ycr}	6	years	Site-specific assumption
Adult Kayaker/Canoer Exposure Duration under Current Use	ED_{akc}	20	years	Site-specific assumptions
Older Child Kayaker/Canoer Exposure Duration under Current Use	ED_{ockc}	12	years	Site-specific assumption
Adult Kayaker/Canoer Exposure Duration under Future Use	ED_{akf}	20	years	Site-specific assumptions
Older Child Kayaker/Canoer Exposure Duration under Future Use	ED_{ockf}	12	years	Site-specific assumption
Construction Worker Exposure Duration	ED_{cw}	1	years	USEPA (2014a) default value
Angler/Crabber Exposure Frequency	EF_{r}	27	days/year	Site-specific assumption
Adult Kayaker/Canoer Exposure Frequency under Current Use	EF_{akc}	18	days/year	Site-specific assumption
Older Child Kayaker/Canoer Exposure Frequency under Current Use	EF_{ockc}	18	days/year	Site-specific assumption
Adult Kayaker/Canoer Exposure Frequency under Future Use	EF_{akf}	39	days/year	Site-specific value requested by EPA (November, 2009; Specific Comment 5)
Older Child Kayaker/Canoer Exposure Frequency under Future Use	EF_{ockf}	39	days/year	Site-specific value requested by EPA (November, 2009; Specific Comment 5)
Construction Worker Exposure Frequency	EF_{cw}	40	days/year	Site-specific assumption based on 8 weeks of activity at 5 days per week
Adult Kayaker/Canoer Surface Water Event Frequency Per Exposure Day under Current Use	EV_{swakc}	1	event/day	Assumes only one surface water contact event on each exposure day
Older Child Kayaker/Canoer Surface Water Event Frequency Per Exposure Day under Current Use	EV_{swockc}	1	event/day	Assumes only one surface water contact event on each exposure day
Adult Kayaker/Canoer Surface Water Event Frequency Per Exposure Day under Future Use	EV_{swakf}	1	event/day	Assumes only one surface water contact event on each exposure day
Older Child Kayaker/Canoer Surface Water Event Frequency Per Exposure Day under Future Use	EV_{swockf}	1	event/day	Assumes only one surface water contact event on each exposure day
Adult Kayaker/Canoer Surface Water Contact Time under Current Use	ET_{swakc}	0.25	hours/event	Assumes boater spends 15 minutes in water after going overboard
Older Child Kayaker/Canoer Surface Water Contact Time under Current Use	ET_{swockc}	0.25	hours/event	Assumes boater spends 15 minutes in water after going overboard
Adult Kayaker/Canoer Surface Water Contact Time under Future Use	ET_{swakf}	0.25	hours/event	Assumes boater spends 15 minutes in water after going overboard
Older Child Kayaker/Canoer Surface Water Contact Time under Future Use	ET_{swockf}	0.25	hours/event	Assumes boater spends 15 minutes in water after going overboard
Construction Worker Exposure Time per day	ET_{cw}	8	hours	USEPA (2014a) default value

Table 2. Exposure Factors Used for Calculating Site-Specific RBSLs

Variable Description	Variable Name	Value	Units	Notes
Adult Angler/Crabber Body Weight	BW_{ar}	80	kg	USEPA (2014a) default for adult
Older Child Angler/Crabber Body Weight (6 to <18 years old)	BW_{ocr}	48.8	kg	Age-weighted value for males and females from USEPA (2011) Table 8-3
Younger Child Angler/Crabber Body Weight (0 to <6 years old)	BW_{yc}	15	kg	USEPA (2014a) default value for child 0 to <6 years old
Adult Kayaker/Canoer Body Weight	BW_{ak}	80	kg	USEPA (2014a) default value for adult
Older Child Kayaker/Canoer Body Weight (6 to <18 years old)	BW_{ock}	48.8	kg	Age-weighted value for males and females from USEPA (2011) Table 8-3
Construction Worker Body Weight	BW_{cw}	80	kg	USEPA (2014a) default for worker
Adult Angler/Crabber Skin Surface Area for Sediment Contact	SA_{ar}	4,760	cm^2/day	Average of male and female (≥21 years old) mean skin surface area for forearms (lower arms) + hands + lower legs from USEPA (2011) Tables 7-12 and 7-13
Older Child Angler/Crabber Skin Surface Area for Sediment Contact (6 to <18 years old)	SA_{ocr}	3,108	cm^2/day	Average of male and female older child (6 to <18 years old) mean skin surface area for forearms (lower arms) + hands + lower legs from USEPA (2011) Tables 7-8 and 7-9
Adult Kayaker/Canoer Skin Surface Area for Sediment Contact	SA_{ak}	4,760	cm^2/day	Average of male and female (≥21 years old) mean skin surface area for forearms (lower arms) + hands + lower legs from USEPA (2011) Tables 7-12 and 7-13
Older Child Kayaker/Canoer Skin Surface Area for Sediment Contact (6 to <18 years old)	SA_{ock}	3,108	cm^2/day	Average of male and female older child (6 to <18 years old) mean skin surface area for forearms (lower arms) + hands + lower legs from USEPA (2011) Tables 7-8 and 7-9
Construction Worker Skin Surface Area for Sediment Contact	SA_{cw}	3,470	cm^2/day	USEPA (2014a) default value for worker skin surface area
Adult Angler/Crabber Sediment Ingestion Rate	IRS_{ar}	100	mg/day	USEPA (2014a) default value for adult resident soil ingestion rate
Older Child Angler/Crabber Sediment Ingestion Rate (6 to <18 years old)	IRS_{ocr}	100	mg/day	USEPA (2014a) default value for adult resident soil ingestion rate
Adult Kayaker/Canoer Sediment Ingestion Rate	IRS_{ak}	100	mg/day	USEPA (2014a) default value for adult resident soil ingestion rate
Older Child Kayaker/Canoer Sediment Ingestion Rate (6 to < 18 years old)	IRS_{ock}	100	mg/day	USEPA (2014a) default value for adult resident soil ingestion rate
Construction Worker Sediment Ingestion Rate	IRS_{cw}	330	mg/day	USEPA (2014a) default value for construction worker soil ingestion rate
Adult Angler/Crabber Sediment Adherence Factor	AF_{ar}	0.30	mg/cm^2	USEPA (2004), geometric mean for reed gatherers, Exhibit 3-3
Older Child Angler/Crabber Sediment Adherence Factor (6 to <18 years old)	AF_{ocr}	0.20	mg/cm^2	USEPA (2004), 8–12 year old playing in wet soil, Exhibit 3-3
Adult Kayaker/Canoer Sediment Adherence Factor	AF_{ak}	0.30	mg/cm^2	USEPA (2004), geometric mean for reed gatherers, Exhibit 3-3
Older Child Kayaker/Canoer Sediment Adherence Factor	AF_{ock}	0.20	mg/cm^2	USEPA (2004), 8–12 year old playing in wet soil, Exhibit 3-3
Construction Worker Sediment Adherence Factor	AF_{cw}	0.30	mg/cm^2	USEPA (2014a) default value for construction worker contact with soil
Adult Kayaker/Canoer Surface Water Incidental Ingestion Rate	IRW_{ak}	0.050	L/hr	USEPA (1989) default value
Older Child Kayaker/Canoer Surface Water Incidental Ingestion Rate	IRW_{ock}	0.050	L/hr	USEPA (1989) default value
Adult Angler/Crabber Fish or Crab Ingestion Rate	IRF_{ar}	22,000	mg/day	USEPA (2014b) 90th percentile consumption rate of uncooked finfish and shellfish by adult consumers
Older Child Angler/Crabber Fish or Crab Ingestion Rate (6 to <18 years old)	IRF_{ocr}	14,700	mg/day	Adult angler/crabber fish ingestion rate scaled by 2/3
Younger Child Angler/Crabber Fish or Crab Ingestion Rate (0 to <6 years old)	IRF_{ycr}	7,300	mg/day	Adult angler/crabber fish ingestion rate scaled by 1/3

Table 2. Exposure Factors Used for Calculating Site-Specific RBSLs

Variable Description	Variable Name	Value	Units	Notes
Calculated Exposure Variables (equations shown in footnotes of relevant RBSL tables)				
Angler/Crabber Age-Adjusted Sediment Ingestion Factor	IFS_{adj}	1,136	mg/kg	Assumes older child at 12 years and adult at 14 years to yield 26 year total exposure duration for combined segments
Angler/Crabber Age-Adjusted Sediment Dermal Factor	DFS_{adj}	10,874	mg/kg	Assumes older child at 12 years and adult at 14 years to yield 26 year total exposure duration for combined segments
Kayaker/Canoer Age-Adjusted Sediment Ingestion Factor - Current Use	IFS_{adjkc}	623	mg/kg	Assumes older child at 12 years and adult at 8 years
Kayaker/Canoer Age-Adjusted Sediment Dermal Factor - Current Use	DFS_{adjkc}	5,322	mg/kg	Assumes older child at 12 years and adult at 8 years
Kayaker/Canoer Age-Adjusted Sediment Ingestion Factor - Future Use	IFS_{adjkf}	1,349	mg/kg	Assumes older child at 12 years and adult at 8 years
Kayaker/Canoer Age-Adjusted Sediment Dermal Factor - Future Use	DFS_{adjkf}	11,530	mg/kg	Assumes older child at 12 years and adult at 8 years
Age-Adjusted Surface Water Incidental Ingestion Rate for Kayaker/Canoers - Current Use	IFW_{adjkc}	0.078	L/kg	Assumes older child at 12 years and adult at 8 years
Age-Adjusted Surface Water Incidental Ingestion Rate for Kayaker/Canoers - Future Use	IFW_{adjkf}	0.17	L/kg	Assumes older child at 12 years and adult at 8 years
Age - Adjusted Angler/Crabber Fish or Crab Ingestion Rate	IRF_{adj}	235,838	mg/day	Assumes younger child at 6 years, older child at 12 years, and adult at 8 years to yield 26 year total exposure duration for combined segments

Notes:
EPA = U.S. Environmental Protection Agency
HQ = hazard quotient
RBSL = risk-based screening level

Sources:
USEPA (1989)
USEPA (2004)
USEPA (2011)
USEPA (2014a)
USEPA (2014b)

Table 3. ADAFs Used for Mutagenic Chemicals in Calculating Site-Specific RBSLs

Receptor Group		Age Category	Duration (days)	ADAF
Younger Child	Child (0 – <6)	0 – <2	2	10
		2 – <6	4	3
		Weighted ADAF		5.3
Older Child	Child (6 – <18 years)	6 – <16	10	3
		16 – <18	2	1
		Weighted ADAF		2.7
Adult + Older Child	Child (6 – <18 years)	6 – <16	10	3
		16 – <18	2	1
	Adult	≥18	14	1
		Weighted ADAF		1.8
Adult + Older Child + Younger Child	Child (0 – <6)	0 – <2	2	10
		2 – <6	4	3
	Child (6 – <18 years)	6 – <16	10	3
		16 – <18	2	1
	Adult	≥18	8	1
		Weighted ADAF		2.8

Notes:
ADAF = age-dependant adjustment factor

Source: USEPA (2005)

Table 4. Site-Specific Sediment RBSLs Calculated for Angler/Crabber—Current and Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Angler/Crabber Sediment RBSL (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	
Metals															
Aluminum	7429905	--	1.0	1.0	--	NA	NA	NA	1.1E+05	NA	1.1E+05	6.6E+04	NA	6.6E+04	6.6E+04
Antimony	7440360	--	0.00040	0.15	--	NA	NA	NA	4.3E+01	NA	4.3E+01	2.6E+01	NA	2.6E+01	2.6E+01
Arsenic	7440382	1.5	0.00030	1.0	0.030	1.5E+00	5.2E+00	1.2E+00	3.2E+01	7.6E+01	2.3E+01	2.0E+01	1.1E+02	1.7E+01	1.2E+00
Barium	7440393	--	0.20	0.070	--	NA	NA	NA	2.2E+04	NA	2.2E+04	1.3E+04	NA	1.3E+04	1.3E+04
Beryllium	7440417	--	0.0020	0.0070	--	NA	NA	NA	2.2E+02	NA	2.2E+02	1.3E+02	NA	1.3E+02	1.3E+02
Cadmium	7440439	--	0.0010	0.025	0.0010	NA	NA	NA	1.1E+02	1.9E+02	6.9E+01	6.6E+01	2.7E+02	5.3E+01	5.3E+01
Chromium (VI)	18540299	0.50	0.0030	0.025	--	2.5E+00	NA	2.5E+00	3.2E+02	NA	3.2E+02	2.0E+02	NA	2.0E+02	2.5E+00
Chromium (total)	7440473	--	1.5	0.013	--	NA	NA	NA	1.6E+05	NA	1.6E+05	9.9E+04	NA	9.9E+04	9.9E+04
Cobalt	7440484	--	0.00030	1.0	--	NA	NA	NA	3.2E+01	NA	3.2E+01	2.0E+01	NA	2.0E+01	2.0E+01
Copper	7440508	--	0.040	1.0	--	NA	NA	NA	4.3E+03	NA	4.3E+03	2.6E+03	NA	2.6E+03	2.6E+03
Iron	7439896	--	0.70	1.0	--	NA	NA	NA	7.6E+04	NA	7.6E+04	4.6E+04	NA	4.6E+04	4.6E+04
Lead [a]	7439921	--	--	1.0	--	--	--	--	--	--	--	--	--	--	--
Manganese	7439965	--	0.14	1.0	--	NA	NA	NA	1.5E+04	NA	1.5E+04	9.2E+03	NA	9.2E+03	9.2E+03
Mercury	7439976	--	0.00030	0.070	--	NA	NA	NA	3.2E+01	NA	3.2E+01	2.0E+01	NA	2.0E+01	2.0E+01
Nickel	7440020	--	0.020	0.040	--	NA	NA	NA	2.2E+03	NA	2.2E+03	1.3E+03	NA	1.3E+03	1.3E+03
Selenium	7782492	--	0.0050	1.0	--	NA	NA	NA	5.4E+02	NA	5.4E+02	3.3E+02	NA	3.3E+02	3.3E+02
Silver	7440224	--	0.0050	0.040	--	NA	NA	NA	5.4E+02	NA	5.4E+02	3.3E+02	NA	3.3E+02	3.3E+02
Thallium	7440280	--	0.000010	1.0	--	NA	NA	NA	1.1E+00	NA	1.1E+00	6.6E-01	NA	6.6E-01	6.6E-01
Vanadium	7440622	--	0.0050	0.026	--	NA	NA	NA	5.4E+02	NA	5.4E+02	3.3E+02	NA	3.3E+02	3.3E+02
Zinc	7440666	--	0.30	1.0	--	NA	NA	NA	3.2E+04	NA	3.2E+04	2.0E+04	NA	2.0E+04	2.0E+04
Organometals															
Methyl mercury	22967926	--	0.00010	1.0	--	NA	NA	NA	1.1E+01	NA	1.1E+01	6.6E+00	NA	6.6E+00	6.6E+00
PAHs															
Acenaphthene	83329	--	0.060	1.0	0.13	NA	NA	NA	6.5E+03	3.5E+03	2.3E+03	4.0E+03	4.9E+03	2.2E+03	2.2E+03
Acenaphthylene	208968	--	0.060	1.0	0.13	NA	NA	NA	6.5E+03	3.5E+03	2.3E+03	4.0E+03	4.9E+03	2.2E+03	2.2E+03
Anthracene	120127	--	0.30	1.0	0.13	NA	NA	NA	3.2E+04	1.7E+04	1.1E+04	2.0E+04	2.4E+04	1.1E+04	1.1E+04
Benz[a]anthracene	56553	0.73	--	1.0	0.13	1.7E+00	1.4E+00	7.8E-01	NA	NA	NA	NA	NA	NA	7.8E-01
Benzo[a]pyrene	50328	7.3	--	1.0	0.13	1.7E-01	1.4E-01	7.8E-02	NA	NA	NA	NA	NA	NA	7.8E-02
Benzo[b]fluoranthene	205992	0.73	--	1.0	0.13	1.7E+00	1.4E+00	7.8E-01	NA	NA	NA	NA	NA	NA	7.8E-01
Benzo[g,h,i]perylene	191242	--	0.030	1.0	0.13	NA	NA	NA	3.2E+03	1.7E+03	1.1E+03	2.0E+03	2.4E+03	1.1E+03	1.1E+03
Benzo[k]fluoranthene	207089	0.073	--	1.0	0.13	1.7E+01	1.4E+01	7.8E+00	NA	NA	NA	NA	NA	NA	7.8E+00
Chrysene	218019	0.0073	--	1.0	0.13	1.7E+02	1.4E+02	7.8E+01	NA	NA	NA	NA	NA	NA	7.8E+01
Dibenz[a,h]anthracene	53703	7.3	--	1.0	0.13	1.7E-01	1.4E-01	7.8E-02	NA	NA	NA	NA	NA	NA	7.8E-02
Dibenzofuran	132649	--	0.0010	1.0	0.03	NA	NA	NA	1.1E+02	2.5E+02	7.6E+01	6.6E+01	3.5E+02	5.6E+01	5.6E+01
Fluoranthene	206440	--	0.040	1.0	0.13	NA	NA	NA	4.3E+03	2.3E+03	1.5E+03	2.6E+03	3.3E+03	1.5E+03	1.5E+03
Fluorene	86737	--	0.040	1.0	0.13	NA	NA	NA	4.3E+03	2.3E+03	1.5E+03	2.6E+03	3.3E+03	1.5E+03	1.5E+03
Indeno[1,2,3-cd]pyrene	193395	0.73	--	1.0	0.13	1.7E+00	1.4E+00	7.8E-01	NA	NA	NA	NA	NA	NA	7.8E-01
2-methylnaphthalene	91576	--	0.0040	1.0	0.13	NA	NA	NA	4.3E+02	2.3E+02	1.5E+02	2.6E+02	3.3E+02	1.5E+02	1.5E+02
Naphthalene	91203	--	0.020	1.0	0.13	NA	NA	NA	2.2E+03	1.2E+03	7.6E+02	1.3E+03	1.6E+03	7.3E+02	7.3E+02
Phenanthrene	85018	--	0.30	1.0	0.13	NA	NA	NA	3.2E+04	1.7E+04	1.1E+04	2.0E+04	2.4E+04	1.1E+04	1.1E+04
Pyrene	129000	--	0.030	1.0	0.13	NA	NA	NA	3.2E+03	1.7E+03	1.1E+03	2.0E+03	2.4E+03	1.1E+03	1.1E+03
Pesticides															
Aldrin	309002	17	0.000030	1.0	--	1.3E-01	NA	1.3E-01	3.2E+00	NA	3.2E+00	2.0E+00	NA	2.0E+00	1.3E-01
Carbazole	86748	0.020	--	--	--	1.1E+02	NA	1.1E+02	NA	NA	NA	NA	NA	NA	1.1E+02
alpha-Chlordane	5103719	0.35	0.00050	1.0	0.040	6.4E+00	1.7E+01	4.6E+00	5.4E+01	9.5E+01	3.4E+01	3.3E+01	1.3E+02	2.6E+01	4.6E+00

Table 4. Site-Specific Sediment RBSLs Calculated for Angler/Crabber—Current and Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Angler/Crabber Sediment RBSL (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	
gamma-Chlordane	5566347	0.35	0.00050	1.0	0.040	6.4E+00	1.7E+01	4.6E+00	5.4E+01	9.5E+01	3.4E+01	3.3E+01	1.3E+02	2.6E+01	4.6E+00
4,4'-DDD	72548	0.24	--	1.0	0.10	9.4E+00	9.8E+00	4.8E+00	NA	NA	NA	NA	NA	NA	4.8E+00
4,4'-DDE	72559	0.34	--	1.0	--	6.6E+00	NA	6.6E+00	NA	NA	NA	NA	NA	NA	6.6E+00
4,4'-DDT	50293	0.34	0.00050	1.0	0.030	6.6E+00	2.3E+01	5.1E+00	5.4E+01	1.3E+02	3.8E+01	3.3E+01	1.8E+02	2.8E+01	5.1E+00
Dieldrin	60571	16	0.000050	1.0	0.10	1.4E-01	1.5E-01	7.2E-02	5.4E+00	3.8E+00	2.2E+00	3.3E+00	5.3E+00	2.0E+00	7.2E-02
Endosulfan I	959988	--	0.0060	1.0	--	NA	NA	NA	6.5E+02	NA	6.5E+02	4.0E+02	NA	4.0E+02	4.0E+02
Endosulfan II	33213659	--	0.0060	1.0	--	NA	NA	NA	6.5E+02	NA	6.5E+02	4.0E+02	NA	4.0E+02	4.0E+02
Endosulfan sulfate	1031078	--	0.0060	1.0	--	NA	NA	NA	6.5E+02	NA	6.5E+02	4.0E+02	NA	4.0E+02	4.0E+02
Endrin	72208	--	0.00030	1.0	0.10	NA	NA	NA	3.2E+01	2.3E+01	1.3E+01	2.0E+01	3.2E+01	1.2E+01	1.2E+01
Endrin aldehyde	7421934	--	0.00030	1.0	0.10	NA	NA	NA	3.2E+01	2.3E+01	1.3E+01	2.0E+01	3.2E+01	1.2E+01	1.2E+01
Endrin ketone	53494705	--	0.00030	1.0	0.10	NA	NA	NA	3.2E+01	2.3E+01	1.3E+01	2.0E+01	3.2E+01	1.2E+01	1.2E+01
Heptachlor	76448	4.5	0.00050	1.0	--	5.0E-01	NA	5.0E-01	5.4E+01	NA	5.4E+01	3.3E+01	NA	3.3E+01	5.0E-01
Heptachlor epoxide	1024573	9.1	0.000013	1.0	--	2.5E-01	NA	2.5E-01	1.4E+00	NA	1.4E+00	8.6E-01	NA	8.6E-01	2.5E-01
alpha-HCH	319846	6.3	0.0080	1.0	0.10	3.6E-01	3.7E-01	1.8E-01	8.7E+02	6.1E+02	3.6E+02	5.3E+02	8.5E+02	3.3E+02	1.8E-01
beta-HCH	319857	1.8	--	1.0	0.10	1.2E+00	1.3E+00	6.4E-01	NA	NA	NA	NA	NA	NA	6.4E-01
delta-HCH	319868	1.8	--	1.0	0.10	1.2E+00	1.3E+00	6.4E-01	NA	NA	NA	NA	NA	NA	6.4E-01
gamma-HCH (Lindane)	58899	1.1	0.00030	1.0	0.040	2.0E+00	5.3E+00	1.5E+00	3.2E+01	5.7E+01	2.1E+01	2.0E+01	8.0E+01	1.6E+01	1.5E+00
Methoxychlor	72435	--	0.0050	1.0	0.10	NA	NA	NA	5.4E+02	3.8E+02	2.2E+02	3.3E+02	5.3E+02	2.0E+02	2.0E+02
Semivolatiles															
Acetophenone	98862	--	0.10	1.0	--	NA	NA	NA	1.1E+04	NA	1.1E+04	6.6E+03	NA	6.6E+03	6.6E+03
Benzaldehyde	100527	--	0.10	1.0	--	NA	NA	NA	1.1E+04	NA	1.1E+04	6.6E+03	NA	6.6E+03	6.6E+03
1,1'-biphenyl	92524	0.0080	0.50	1.0	--	2.8E+02	NA	2.8E+02	5.4E+04	NA	5.4E+04	3.3E+04	NA	3.3E+04	2.8E+02
Butyl benzyl phthalate	85687	0.0019	0.20	1.0	0.10	1.2E+03	1.2E+03	6.0E+02	2.2E+04	1.5E+04	8.9E+03	1.3E+04	2.1E+04	8.1E+03	6.0E+02
Caprolactam	105602	--	0.50	1.0	0.10	NA	NA	NA	5.4E+04	3.8E+04	2.2E+04	3.3E+04	5.3E+04	2.0E+04	2.0E+04
4-chloroaniline	106478	0.20	0.0040	1.0	0.10	1.1E+01	1.2E+01	5.7E+00	4.3E+02	3.0E+02	1.8E+02	2.6E+02	4.2E+02	1.6E+02	5.7E+00
3,3'-dichlorobenzidine	91941	0.45	--	1.0	0.10	5.0E+00	5.2E+00	2.6E+00	NA	NA	NA	NA	NA	NA	2.6E+00
2,4-dimethylphenol	105679	--	0.020	1.0	0.10	NA	NA	NA	2.2E+03	1.5E+03	8.9E+02	1.3E+03	2.1E+03	8.1E+02	8.1E+02
2,4-dinitrotoluene	121142	0.31	0.0020	1.0	0.10	7.3E+00	7.4E+00	3.7E+00	2.2E+02	1.5E+02	8.8E+01	1.3E+02	2.1E+02	8.1E+01	3.7E+00
2,6-dinitrotoluene	606202	1.5	0.00030	1.0	0.099	1.5E+00	1.6E+00	7.7E-01	3.2E+01	2.3E+01	1.3E+01	2.0E+01	3.2E+01	1.2E+01	7.7E-01
Hexachlorobenzene	118741	1.6	0.00080	1.0	--	1.4E+00	NA	1.4E+00	8.7E+01	NA	8.7E+01	5.3E+01	NA	5.3E+01	1.4E+00
Isophorone	78591	0.00095	0.20	1.0	0.10	2.4E+03	2.5E+03	1.2E+03	2.2E+04	1.5E+04	8.9E+03	1.3E+04	2.1E+04	8.1E+03	1.2E+03
2-methylphenol	95487	--	0.050	1.0	0.10	NA	NA	NA	5.4E+03	3.8E+03	2.2E+03	3.3E+03	5.3E+03	2.0E+03	2.0E+03
4-methylphenol	106445	--	0.10	1.0	0.10	NA	NA	NA	1.1E+04	7.6E+03	4.5E+03	6.6E+03	1.1E+04	4.1E+03	4.1E+03
2-nitroaniline	88744	--	0.010	1.0	0.10	NA	NA	NA	1.1E+03	7.6E+02	4.5E+02	6.6E+02	1.1E+03	4.1E+02	4.1E+02
3-nitroaniline	100016	0.020	0.0040	1.0	0.10	1.1E+02	1.2E+02	5.7E+01	4.3E+02	3.0E+02	1.8E+02	2.6E+02	4.2E+02	1.6E+02	5.7E+01
N-nitrosodiphenylamine	86306	0.0049	--	1.0	0.10	4.6E+02	4.8E+02	2.3E+02	NA	NA	NA	NA	NA	NA	2.3E+02
Phenol	108952	--	0.30	1.0	0.10	NA	NA	NA	3.2E+04	2.3E+04	1.3E+04	2.0E+04	3.2E+04	1.2E+04	1.2E+04
bis(2-ethylhexyl)phthalate	117817	0.014	0.020	1.0	0.10	1.6E+02	1.7E+02	8.2E+01	2.2E+03	1.5E+03	8.9E+02	1.3E+03	2.1E+03	8.1E+02	8.2E+01
Diethyl phthalate	84662	--	0.80	1.0	0.10	NA	NA	NA	8.7E+04	6.1E+04	3.6E+04	5.3E+04	8.5E+04	3.3E+04	3.3E+04
Dimethyl phthalate	131113	--	0.80	1.0	0.10	NA	NA	NA	8.7E+04	6.1E+04	3.6E+04	5.3E+04	8.5E+04	3.3E+04	3.3E+04
Di-*n*-butyl phthalate	84742	--	0.10	1.0	0.10	NA	NA	NA	1.1E+04	7.6E+03	4.5E+03	6.6E+03	1.1E+04	4.1E+03	4.1E+03
Di-*n*-octylphthalate	117840	--	0.010	1.0	0.10	NA	NA	NA	1.1E+03	7.6E+02	4.5E+02	6.6E+02	1.1E+03	4.1E+02	4.1E+02
2,4,6-trichlorophenol	88062	0.011	0.0010	1.0	0.10	2.0E+02	2.1E+02	1.0E+02	1.1E+02	7.6E+01	4.5E+01	6.6E+01	1.1E+02	4.1E+01	4.1E+01
PCBs															
PCBs (total Aroclors)	(blank)	2.0	0.00002	1.0	0.14	1.1E+00	8.4E-01	4.8E-01	2.2E+00	1.1E+00	7.2E-01	1.3E+00	1.5E+00	7.1E-01	4.8E-01

Table 4. Site-Specific Sediment RBSLs Calculated for Angler/Crabber—Current and Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Angler/Crabber Sediment RBSL (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	
Volatiles															
Acetone	67641	--	0.90	1.0	--	NA	NA	NA	9.7E+04	NA	9.7E+04	5.9E+04	NA	5.9E+04	5.9E+04
Benzene	71432	0.055	0.0040	1.0	--	4.1E+01	NA	4.1E+01	4.3E+02	NA	4.3E+02	2.6E+02	NA	2.6E+02	4.1E+01
bis(2-chloroethyl)ether	111444	1.1	--	1.0	--	2.0E+00	NA	2.0E+00	NA	NA	NA	NA	NA	NA	2.0E+00
2-butanone	78933	--	0.60	1.0	--	NA	NA	NA	6.5E+04	NA	6.5E+04	4.0E+04	NA	4.0E+04	4.0E+04
Carbon disulfide	75150	--	0.10	1.0	--	NA	NA	NA	1.1E+04	NA	1.1E+04	6.6E+03	NA	6.6E+03	6.6E+03
Chlorobenzene	108907	--	0.020	1.0	--	NA	NA	NA	2.2E+03	NA	2.2E+03	1.3E+03	NA	1.3E+03	1.3E+03
Chloroform	67663	0.031	0.010	1.0	--	7.3E+01	NA	7.3E+01	1.1E+03	NA	1.1E+03	6.6E+02	NA	6.6E+02	7.3E+01
Chloromethane	74873	0.013	--	1.0	--	1.7E+02	NA	1.7E+02	NA	NA	NA	NA	NA	NA	1.7E+02
1,2-dichlorobenzene	95501	--	0.090	1.0	--	NA	NA	NA	9.7E+03	NA	9.7E+03	5.9E+03	NA	5.9E+03	5.9E+03
1,3-dichlorobenzene	541731	--	0.020	-	--	NA	NA	NA	2.2E+03	NA	2.2E+03	1.3E+03	NA	1.3E+03	1.3E+03
1,4-dichlorobenzene	106467	0.0054	0.070	1.0	--	4.2E+02	NA	4.2E+02	7.6E+03	NA	7.6E+03	4.6E+03	NA	4.6E+03	4.2E+02
Dichlorobenzenes (total)	106467	0.0054	0.070	1.0	--	4.2E+02	NA	4.2E+02	7.6E+03	NA	7.6E+03	4.6E+03	NA	4.6E+03	4.2E+02
1,1-dichloroethane	75343	0.0057	0.20	1.0	--	3.9E+02	NA	3.9E+02	2.2E+04	NA	2.2E+04	1.3E+04	NA	1.3E+04	3.9E+02
cis -1,2-dichloroethene	156592	--	0.0020	1.0	--	NA	NA	NA	2.2E+02	NA	2.2E+02	1.3E+02	NA	1.3E+02	1.3E+02
trans -1,2-dichloroethene	156605	--	0.020	1.0	--	NA	NA	NA	2.2E+03	NA	2.2E+03	1.3E+03	NA	1.3E+03	1.3E+03
Ethylbenzene	100414	0.011	0.10	1.0	--	2.0E+02	NA	2.0E+02	1.1E+04	NA	1.1E+04	6.6E+03	NA	6.6E+03	2.0E+02
2-hexanone	591786	--	0.0050	1.0	--	NA	NA	NA	5.4E+02	NA	5.4E+02	3.3E+02	NA	3.3E+02	3.3E+02
Isopropylbenzene	98828	--	0.10	1.0	--	NA	NA	NA	1.1E+04	NA	1.1E+04	6.6E+03	NA	6.6E+03	6.6E+03
Methyl acetate	79209	--	1.0	1.0	--	NA	NA	NA	1.1E+05	NA	1.1E+05	6.6E+04	NA	6.6E+04	6.6E+04
Methylene chloride	75092	0.0020	0.0060	1.0	--	6.4E+02	NA	6.4E+02	6.5E+02	NA	6.5E+02	4.0E+02	NA	4.0E+02	4.0E+02
Styrene	100425	--	0.20	1.0	--	NA	NA	NA	2.2E+04	NA	2.2E+04	1.3E+04	NA	1.3E+04	1.3E+04
Tetrachloroethene	127184	0.0021	0.0060	1.0	--	1.1E+03	NA	1.1E+03	6.5E+02	NA	6.5E+02	4.0E+02	NA	4.0E+02	4.0E+02
Toluene	108883	--	0.080	1.0	--	NA	NA	NA	8.7E+03	NA	8.7E+03	5.3E+03	NA	5.3E+03	5.3E+03
1,2,3-trichlorobenzene	87616	--	0.00080	1.0	--	NA	NA	NA	8.7E+01	NA	8.7E+01	5.3E+01	NA	5.3E+01	5.3E+01
1,2,4-trichlorobenzene	120821	0.029	0.010	1.0	--	7.8E+01	NA	7.8E+01	1.1E+03	NA	1.1E+03	6.6E+02	NA	6.6E+02	7.8E+01
Trichloroethene	79016	0.046	0.00050	1.0	--	4.2E+01	NA	4.2E+01	5.4E+01	NA	5.4E+01	3.3E+01	NA	3.3E+01	3.3E+01
Trichlorotrifluoroethane	76131	--	30	1.0	--	NA	NA	NA	3.2E+06	NA	3.2E+06	2.0E+06	NA	2.0E+06	2.0E+06
Vinyl chloride	75014	0.72	0.0030	1.0	--	6.6E-02	NA	6.6E-02	3.2E+02	NA	3.2E+02	2.0E+02	NA	2.0E+02	6.6E-02
m,p -xylenes	1330207	--	0.20	1.0	--	NA	NA	NA	2.2E+04	NA	2.2E+04	1.3E+04	NA	1.3E+04	1.3E+04
o -xylene	95476	--	0.20	1.0	--	NA	NA	NA	2.2E+04	NA	2.2E+04	1.3E+04	NA	1.3E+04	1.3E+04
Xylenes	1330207	--	0.20	1.0	--	NA	NA	NA	2.2E+04	NA	2.2E+04	1.3E+04	NA	1.3E+04	1.3E+04

Notes:

ABS_d = dermal absorption factor
CAS = chemical abstracts service
CSF = cancer slope factor
GIABS = gastrointestinal absorption factor
HCH = hexachlorocyclohexane
HQ = hazard quotient
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
NA = not calculated due to missing toxicity data or exposure pathway not relevant
RBSL = risk-based screening level
RfD = reference dose
-- = no data available

[a] Lead screening level calculated using Adult Lead Methodology. See text.

1,3-dichlorobenzene RfD value is based on the Agency for Toxic Substances and Disease Registry subchronic minimal risk level.
Carbazole oral CSF is based on the health effects assessment summary table (HEAST) value.
Chloroethane RfD value is based on the provision peer reviewed toxicity value (PPRTV) subchronic RfD.
Chloromethane CSF is based on the HEAST value.
Chromium values are based on toxicity criterion for chromium (III) as a surrogate.
Mercury values are based on toxicity criterion for mercuric chloride as a surrogate.
The cancer slope value for PCBs is based on the toxicity value for total PCBs.

Table 4. Site-Specific Sediment RBSLs Calculated for Angler/Crabber—Current and Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Angler/Crabber Sediment RBSL (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	

Toxicity criteria for 3-nitroaniline are based on 4-nitroaniline as a surrogate.
Toxicity criteria for acenaphthylene are based on acenaphthene as a surrogate.
Toxicity criteria for alpha-chlordane are based on chlordane as a surrogate.
Toxicity criteria for benzo[g,h,i]perylene are based on pyrene as a surrogate.
Toxicity criteria for delta-HCH are based on technical HCH as a surrogate.
Toxicity criteria for dichlorobenzenes (total) are based on 1,4-dichlorobenzene as a surrogate.
Toxicity criteria for dimethyl phthalate are based on diethyl phthalate as a surrogate.
Toxicity criteria for endosulfan I are based on endosulfan as a surrogate.
Toxicity criteria for endosulfan II are based on endosulfan as a surrogate.
Toxicity criteria for endosulfan sulfate are based on endosulfan as a surrogate.
Toxicity criteria for endrin aldehyde are based on endrin as a surrogate.
Toxicity criteria for endrin ketone are based on endrin as a surrogate.
Toxicity criteria for gamma-chlordane are based on chlordane as a surrogate.
Toxicity criteria for *m,p* -xylenes are based on xylenes as a surrogate.
Toxicity criteria for phenanthrene are based on anthracene as a surrogate.

RBSL for Sediment Ingestion - Carcinogens (mg/kg) = [TR x 365 (day/yr) x LT (yr)] / [IFS_{adj} (mg/kg) x 1E-6 (kg/mg) x CSF_o (mg/kg-day)$^{-1}$ x ADAF]
where IFS_{adj} (mg/kg) = {[EF_r (day/yr) x ED_{ocr} (yr) x IRS_{ocr} (mg/day)] / BW_{ocr} (kg)} + {[EF_r (days/yr) x [ED_{ar} (yr) - ED_{ocr} (yr)] x IRS_{ar} (mg/day)] / BW_{ar} (kg)}

RBSL for Sediment Ingestion - Carcinogen vinyl chloride (mg/kg) = TR / {([CSF_o (mg/kg-day)$^{-1}$ x IFS_{adj} (mg/kg) x 1E-6 (kg/mg)] / [365 (day/yr) x LT (yr)]) + ([CSF_o (mg/kg-day)$^{-1}$ x IRS_{ocr} x 1E-6 (kg/mg)] / BW_{ocr} (kg))}
where IFS_{adj} (mg/kg) = {[EF_r (day/yr) x ED_{ocr} (yr) x IRS_{ocr} (mg/day)] / BW_{ocr} (kg)} + {[EF_r (days/yr) x [ED_{ar} (yr) - ED_{ocr} (yr)] x IRS_{ar} (mg/day)] / BW_{ar} (kg)}

RBSL for Sediment Ingestion - Carcinogen trichloroethene (mg/kg) = [TR x 365 (day/yr) x LT (yr)] / {CSF_o (mg/kg-day)$^{-1}$ x 1E-6 (kg/mg) x ([CAF_o x IFS_{adj} (mg/kg)] + [MAF_o x IFS_{adj} (mg/kg) x ADAF])}
where IFS_{adj} (mg/kg) = {[EF_r (day/yr) x ED_{ocr} (yr) x IRS_{ocr} (mg/day)] / BW_{ocr} (kg)} + {[EF_r (days/yr) x [ED_{ar} (yr) - ED_{ocr} (yr)] x IRS_{ar} (mg/day)] / BW_{ar} (kg)}
CAF_o = 0.804
MAF_o = 0.202

RBSL for Sediment Dermal Contact - Carcinogens (mg/kg) = [TR x 365 (day/yr) x LT (yr)] / {DFS_{adj} (mg/kg) x 1E-6 (kg/mg) x ABS x [CSF_o (mg/kg-day)$^{-1}$ / GIABS] x ADAF}
where DFS_{adj} (mg/kg) = {[EF_{ocr} (days/yr) x ED_{ocr} (yr) x SA_{ocr} (cm^2/day) x AF_{ocr} (mg/cm^2)] / BW_{ocr} (kg)} + {[EF_r (days/yr) x [ED_{ar} (yr) - ED_{ocr} (yr)] x SA_{ar} (cm^2/day) x AF_{ar} (mg/cm^2)] / BW_{ar} (kg)}

See Table 3 for ADAF values.

Total RBSL for Carcinogens (mg/kg) = 1 / {[1/Carcinogen RBSL for Sediment Ingestion (mg/kg)] + [1/Carcinogen RBSL for Dermal Contact (mg/kg)]}

RBSL for Sediment Ingestion - Adult, Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{ar} (yr) x BW_{ar} (kg)] / {EF_r (day/yr) x ED_{ar} (yr) x IRS_{ar} (mg/day) x 1E-6 (kg/mg) x [1 / RfD_o (mg/kg-day)]}

RBSL for Sediment Dermal Contact - Adult, Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{ar} (yr) x BW_{ar} (kg)] / {EF_r (day/yr) x ED_{ar} (yr) x SA_{ar} (cm^2/day) x AF_{ar} (mg/cm^2) x 1E-6 (kg/mg) x ABS x [1 / RfD_o (mg/kg-day) x GIABS]}

RBSL for Sediment Ingestion - Older Child, Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{ocr} (yr) x BW_{ocr} (kg)] / {EF_r (day/yr) x ED_{ocr} (yr) x IRS_{ocr} (mg/day) x 1E-6 (kg/mg) x [1 / RfD_o (mg/kg-day)]}

RBSL for Sediment Dermal Contact - Older Child, Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{ocr} (yr) x BW_{ocr} (kg)] / {EF_r (day/yr) x ED_{ocr} (yr) x SA_{ocr} (cm^2/day) x AF_{ocr} (mg/cm^2) x 1E-6 (kg/mg) x ABS x [1 / RfD_o (mg/kg-day) x GIABS]}

Total RBSL - Noncancer (mg/kg) = 1 / {[1/Noncancer RBSL for Sediment Ingestion (mg/kg)] + [1/Noncancer RBSL for Dermal Contact (mg/kg)]}

Table 5. Site-Specific Sediment RBSLs Calculated for Kayaker/Canoer—Current Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Kayaker/Canoer Sediment RBSL Current Use (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	
Metals															
Aluminum	7429905	--	1.0	1.0	--	NA	NA	NA	1.6E+05	NA	1.6E+05	9.9E+04	NA	9.9E+04	9.9E+04
Antimony	7440360	--	0.00040	0.15	--	NA	NA	NA	6.5E+01	NA	6.5E+01	4.0E+01	NA	4.0E+01	4.0E+01
Arsenic	7440382	1.5	0.00030	1.0	0.030	2.7E+00	1.1E+01	2.2E+00	4.9E+01	1.1E+02	3.4E+01	3.0E+01	1.6E+02	2.5E+01	2.2E+00
Barium	7440393	--	0.20	0.070	--	NA	NA	NA	3.2E+04	NA	3.2E+04	2.0E+04	NA	2.0E+04	2.0E+04
Beryllium	7440417	--	0.0020	0.0070	--	NA	NA	NA	3.2E+02	NA	3.2E+02	2.0E+02	NA	2.0E+02	2.0E+02
Cadmium	7440439	--	0.0010	0.025	0.0010	NA	NA	NA	1.6E+02	2.8E+02	1.0E+02	9.9E+01	4.0E+02	7.9E+01	7.9E+01
Chromium (VI)	18540299	0.50	0.0030	0.025	--	4.6E+00	NA	4.6E+00	4.9E+02	NA	4.9E+02	3.0E+02	NA	3.0E+02	4.6E+00
Chromium (total)	7440473	--	1.5	0.013	--	NA	NA	NA	2.4E+05	NA	2.4E+05	1.5E+05	NA	1.5E+05	1.5E+05
Cobalt	7440484	--	0.00030	1.0	--	NA	NA	NA	4.9E+01	NA	4.9E+01	3.0E+01	NA	3.0E+01	3.0E+01
Copper	7440508	--	0.040	1.0	--	NA	NA	NA	6.5E+03	NA	6.5E+03	4.0E+03	NA	4.0E+03	4.0E+03
Iron	7439896	--	0.70	1.0	--	NA	NA	NA	1.1E+05	NA	1.1E+05	6.9E+04	NA	6.9E+04	6.9E+04
Lead [a]	7439921	--	--	1.0	--	--	--	--	--	--	--	--	--	--	--
Manganese	7439965	--	0.14	1.0	--	NA	NA	NA	2.3E+04	NA	2.3E+04	1.4E+04	NA	1.4E+04	1.4E+04
Mercury	7439976	--	0.00030	0.070	--	NA	NA	NA	4.9E+01	NA	4.9E+01	3.0E+01	NA	3.0E+01	3.0E+01
Nickel	7440020	--	0.020	0.040	--	NA	NA	NA	3.2E+03	NA	3.2E+03	2.0E+03	NA	2.0E+03	2.0E+03
Selenium	7782492	--	0.0050	1.0	--	NA	NA	NA	8.1E+02	NA	8.1E+02	4.9E+02	NA	4.9E+02	4.9E+02
Silver	7440224	--	0.0050	0.040	--	NA	NA	NA	8.1E+02	NA	8.1E+02	4.9E+02	NA	4.9E+02	4.9E+02
Thallium	7440280	--	0.000010	1.0	--	NA	NA	NA	1.6E+00	NA	1.6E+00	9.9E-01	NA	9.9E-01	9.9E-01
Vanadium	7440622	--	0.0050	0.026	--	NA	NA	NA	8.1E+02	NA	8.1E+02	4.9E+02	NA	4.9E+02	4.9E+02
Zinc	7440666	--	0.30	1.0	--	NA	NA	NA	4.9E+04	NA	4.9E+04	3.0E+04	NA	3.0E+04	3.0E+04
Organometals															
Methyl mercury	22967926	--	0.00010	1.0	--	NA	NA	NA	1.6E+01	NA	1.6E+01	9.9E+00	NA	9.9E+00	9.9E+00
PAHs															
Acenaphthene	83329	--	0.060	1.0	0.13	NA	NA	NA	9.7E+03	5.2E+03	3.4E+03	5.9E+03	7.3E+03	3.3E+03	3.3E+03
Acenaphthylene	208968	--	0.060	1.0	0.13	NA	NA	NA	9.7E+03	5.2E+03	3.4E+03	5.9E+03	7.3E+03	3.3E+03	3.3E+03
Anthracene	120127	--	0.30	1.0	0.13	NA	NA	NA	4.9E+04	2.6E+04	1.7E+04	3.0E+04	3.7E+04	1.6E+04	1.6E+04
Benz[a]anthracene	56553	0.73	--	1.0	0.13	3.2E+00	2.9E+00	1.5E+00	NA	NA	NA	NA	NA	NA	1.5E+00
Benzo[a]pyrene	50328	7.3	--	1.0	0.13	3.2E-01	2.9E-01	1.5E-01	NA	NA	NA	NA	NA	NA	1.5E-01
Benzo[b]fluoranthene	205992	0.73	--	1.0	0.13	3.2E+00	2.9E+00	1.5E+00	NA	NA	NA	NA	NA	NA	1.5E+00
Benzo[g,h,i]perylene	191242	--	0.030	1.0	0.13	NA	NA	NA	4.9E+03	2.6E+03	1.7E+03	3.0E+03	3.7E+03	1.6E+03	1.6E+03
Benzo[k]fluoranthene	207089	0.073	--	1.0	0.13	3.2E+01	2.9E+01	1.5E+01	NA	NA	NA	NA	NA	NA	1.5E+01
Chrysene	218019	0.0073	--	1.0	0.13	3.2E+02	2.9E+02	1.5E+02	NA	NA	NA	NA	NA	NA	1.5E+02
Dibenz[a,h]anthracene	53703	7.3	--	1.0	0.13	3.2E-01	2.9E-01	1.5E-01	NA	NA	NA	NA	NA	NA	1.5E-01
Dibenzofuran	132649	--	0.0010	1.0	0.03	NA	NA	NA	1.6E+02	3.8E+02	1.1E+02	9.9E+01	5.3E+02	8.3E+01	8.3E+01
Fluoranthene	206440	--	0.040	1.0	0.13	NA	NA	NA	6.5E+03	3.5E+03	2.3E+03	4.0E+03	4.9E+03	2.2E+03	2.2E+03
Fluorene	86737	--	0.040	1.0	0.13	NA	NA	NA	6.5E+03	3.5E+03	2.3E+03	4.0E+03	4.9E+03	2.2E+03	2.2E+03
Indeno[1,2,3-cd]pyrene	193395	0.73	--	1.0	0.13	3.2E+00	2.9E+00	1.5E+00	NA	NA	NA	NA	NA	NA	1.5E+00
2-methylnaphthalene	91576	--	0.0040	1.0	0.13	NA	NA	NA	6.5E+02	3.5E+02	2.3E+02	4.0E+02	4.9E+02	2.2E+02	2.2E+02
Naphthalene	91203	--	0.020	1.0	0.13	NA	NA	NA	3.2E+03	1.7E+03	1.1E+03	2.0E+03	2.4E+03	1.1E+03	1.1E+03
Phenanthrene	85018	--	0.30	1.0	0.13	NA	NA	NA	4.9E+04	2.6E+04	1.7E+04	3.0E+04	3.7E+04	1.6E+04	1.6E+04
Pyrene	129000	--	0.030	1.0	0.13	NA	NA	NA	4.9E+03	2.6E+03	1.7E+03	3.0E+03	3.7E+03	1.6E+03	1.6E+03

Table 5. Site-Specific Sediment RBSLs Calculated for Kayaker/Canoer—Current Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Kayaker/Canoer Sediment RBSL Current Use (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	
Pesticides															
Aldrin	309002	17	0.000030	1.0	-	2.4E-01	NA	2.4E-01	4.9E+00	-	4.9E+00	3.0E+00	-	3.0E+00	2.4E-01
Carbazole	86748	0.020	--	--	--	2.1E+02	NA	2.1E+02	NA	NA	NA	NA	NA	NA	2.1E+02
alpha-Chlordane	5103719	0.35	0.00050	1.0	0.040	1.2E+01	3.4E+01	8.7E+00	8.1E+01	1.4E+02	5.2E+01	4.9E+01	2.0E+02	4.0E+01	8.7E+00
gamma-Chlordane	5566347	0.35	0.00050	1.0	0.040	1.2E+01	3.4E+01	8.7E+00	8.1E+01	1.4E+02	5.2E+01	4.9E+01	2.0E+02	4.0E+01	8.7E+00
4,4'-DDD	72548	0.24	--	1.0	0.10	1.7E+01	2.0E+01	9.2E+00	NA	NA	NA	NA	NA	NA	9.2E+00
4,4'-DDE	72559	0.34	--	1.0	--	1.2E+01	NA	1.2E+01	NA	NA	NA	NA	NA	NA	1.2E+01
4,4'-DDT	50293	0.34	0.00050	1.0	0.030	1.2E+01	4.7E+01	9.6E+00	8.1E+01	1.9E+02	5.7E+01	4.9E+01	2.7E+02	4.2E+01	9.6E+00
Dieldrin	60571	16	0.000050	1.0	0.10	2.6E-01	3.0E-01	1.4E-01	8.1E+00	5.7E+00	3.3E+00	4.9E+00	8.0E+00	3.1E+00	1.4E-01
Endosulfan I	959988	--	0.0060	1.0	--	NA	NA	NA	9.7E+02	NA	9.7E+02	5.9E+02	NA	5.9E+02	5.9E+02
Endosulfan II	33213659	--	0.0060	1.0	--	NA	NA	NA	9.7E+02	NA	9.7E+02	5.9E+02	NA	5.9E+02	5.9E+02
Endosulfan sulfate	1031078	--	0.0060	1.0	--	NA	NA	NA	9.7E+02	NA	9.7E+02	5.9E+02	NA	5.9E+02	5.9E+02
Endrin	72208	--	0.00030	1.0	0.10	NA	NA	NA	4.9E+01	3.4E+01	2.0E+01	3.0E+01	4.8E+01	1.8E+01	1.8E+01
Endrin aldehyde	7421934	--	0.00030	1.0	0.10	NA	NA	NA	4.9E+01	3.4E+01	2.0E+01	3.0E+01	4.8E+01	1.8E+01	1.8E+01
Endrin ketone	53494705	--	0.00030	1.0	0.10	NA	NA	NA	4.9E+01	3.4E+01	2.0E+01	3.0E+01	4.8E+01	1.8E+01	1.8E+01
Heptachlor	76448	4.5	0.00050	1.0	--	9.1E-01	NA	9.1E-01	8.1E+01	NA	8.1E+01	4.9E+01	NA	4.9E+01	9.1E-01
Heptachlor epoxide	1024573	9.1	0.000013	1.0	--	4.5E-01	NA	4.5E-01	2.1E+00	NA	2.1E+00	1.3E+00	NA	1.3E+00	4.5E-01
alpha-HCH	319846	6.3	0.0080	1.0	0.10	6.5E-01	7.6E-01	3.5E-01	1.3E+03	9.1E+02	5.3E+02	7.9E+02	1.3E+03	4.9E+02	3.5E-01
beta-HCH	319857	1.8	--	1.0	0.10	2.3E+00	2.7E+00	1.2E+00	NA	NA	NA	NA	NA	NA	1.2E+00
delta-HCH	319868	1.8	--	1.0	0.10	2.3E+00	2.7E+00	1.2E+00	NA	NA	NA	NA	NA	NA	1.2E+00
gamma-HCH (Lindane)	58899	1.1	0.00030	1.0	0.040	3.7E+00	1.1E+01	2.8E+00	4.9E+01	8.5E+01	3.1E+01	3.0E+01	1.2E+02	2.4E+01	2.8E+00
Methoxychlor	72435	--	0.0050	1.0	0.1	NA	NA	NA	8.1E+02	5.7E+02	3.3E+02	4.9E+02	8.0E+02	3.1E+02	3.1E+02
Semivolatiles															
Acetophenone	98862	--	0.10	1.0	--	NA	NA	NA	1.6E+04	NA	1.6E+04	9.9E+03	NA	9.9E+03	9.9E+03
Benzaldehyde	100527	--	0.10	1.0	--	NA	NA	NA	1.6E+04	NA	1.6E+04	9.9E+03	NA	9.9E+03	9.9E+03
1,1'-biphenyl	92524	0.0080	0.50	1.0	--	5.1E+02	NA	5.1E+02	8.1E+04	NA	8.1E+04	4.9E+04	NA	4.9E+04	5.1E+02
Butyl benzyl phthalate	85687	0.0019	0.20	1.0	0.10	2.2E+03	2.5E+03	1.2E+03	3.2E+04	2.3E+04	1.3E+04	2.0E+04	3.2E+04	1.2E+04	1.2E+03
Caprolactam	105602	--	0.50	1.0	0.10	NA	NA	NA	8.1E+04	5.7E+04	3.3E+04	4.9E+04	8.0E+04	3.1E+04	3.1E+04
4-chloroaniline	106478	0.20	0.0040	1.0	0.10	2.1E+01	2.4E+01	1.1E+01	6.5E+02	4.5E+02	2.7E+02	4.0E+02	6.4E+02	2.4E+02	1.1E+01
3,3'-dichlorobenzidine	91941	0.45	--	1.0	0.10	9.1E+00	1.1E+01	4.9E+00	NA	NA	NA	NA	NA	NA	4.9E+00
2,4-dimethylphenol	105679	--	0.020	1.0	0.10	NA	NA	NA	3.2E+03	2.3E+03	1.3E+03	2.0E+03	3.2E+03	1.2E+03	1.2E+03
2,4-dinitrotoluene	121142	0.31	0.0020	1.0	0.10	1.3E+01	1.5E+01	7.1E+00	3.2E+02	2.2E+02	1.3E+02	2.0E+02	3.1E+02	1.2E+02	7.1E+00
2,6-dinitrotoluene	606202	1.5	0.00030	1.0	0.099	2.7E+00	3.2E+00	1.5E+00	4.9E+01	3.4E+01	2.0E+01	3.0E+01	4.8E+01	1.8E+01	1.5E+00
Hexachlorobenzene	118741	1.6	0.00080	1.0	-	2.6E+00	NA	2.6E+00	1.3E+02	NA	1.3E+02	7.9E+01	NA	7.9E+01	2.6E+00
Isophorone	78591	0.00095	0.20	1.0	0.10	4.3E+03	5.1E+03	2.3E+03	3.2E+04	2.3E+04	1.3E+04	2.0E+04	3.2E+04	1.2E+04	2.3E+03
2-methylphenol	95487	--	0.050	1.0	0.10	NA	NA	NA	8.1E+03	5.7E+03	3.3E+03	4.9E+03	8.0E+03	3.1E+03	3.1E+03
4-methylphenol	106445	--	0.10	1.0	0.10	NA	NA	NA	1.6E+04	1.1E+04	6.7E+03	9.9E+03	1.6E+04	6.1E+03	6.1E+03
2-nitroaniline	88744	--	0.010	1.0	0.10	NA	NA	NA	1.6E+03	1.1E+03	6.7E+02	9.9E+02	1.6E+03	6.1E+02	6.1E+02
3-nitroaniline	99092	0.020	0.0040	1.0	0.10	2.1E+02	2.4E+02	1.1E+02	6.5E+02	4.5E+02	2.7E+02	4.0E+02	6.4E+02	2.4E+02	1.1E+02
N-nitrosodiphenylamine	86306	0.0049	--	1.0	0.10	8.4E+02	9.8E+02	4.5E+02	NA	NA	NA	NA	NA	NA	4.5E+02
Phenol	108952	--	0.30	1.0	0.10	NA	NA	NA	4.9E+04	3.4E+04	2.0E+04	3.0E+04	4.8E+04	1.8E+04	1.8E+04

Table 5. Site-Specific Sediment RBSLs Calculated for Kayaker/Canoer—Current Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Kayaker/Canoer Sediment RBSL Current Use (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	
bis(2-ethylhexyl)phthalate	117817	0.014	0.020	1.0	0.10	2.9E+02	3.4E+02	1.6E+02	3.2E+03	2.3E+03	1.3E+03	2.0E+03	3.2E+03	1.2E+03	1.6E+02
Diethyl phthalate	84662	--	0.80	1.0	0.10	NA	NA	NA	1.3E+05	9.1E+04	5.3E+04	7.9E+04	1.3E+05	4.9E+04	4.9E+04
Dimethyl phthalate	131113	--	0.80	1.0	0.10	NA	NA	NA	1.3E+05	9.1E+04	5.3E+04	7.9E+04	1.3E+05	4.9E+04	4.9E+04
Di-*n* -butyl phthalate	84742	--	0.10	1.0	0.10	NA	NA	NA	1.6E+04	1.1E+04	6.7E+03	9.9E+03	1.6E+04	6.1E+03	6.1E+03
Di-*n* -octylphthalate	117840	--	0.010	1.0	0.10	NA	NA	NA	1.6E+03	1.1E+03	6.7E+02	9.9E+02	1.6E+03	6.1E+02	6.1E+02
2,4,6-trichlorophenol	88062	0.011	0.0010	1.0	0.10	3.7E+02	4.4E+02	2.0E+02	1.6E+02	1.1E+02	6.7E+01	9.9E+01	1.6E+02	6.1E+01	6.1E+01
PCBs															
PCBs (total Aroclors)	(blank)	2	0.00002	1.0	0.14	2.1E+00	1.7E+00	9.3E-01	3.2E+00	1.6E+00	1.1E+00	2.0E+00	2.3E+00	1.1E+00	9.3E-01
Volatiles															
Acetone	67641	--	0.90	1.0	--	NA	NA	NA	1.5E+05	NA	1.5E+05	8.9E+04	NA	8.9E+04	8.9E+04
Benzene	71432	0.055	0.0040	1.0	--	7.5E+01	NA	7.5E+01	6.5E+02	NA	6.5E+02	4.0E+02	NA	4.0E+02	7.5E+01
bis(2-chloroethyl)ether	111444	1.1	--	1.0	--	3.7E+00	NA	3.7E+00	NA	NA	NA	NA	NA	NA	3.7E+00
2-butanone	78933	--	0.60	1.0	--	NA	NA	NA	9.7E+04	NA	9.7E+04	5.9E+04	NA	5.9E+04	5.9E+04
Carbon disulfide	75150	--	0.10	1.0	--	NA	NA	NA	1.6E+04	NA	1.6E+04	9.9E+03	NA	9.9E+03	9.9E+03
Chlorobenzene	108907	--	0.020	1.0	--	NA	NA	NA	3.2E+03	NA	3.2E+03	2.0E+03	NA	2.0E+03	2.0E+03
Chloroform	67663	0.031	0.010	1.0	--	1.3E+02	NA	1.3E+02	1.6E+03	NA	1.6E+03	9.9E+02	NA	9.9E+02	1.3E+02
Chloromethane	74873	0.013	--	1.0	--	3.2E+02	NA	3.2E+02	NA	NA	NA	NA	NA	NA	3.2E+02
1,2-dichlorobenzene	95501	--	0.090	1.0	--	NA	NA	NA	1.5E+04	NA	1.5E+04	8.9E+03	NA	8.9E+03	8.9E+03
1,3-dichlorobenzene	541731	--	0.020	-	--	NA	NA	NA	3.2E+03	NA	3.2E+03	2.0E+03	NA	2.0E+03	2.0E+03
1,4-dichlorobenzene	106467	0.0054	0.070	1.0	--	7.6E+02	NA	7.6E+02	1.1E+04	NA	1.1E+04	6.9E+03	NA	6.9E+03	7.6E+02
Dichlorobenzenes (total)	106467	0.0054	0.070	1.0	--	7.6E+02	NA	7.6E+02	1.1E+04	NA	1.1E+04	6.9E+03	NA	6.9E+03	7.6E+02
1,1-dichloroethane	75343	0.0057	0.20	1.0	--	7.2E+02	NA	7.2E+02	3.2E+04	NA	3.2E+04	2.0E+04	NA	2.0E+04	7.2E+02
cis -1,2-dichloroethene	156592	--	0.0020	1.0	--	NA	NA	NA	3.2E+02	NA	3.2E+02	2.0E+02	NA	2.0E+02	2.0E+02
trans -1,2-dichloroethene	156605	--	0.020	1.0	--	NA	NA	NA	3.2E+03	NA	3.2E+03	2.0E+03	NA	2.0E+03	2.0E+03
Ethylbenzene	100414	0.011	0.10	1.0	--	3.7E+02	NA	3.7E+02	1.6E+04	NA	1.6E+04	9.9E+03	NA	9.9E+03	3.7E+02
2-hexanone	591786	--	0.0050	1.0	--	NA	NA	NA	8.1E+02	NA	8.1E+02	4.9E+02	NA	4.9E+02	4.9E+02
Isopropylbenzene	98828	--	0.10	1.0	--	NA	NA	NA	1.6E+04	NA	1.6E+04	9.9E+03	NA	9.9E+03	9.9E+03
Methyl acetate	79209	--	1.0	1.0	--	NA	NA	NA	1.6E+05	NA	1.6E+05	9.9E+04	NA	9.9E+04	9.9E+04
Methylene chloride	75092	0.0020	0.0060	1.0	--	1.2E+03	NA	1.2E+03	9.7E+02	NA	9.7E+02	5.9E+02	NA	5.9E+02	5.9E+02
Styrene	100425	--	0.20	1.0	--	NA	NA	NA	3.2E+04	NA	3.2E+04	2.0E+04	NA	2.0E+04	2.0E+04
Tetrachloroethene	127184	0.0021	0.0060	1.0	--	2.0E+03	NA	2.0E+03	9.7E+02	NA	9.7E+02	5.9E+02	NA	5.9E+02	5.9E+02
Toluene	108883	--	0.080	1.0	--	NA	NA	NA	1.3E+04	NA	1.3E+04	7.9E+03	NA	7.9E+03	7.9E+03
1,2,3-trichlorobenzene	87616	--	0.00080	1.0	--	NA	NA	NA	1.3E+02	NA	1.3E+02	7.9E+01	NA	7.9E+01	7.9E+01
1,2,4-trichlorobenzene	120821	0.029	0.010	1.0	--	1.4E+02	NA	1.4E+02	1.6E+03	NA	1.6E+03	9.9E+02	NA	9.9E+02	1.4E+02
Trichloroethene	79016	0.046	0.00050	1.0	--	7.7E+01	NA	7.7E+01	8.1E+01	NA	8.1E+01	4.9E+01	NA	4.9E+01	4.9E+01
Trichlorotrifluoroethane	76131	--	30	1.0	--	NA	NA	NA	4.9E+06	NA	4.9E+06	3.0E+06	NA	3.0E+06	3.0E+06
Vinyl chloride	75014	0.72	0.0030	1.0	--	6.7E-02	NA	6.7E-02	4.9E+02	NA	4.9E+02	3.0E+02	NA	3.0E+02	6.7E-02
m,p -xylenes	13302070	--	0.20	1.0	--	NA	NA	NA	3.2E+04	NA	3.2E+04	2.0E+04	NA	2.0E+04	2.0E+04
o -xylene	95476	--	0.20	1.0	--	NA	NA	NA	3.2E+04	NA	3.2E+04	2.0E+04	NA	2.0E+04	2.0E+04
Xylenes	1330207	--	0.20	1.0	--	NA	NA	NA	3.2E+04	NA	3.2E+04	2.0E+04	NA	2.0E+04	2.0E+04

Table 5. Site-Specific Sediment RBSLs Calculated for Kayaker/Canoer—Current Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Kayaker/Canoer Sediment RBSL Current Use (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	

Notes:

ABS_d = dermal absorption factor
CAS = chemical abstract service
CSF = cancer slope factor
GIABS = gastrointestinal absorption factor
HCH = hexachlorocyclohexane
HQ = hazard quotient
NA = not calculated due to missing toxicity data or exposure pathway not relevant
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RBSL = risk-based screening level
RfD = reference dose
-- = no data available

[a] Lead screening value calculated using Adult Lead Methodology. See text.

1,3-dichlorobenzene RfD value is based on the Agency for Toxic Substances and Disease Registry subchronic minimal risk level.
Carbazole oral CSF is based on the health effects assessment summary tables (HEAST) value.
Chloroethane RfD value is based on the provisional peer reviewed toxicity value (PPRTV) subchronic RfD.
Chloromethane CSF is based on the HEAST value.
Chromium values are based on toxicity criterion for chromium (III) as a surrogate.
Mercury values are based on toxicity criterion for mercuric chloride as a surrogate.
The cancer slope value for PCBs is based on the toxicity value for total PCBs.
Toxicity criteria for 3-nitroaniline are based on 4-nitroaniline as a surrogate.
Toxicity criteria for acenaphthylene are based on acenaphthene as a surrogate.
Toxicity criteria for alpha-chlordane are based on chlordane as a surrogate.
Toxicity criteria for benzo[g,h,i]perylene are based on pyrene as a surrogate.
Toxicity criteria for delta-HCH are based on technical HCH as a surrogate.
Toxicity criteria for dichlorobenzenes (total) are based on 1,4-dichlorobenzene as a surrogate.
Toxicity criteria for dimethyl phthalate are based on diethyl phthalate as a surrogate.
Toxicity criteria for endosulfan I are based on endosulfan as a surrogate.
Toxicity criteria for endosulfan II are based on endosulfan as a surrogate.
Toxicity criteria for endosulfan sulfate are based on endosulfan as a surrogate.
Toxicity criteria for endrin aldehyde are based on endrin as a surrogate.
Toxicity criteria for endrin ketone are based on endrin as a surrogate.
Toxicity criteria for gamma-chlordane are based on chlordane as a surrogate.
Toxicity criteria for *m,p* -xylenes are based on xylenes as a surrogate.
Toxicity criteria for phenanthrene are based on anthracene as a surrogate.

RBSL for Sediment Ingestion - Carcinogens (mg/kg) = [TR x 365 (day/yr) x LT (yr)] / [IFS_{adjkc} (mg/kg) x 1E-6 (kg/mg) x CSF_o (mg/kg-day)$^{-1}$ x ADAF]

where IFS_{adjkc} (mg/kg) = {[EF_{ockc} (day/yr) x ED_{ockc} (yr) x IRS_{ock} (mg/day)] / BW_{ock} (kg)} + {[EF_{akc} (days/yr) x [ED_{akc} (yr) - ED_{ockc} (yr)] x IRS_{ak} (mg/day)] / BW_{ak} (kg)}

RBSL for Sediment Ingestion - Carcinogen vinyl chloride (mg/kg) = TR / {([CSF_o (mg/kg-day)-1 x IFS_{adjkc} (mg/kg) x 1E-6 (kg/mg)] / [365 (day/yr) x LT (yr)]) + ([CSF_o (mg/kg-day)-1 x IRS_{ock} x 1E-6 (kg/mg)] / BW_{ock} (kg))}

where IFS_{adjkc} (mg/kg) = {[EF_{ockc} (day/yr) x ED_{ockc} (yr) x IRS_{ock} (mg/day)] / BW_{ock} (kg)} + {[EF_{akc} (days/yr) x [ED_{akc} (yr) - ED_{ockc} (yr)] x IRS_{ak} (mg/day)] / BW_{ak} (kg)}

RBSL for Sediment Ingestion - Carcinogen trichloroethene (mg/kg) = [TR x 365 (day/yr) x LT (yr)] / {CSF_o (mg/kg-day)-1 x 1E-6 (kg/mg) x ([CAF_o x IFS_{adjkc} (mg/kg)] + [MAF_o x IFS_{adjkc} (mg/kg) x ADAF])}

where IFS_{adjkc} (mg/kg) = {[EF_{ockc} (day/yr) x ED_{ockc} (yr) x IRS_{ock} (mg/day)] / BW_{ock} (kg)} + {[EF_{akc} (days/yr) x [ED_{akc} (yr) - ED_{ockc} (yr)] x IRS_{ak} (mg/day)] / BW_{ak} (kg)}

CAF_o = 0.804 MAF_o = 0.202

RBSL for Sediment Dermal Contact - Carcinogens (mg/kg) = [TR x 365 (day/yr) x LT (yr)] / {DFS_{adjkc} (mg/kg) x 1E-6 (kg/mg) x ABS x [CSF_o (mg/kg-day)-1 / GIABS] x ADAF}

where DFS_{adjkc} (mg/kg) = {[EF_{ockc} (days/yr) x ED_{ockc} (yr) x SA_{ock} (cm^2/day) x AF_{ock} (mg/cm^2)] / BW_{ock} (kg)} + {[EF_{akc} (days/yr) x [ED_{akc} (yr) - ED_{ockc} (yr)] x SA_{ak} (cm^2/day) x AF_{ak} (mg/cm^2)] / BW_{ak} (kg)}

See Table 3 for ADAF values.

Table 5. Site-Specific Sediment RBSLs Calculated for Kayaker/Canoer—Current Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Kayaker/Canoer Sediment RBSL Current Use (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	

Total RBSL for Carcinogens (mg/kg) = 1 / {[1/Carcinogen RBSL for Sediment Ingestion (mg/kg)] + [1/Carcinogen RBSL for Dermal Contact (mg/kg)]}

RBSL for Sediment Ingestion - Adult, Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{akc} (yr) x BW_{ak} (kg)] / {EF_{akc} (day/yr) x ED_{akc} (yr) x IRS_{ak} (mg/day) x 1E-6 (kg/mg) x [1 / RfD_o (mg/kg-day)]}

RBSL for Sediment Dermal Contact - Adult, Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{akc} (yr) x BW_{ak} (kg)] / {EF_{akc} (day/yr) x ED_{akc} (yr) x SA_{ak} (cm^2/day) x AF_{ak} (mg/cm^2) x 1E-6 (kg/mg) x ABS x [1 / RfD_o (mg/kg-day) x GIABS]}

RBSL for Sediment Ingestion - Older Child, Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{ockc} (yr) x BW_{ock} (kg)] / {EF_{ockc} (day/yr) x ED_{ockc} (yr) x IRS_{ock} (mg/day) x 1E-6 (kg/mg) x [1 / RfD_o (mg/kg-day)]}

RBSL for Sediment Dermal Contact - Older Child, Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{ockc} (yr) x BW_{ock} (kg)] / {EF_{ockc} (day/yr) x ED_{ockc} (yr) x SA_{ock} (cm^2/day) x AF_{ock} (mg/cm^2) x 1E-6 (kg/mg) x ABS x [1 / RfD_o (mg/kg-day) x GIABS]}

Total RBSL - Noncancer (mg/kg) = 1 / {[1/Noncancer RBSL for Sediment Ingestion (mg/kg)] + [1/Noncancer RBSL for Dermal Contact (mg/kg)]}

Table 6. Site-Specific Sediment RBSLs Calculated for Kayaker/Canoer—Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Kayaker/Canoer Sediment RBSL Future Use (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	
Metals															
Aluminum	7429905	--	1.0	1.0	--	NA	NA	NA	7.5E+04	NA	7.5E+04	4.6E+04	NA	4.6E+04	4.6E+04
Antimony	7440360	--	0.00040	0.15	--	NA	NA	NA	3.0E+01	NA	3.0E+01	1.8E+01	NA	1.8E+01	1.8E+01
Arsenic	7440382	1.5	0.00030	1.0	0.030	1.3E+00	4.9E+00	1.0E+00	2.2E+01	5.2E+01	1.6E+01	1.4E+01	7.3E+01	1.2E+01	1.0E+00
Barium	7440393	--	0.20	0.070	--	NA	NA	NA	1.5E+04	NA	1.5E+04	9.1E+03	NA	9.1E+03	9.1E+03
Beryllium	7440417	--	0.0020	0.0070	--	NA	NA	NA	1.5E+02	NA	1.5E+02	9.1E+01	NA	9.1E+01	9.1E+01
Cadmium	7440439	--	0.0010	0.025	0.0010	NA	NA	NA	7.5E+01	1.3E+02	4.8E+01	4.6E+01	1.8E+02	3.7E+01	3.7E+01
Chromium (VI)	18540299	0.50	0.0030	0.025	--	2.1E+00	NA	2.1E+00	2.2E+02	NA	2.2E+02	1.4E+02	NA	1.4E+02	2.1E+00
Chromium (total)	7440473	--	1.5	0.013	--	NA	NA	NA	1.1E+05	NA	1.1E+05	6.9E+04	NA	6.9E+04	6.9E+04
Cobalt	7440484	--	0.00030	1.0	--	NA	NA	NA	2.2E+01	NA	2.2E+01	1.4E+01	NA	1.4E+01	1.4E+01
Copper	7440508	--	0.040	1.0	--	NA	NA	NA	3.0E+03	NA	3.0E+03	1.8E+03	NA	1.8E+03	1.8E+03
Iron	7439896	--	0.70	1.0	--	NA	NA	NA	5.2E+04	NA	5.2E+04	3.2E+04	NA	3.2E+04	3.2E+04
Lead [a]	7439921	--	--	1.0	--	--	--	--	--	--	--	--	--	--	--
Manganese	7439965	--	0.14	1.0	--	NA	NA	NA	1.0E+04	NA	1.0E+04	6.4E+03	NA	6.4E+03	6.4E+03
Mercury	7439976	--	0.00030	0.070	--	NA	NA	NA	2.2E+01	NA	2.2E+01	1.4E+01	NA	1.4E+01	1.4E+01
Nickel	7440020	--	0.020	0.040	--	NA	NA	NA	1.5E+03	NA	1.5E+03	9.1E+02	NA	9.1E+02	9.1E+02
Selenium	7782492	--	0.0050	1.0	--	NA	NA	NA	3.7E+02	NA	3.7E+02	2.3E+02	NA	2.3E+02	2.3E+02
Silver	7440224	--	0.0050	0.040	--	NA	NA	NA	3.7E+02	NA	3.7E+02	2.3E+02	NA	2.3E+02	2.3E+02
Thallium	7440280	--	0.000010	1.0	--	NA	NA	NA	7.5E-01	NA	7.5E-01	4.6E-01	NA	4.6E-01	4.6E-01
Vanadium	7440622	--	0.0050	0.026	--	NA	NA	NA	3.7E+02	NA	3.7E+02	2.3E+02	NA	2.3E+02	2.3E+02
Zinc	7440666	--	0.30	1.0	--	NA	NA	NA	2.2E+04	NA	2.2E+04	1.4E+04	NA	1.4E+04	1.4E+04
Organometals															
Methyl mercury	22967926	--	0.00010	1.0	--	NA	NA	NA	7.5E+00	NA	7.5E+00	4.6E+00	NA	4.6E+00	4.6E+00
PAHs															
Acenaphthene	83329	--	0.060	1.0	0.13	NA	NA	NA	4.5E+03	2.4E+03	1.6E+03	2.7E+03	3.4E+03	1.5E+03	1.5E+03
Acenaphthylene	208968	--	0.060	1.0	0.13	NA	NA	NA	4.5E+03	2.4E+03	1.6E+03	2.7E+03	3.4E+03	1.5E+03	1.5E+03
Anthracene	120127	--	0.30	1.0	0.13	NA	NA	NA	2.2E+04	1.2E+04	7.9E+03	1.4E+04	1.7E+04	7.6E+03	7.6E+03
Benz[a]anthracene	56553	0.73	--	1.0	0.13	1.5E+00	1.3E+00	6.9E-01	NA	NA	NA	NA	NA	NA	6.9E-01
Benzo[a]pyrene	50328	7.3	--	1.0	0.13	1.5E-01	1.3E-01	6.9E-02	NA	NA	NA	NA	NA	NA	6.9E-02
Benzo[b]fluoranthene	205992	0.73	--	1.0	0.13	1.5E+00	1.3E+00	6.9E-01	NA	NA	NA	NA	NA	NA	6.9E-01
Benzo[g,h,i]perylene	191242	--	0.030	1.0	0.13	NA	NA	NA	2.2E+03	1.2E+03	7.9E+02	1.4E+03	1.7E+03	7.6E+02	7.6E+02
Benzo[k]fluoranthene	207089	0.073	--	1.0	0.13	1.5E+01	1.3E+01	6.9E+00	NA	NA	NA	NA	NA	NA	6.9E+00
Chrysene	218019	0.0073	--	1.0	0.13	1.5E+02	1.3E+02	6.9E+01	NA	NA	NA	NA	NA	NA	6.9E+01
Dibenz[a,h]anthracene	53703	7.3	--	1.0	0.13	1.5E-01	1.3E-01	6.9E-02	NA	NA	NA	NA	NA	NA	6.9E-02
Dibenzofuran	132649	--	0.0010	1.0	0.030	NA	NA	NA	7.5E+01	1.7E+02	5.2E+01	4.6E+01	2.4E+02	3.8E+01	3.8E+01
Fluoranthene	206440	--	0.040	1.0	0.13	NA	NA	NA	3.0E+03	1.6E+03	1.0E+03	1.8E+03	2.3E+03	1.0E+03	1.0E+03
Fluorene	86737	--	0.040	1.0	0.13	NA	NA	NA	3.0E+03	1.6E+03	1.0E+03	1.8E+03	2.3E+03	1.0E+03	1.0E+03
Indeno[1,2,3-cd]pyrene	193395	0.73	--	1.0	0.13	1.5E+00	1.3E+00	6.9E-01	NA	NA	NA	NA	NA	NA	6.9E-01
2-methylnaphthalene	91576	--	0.0040	1.0	0.13	NA	NA	NA	3.0E+02	1.6E+02	1.0E+02	1.8E+02	2.3E+02	1.0E+02	1.0E+02
Naphthalene	91203	--	0.020	1.0	0.13	NA	NA	NA	1.5E+03	8.1E+02	5.2E+02	9.1E+02	1.1E+03	5.1E+02	5.1E+02
Phenanthrene	85018	--	0.30	1.0	0.13	NA	NA	NA	2.2E+04	1.2E+04	7.9E+03	1.4E+04	1.7E+04	7.6E+03	7.6E+03
Pyrene	129000	--	0.030	1.0	0.13	NA	NA	NA	2.2E+03	1.2E+03	7.9E+02	1.4E+03	1.7E+03	7.6E+02	7.6E+02

Table 6. Site-Specific Sediment RBSLs Calculated for Kayaker/Canoer—Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Kayaker/Canoer Sediment RBSL Future Use (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	
Pesticides															
Aldrin	309002	17	0.000030	1.0	--	1.1E-01	NA	1.1E-01	2.2E+00	NA	2.2E+00	1.4E+00	NA	1.4E+00	1.1E-01
Carbazole	86748	0.020	--	--	--	9.5E+01	NA	9.5E+01	NA	NA	NA	NA	NA	NA	9.5E+01
alpha-Chlordane	5103719	0.35	0.00050	1.0	0.040	5.4E+00	1.6E+01	4.0E+00	3.7E+01	6.6E+01	2.4E+01	2.3E+01	9.2E+01	1.8E+01	4.0E+00
gamma-Chlordane	5566347	0.35	0.00050	1.0	0.040	5.4E+00	1.6E+01	4.0E+00	3.7E+01	6.6E+01	2.4E+01	2.3E+01	9.2E+01	1.8E+01	4.0E+00
4,4'-DDD	72548	0.24	--	1.0	0.10	7.9E+00	9.2E+00	4.3E+00	NA	NA	NA	NA	NA	NA	4.3E+00
4,4'-DDE	72559	0.34	--	1.0	--	5.6E+00	NA	5.6E+00	NA	NA	NA	NA	NA	NA	5.6E+00
4,4'-DDT	50293	0.34	0.00050	1.0	0.030	5.6E+00	2.2E+01	4.4E+00	3.7E+01	8.7E+01	2.6E+01	2.3E+01	1.2E+02	1.9E+01	4.4E+00
Dieldrin	60571	16	0.000050	1.0	0.10	1.2E-01	1.4E-01	6.4E-02	3.7E+00	2.6E+00	1.5E+00	2.3E+00	3.7E+00	1.4E+00	6.4E-02
Endosulfan I	959988	--	0.0060	1.0	--	NA	NA	NA	4.5E+02	NA	4.5E+02	2.7E+02	NA	2.7E+02	2.7E+02
Endosulfan II	33213659	--	0.0060	1.0	--	NA	NA	NA	4.5E+02	NA	4.5E+02	2.7E+02	NA	2.7E+02	2.7E+02
Endosulfan sulfate	1031078	--	0.0060	1.0	--	NA	NA	NA	4.5E+02	NA	4.5E+02	2.7E+02	NA	2.7E+02	2.7E+02
Endrin	72208	--	0.00030	1.0	0.10	NA	NA	NA	2.2E+01	1.6E+01	9.3E+00	1.4E+01	2.2E+01	8.4E+00	8.4E+00
Endrin aldehyde	7421934	--	0.00030	1.0	0.10	NA	NA	NA	2.2E+01	1.6E+01	9.3E+00	1.4E+01	2.2E+01	8.4E+00	8.4E+00
Endrin ketone	53494705	--	0.00030	1.0	0.10	NA	NA	NA	2.2E+01	1.6E+01	9.3E+00	1.4E+01	2.2E+01	8.4E+00	8.4E+00
Heptachlor	76448	4.5	0.00050	1.0	--	4.2E-01	NA	4.2E-01	3.7E+01	NA	3.7E+01	2.3E+01	NA	2.3E+01	4.2E-01
Heptachlor epoxide	1024573	9.1	0.000013	1.0	--	2.1E-01	NA	2.1E-01	9.7E-01	NA	9.7E-01	5.9E-01	NA	5.9E-01	2.1E-01
alpha-HCH	319846	6.3	0.0080	1.0	0.10	3.0E-01	3.5E-01	1.6E-01	6.0E+02	4.2E+02	2.5E+02	3.7E+02	5.9E+02	2.3E+02	1.6E-01
beta-HCH	319857	1.8	--	1.0	0.10	1.1E+00	1.2E+00	5.7E-01	NA	NA	NA	NA	NA	NA	5.7E-01
delta-HCH	319868	1.8	--	1.0	0.10	1.1E+00	1.2E+00	5.7E-01	NA	NA	NA	NA	NA	NA	5.7E-01
gamma-HCH (Lindane)	58899	1.1	0.00030	1.0	0.040	1.7E+00	5.0E+00	1.3E+00	2.2E+01	3.9E+01	1.4E+01	1.4E+01	5.5E+01	1.1E+01	1.3E+00
Methoxychlor	72435	--	0.0050	1.0	0.10	NA	NA	NA	3.7E+02	2.6E+02	1.5E+02	2.3E+02	3.7E+02	1.4E+02	1.4E+02
Semivolatiles															
Acetophenone	98862	--	0.10	1.0	--	NA	NA	NA	7.5E+03	NA	7.5E+03	4.6E+03	NA	4.6E+03	4.6E+03
Benzaldehyde	100527	--	0.10	1.0	--	NA	NA	NA	7.5E+03	NA	7.5E+03	4.6E+03	NA	4.6E+03	4.6E+03
1,1'-biphenyl	92524	0.0080	0.50	1.0	--	2.4E+02	NA	2.4E+02	3.7E+04	NA	3.7E+04	2.3E+04	NA	2.3E+04	2.4E+02
Butyl benzyl phthalate	85687	0.0019	0.20	1.0	0.10	1.0E+03	1.2E+03	5.4E+02	1.5E+04	1.0E+04	6.2E+03	9.1E+03	1.5E+04	5.6E+03	5.4E+02
Caprolactam	105602	--	0.50	1.0	0.10	NA	NA	NA	3.7E+04	2.6E+04	1.5E+04	2.3E+04	3.7E+04	1.4E+04	1.4E+04
4-chloroaniline	106478	0.20	0.0040	1.0	0.10	9.5E+00	1.1E+01	5.1E+00	3.0E+02	2.1E+02	1.2E+02	1.8E+02	2.9E+02	1.1E+02	5.1E+00
3,3'-dichlorobenzidine	91941	0.45	-	1.0	0.10	4.2E+00	4.9E+00	2.3E+00	NA	NA	NA	NA	NA	NA	2.3E+00
2,4-dimethylphenol	105679	--	0.020	1.0	0.10	NA	NA	NA	1.5E+03	1.0E+03	6.2E+02	9.1E+02	1.5E+03	5.6E+02	5.6E+02
2,4-dinitrotoluene	121142	0.31	0.0020	1.0	0.10	6.1E+00	7.0E+00	3.3E+00	1.5E+02	1.0E+02	6.1E+01	9.1E+01	1.4E+02	5.6E+01	3.3E+00
2,6-dinitrotoluene	606202	1.5	0.0003	1.0	0.099	1.3E+00	1.5E+00	6.8E-01	2.2E+01	1.6E+01	9.3E+00	1.4E+01	2.2E+01	8.5E+00	6.8E-01
Hexachlorobenzene	118741	1.6	0.00080	1.0	--	1.2E+00	NA	1.2E+00	6.0E+01	NA	6.0E+01	3.7E+01	NA	3.7E+01	1.2E+00
Isophorone	78591	0.00095	0.20	1.0	0.10	2.0E+03	2.3E+03	1.1E+03	1.5E+04	1.0E+04	6.2E+03	9.1E+03	1.5E+04	5.6E+03	1.1E+03
2-methylphenol	95487	--	0.050	1.0	0.10	NA	NA	NA	3.7E+03	2.6E+03	1.5E+03	2.3E+03	3.7E+03	1.4E+03	1.4E+03
4-methylphenol	106445	--	0.10	1.0	0.10	NA	NA	NA	7.5E+03	5.2E+03	3.1E+03	4.6E+03	7.3E+03	2.8E+03	2.8E+03
2-nitroaniline	88744	--	0.010	1.0	0.10	NA	NA	NA	7.5E+02	5.2E+02	3.1E+02	4.6E+02	7.3E+02	2.8E+02	2.8E+02
3-nitroaniline	100016	0.020	0.0040	1.0	0.10	9.5E+01	1.1E+02	5.1E+01	3.0E+02	2.1E+02	1.2E+02	1.8E+02	2.9E+02	1.1E+02	5.1E+01
N-nitrosodiphenylamine	86306	0.0049	--	1.0	0.10	3.9E+02	4.5E+02	2.1E+02	NA	NA	NA	NA	NA	NA	2.1E+02
Phenol	108952	--	0.30	1.0	0.10	NA	NA	NA	2.2E+04	1.6E+04	9.3E+03	1.4E+04	2.2E+04	8.4E+03	8.4E+03
bis(2-ethylhexyl)phthalate	117817	0.014	0.020	1.0	0.10	1.4E+02	1.6E+02	7.3E+01	1.5E+03	1.0E+03	6.2E+02	9.1E+02	1.5E+03	5.6E+02	7.3E+01

Table 6. Site-Specific Sediment RBSLs Calculated for Kayaker/Canoer—Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Kayaker/Canoer Sediment RBSL Future Use (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	
Diethyl phthalate	84662	--	0.80	1.0	0.10	NA	NA	NA	6.0E+04	4.2E+04	2.5E+04	3.7E+04	5.9E+04	2.3E+04	2.3E+04
Dimethyl phthalate	131113	--	0.80	1.0	0.10	NA	NA	NA	6.0E+04	4.2E+04	2.5E+04	3.7E+04	5.9E+04	2.3E+04	2.3E+04
Di-*n* -butyl phthalate	84742	--	0.10	1.0	0.10	NA	NA	NA	7.5E+03	5.2E+03	3.1E+03	4.6E+03	7.3E+03	2.8E+03	2.8E+03
Di-*n* -octylphthalate	117840	--	0.010	1.0	0.10	NA	NA	NA	7.5E+02	5.2E+02	3.1E+02	4.6E+02	7.3E+02	2.8E+02	2.8E+02
2,4,6-trichlorophenol	88062	0.011	0.0010	1.0	0.10	1.7E+02	2.0E+02	9.3E+01	7.5E+01	5.2E+01	3.1E+01	4.6E+01	7.3E+01	2.8E+01	2.8E+01
PCBs															
PCBs (total Aroclors)	--	2.0	0.000020	1.0	0.14	9.5E-01	7.9E-01	4.3E-01	1.5E+00	7.5E-01	5.0E-01	9.1E-01	1.0E+00	4.9E-01	4.3E-01
Volatiles															
Acetone	67641	--	0.90	1.0	--	NA	NA	NA	6.7E+04	NA	6.7E+04	4.1E+04	NA	4.1E+04	4.1E+04
Benzene	71432	0.055	0.0040	1.0	--	3.4E+01	NA	3.4E+01	3.0E+02	NA	3.0E+02	1.8E+02	NA	1.8E+02	3.4E+01
bis(2-chloroethyl)ether	111444	1.1	--	1.0	--	1.7E+00	NA	1.7E+00	NA	NA	NA	NA	NA	NA	1.7E+00
2-butanone	78933	--	0.60	1.0	--	NA	NA	NA	4.5E+04	NA	4.5E+04	2.7E+04	NA	2.7E+04	2.7E+04
Carbon disulfide	75150	--	0.10	1.0	--	NA	NA	NA	7.5E+03	NA	7.5E+03	4.6E+03	NA	4.6E+03	4.6E+03
Chlorobenzene	108907	--	0.020	1.0	--	NA	NA	NA	1.5E+03	NA	1.5E+03	9.1E+02	NA	9.1E+02	9.1E+02
Chloroform	67663	0.031	0.010	1.0	--	6.1E+01	NA	6.1E+01	7.5E+02	NA	7.5E+02	4.6E+02	NA	4.6E+02	6.1E+01
Chloromethane	74873	0.013	--	1.0	--	1.5E+02	NA	1.5E+02	NA	NA	NA	NA	NA	NA	1.5E+02
1,2-dichlorobenzene	95501	--	0.090	1.0	--	NA	NA	NA	6.7E+03	NA	6.7E+03	4.1E+03	NA	4.1E+03	4.1E+03
1,3-dichlorobenzene	541731	--	0.020	-	--	NA	NA	NA	1.5E+03	NA	1.5E+03	9.1E+02	NA	9.1E+02	9.1E+02
1,4-dichlorobenzene	106467	0.0054	0.070	1.0	--	3.5E+02	NA	3.5E+02	5.2E+03	NA	5.2E+03	3.2E+03	NA	3.2E+03	3.5E+02
Dichlorobenzenes (total)	106467	0.0054	0.070	1.0	--	3.5E+02	NA	3.5E+02	5.2E+03	NA	5.2E+03	3.2E+03	NA	3.2E+03	3.5E+02
1,1-dichloroethane	75343	0.0057	0.20	1.0	--	3.3E+02	NA	3.3E+02	1.5E+04	NA	1.5E+04	9.1E+03	NA	9.1E+03	3.3E+02
cis -1,2-dichloroethene	156592	--	0.0020	1.0	--	NA	NA	NA	1.5E+02	NA	1.5E+02	9.1E+01	NA	9.1E+01	9.1E+01
trans -1,2-dichloroethene	156605	--	0.020	1.0	--	NA	NA	NA	1.5E+03	NA	1.5E+03	9.1E+02	NA	9.1E+02	9.1E+02
Ethylbenzene	100414	0.011	0.10	1.0	--	1.7E+02	NA	1.7E+02	7.5E+03	NA	7.5E+03	4.6E+03	NA	4.6E+03	1.7E+02
2-hexanone	591786	--	0.0050	1.0	--	NA	NA	NA	3.7E+02	NA	3.7E+02	2.3E+02	NA	2.3E+02	2.3E+02
Isopropylbenzene	98828	-	0.10	1.0	--	NA	NA	NA	7.5E+03	NA	7.5E+03	4.6E+03	NA	4.6E+03	4.6E+03
Methyl acetate	79209	--	1.0	1.0	--	NA	NA	NA	7.5E+04	NA	7.5E+04	4.6E+04	NA	4.6E+04	4.6E+04
Methylene chloride	75092	0.0020	0.0060	1.0	--	5.4E+02	NA	5.4E+02	4.5E+02	NA	4.5E+02	2.7E+02	NA	2.7E+02	2.7E+02
Styrene	100425	--	0.20	1.0	--	NA	NA	NA	1.5E+04	NA	1.5E+04	9.1E+03	NA	9.1E+03	9.1E+03
Tetrachloroethene	127184	0.0021	0.0060	1.0	--	9.0E+02	NA	9.0E+02	4.5E+02	NA	4.5E+02	2.7E+02	NA	2.7E+02	2.7E+02
Toluene	108883	--	0.080	1.0	--	NA	NA	NA	6.0E+03	NA	6.0E+03	3.7E+03	NA	3.7E+03	3.7E+03
1,2,3-trichlorobenzene	87616	--	0.00080	1.0	--	NA	NA	NA	6.0E+01	NA	6.0E+01	3.7E+01	NA	3.7E+01	3.7E+01
1,2,4-trichlorobenzene	120821	0.029	0.010	1.0	--	6.5E+01	NA	6.5E+01	7.5E+02	NA	7.5E+02	4.6E+02	NA	4.6E+02	6.5E+01
Trichloroethene	79016	0.046	0.00050	1.0	--	3.5E+01	NA	3.5E+01	3.7E+01	NA	3.7E+01	2.3E+01	NA	2.3E+01	2.3E+01
Trichlorotrifluoroethane	76131	--	30	1.0	--	NA	NA	NA	2.2E+06	NA	2.2E+06	1.4E+06	NA	1.4E+06	1.4E+06
Vinyl chloride	75014	0.72	0.0030	1.0	--	6.6E-02	NA	6.6E-02	2.2E+02	NA	2.2E+02	1.4E+02	NA	1.4E+02	6.6E-02
m,p -xylenes	13302070	--	0.20	1.0	--	NA	NA	NA	1.5E+04	NA	1.5E+04	9.1E+03	NA	9.1E+03	9.1E+03
o -xylene	95476	--	0.20	1.0	--	NA	NA	NA	1.5E+04	NA	1.5E+04	9.1E+03	NA	9.1E+03	9.1E+03
Xylenes	1330207	--	0.20	1.0	--	NA	NA	NA	1.5E+04	NA	1.5E+04	9.1E+03	NA	9.1E+03	9.1E+03

Table 6. Site-Specific Sediment RBSLs Calculated for Kayaker/Canoer—Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Kayaker/Canoer Sediment RBSL Future Use (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	

Notes:

ABS_d = dermal absorption factor
CAS = chemical abstract service
CSF = cancer slope factor
GIABS = gastrointestinal absorption factor
HCH = hexachlorocyclohexane
HQ = hazard quotient
NA = not calculated due to missing toxicity data or exposure pathway not relevant
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RBSL = risk-based screening level
RfD = reference dose
-- = no data available

[a] Lead screening value calculated using Adult Lead Methodology. See text.

1,3-dichlorobenzene RfD value is based on the Agency for Toxic Substances and Disease Registry subchronic minimal risk level.
Carbazole oral CSF is based on the health effects assessment summary tables (HEAST) value.
Chloroethane RfD value is based on the provisional peer reviewed toxicity value (PPRTV) subchronic RfD.
Chloromethane CSF is based on the HEAST value.
Chromium values are based on toxicity criterion for chromium (III) as a surrogate.
Mercury values are based on toxicity criterion for mercuric chloride as a surrogate.
The cancer slope value for PCBs is based on the toxicity value for total PCBs.
Toxicity criteria for 3-nitroaniline are based on 4-nitroaniline as a surrogate.
Toxicity criteria for acenaphthylene are based on acenaphthene as a surrogate.
Toxicity criteria for alpha-chlordane are based on chlordane as a surrogate.
Toxicity criteria for benzo[g,h,i]perylene are based on pyrene as a surrogate.
Toxicity criteria for delta-HCH are based on technical HCH as a surrogate.
Toxicity criteria for dichlorobenzenes (total) are based on 1,4-dichlorobenzene as a surrogate.
Toxicity criteria for dimethyl phthalate are based on diethyl phthalate as a surrogate.
Toxicity criteria for endosulfan I are based on endosulfan as a surrogate.
Toxicity criteria for endosulfan II are based on endosulfan as a surrogate.
Toxicity criteria for endosulfan sulfate are based on endosulfan as a surrogate.
Toxicity criteria for endrin aldehyde are based on endrin as a surrogate.
Toxicity criteria for endrin ketone are based on endrin as a surrogate.
Toxicity criteria for gamma-chlordane are based on chlordane as a surrogate.
Toxicity criteria for *m*,*p* -xylenes are based on xylenes as a surrogate.
Toxicity criteria for phenanthrene are based on anthracene as a surrogate.

RBSL for Sediment Ingestion - Carcinogens (mg/kg) = [TR x 365 (day/yr) x LT (yr)] / [IFS_{adj} (mg/kg) x 1E-6 (kg/mg) x CSF_o (mg/kg-day)$^{-1}$ x ADAF]
where IFS_{adjkf} (mg/kg) = {[EF_{ockf} (day/yr) x ED_{ockf} (yr) x IRS_{ock} (mg/day)] / BW_{ock} (kg)} + {[EF_{akf} (days/yr) x [ED_{akf} (yr) - ED_{ockf} (yr)] x IRS_{ak} (mg/day)] / BW_{ak} (kg)}

RBSL for Sediment Ingestion - Carcinogen vinyl chloride (mg/kg) = TR / {([CSF_o (mg/kg-day)$^{-1}$ x IFS_{adjkf} (mg/kg) x 1E-6 (kg/mg)] / [365 (day/yr) x LT (yr)]) + ([CSF_o (mg/kg-day)$^{-1}$ x IRS_{ock} x 1E-6 (kg/mg)] / BW_{ock} (kg))}
where IFS_{adjkf} (mg/kg) = {[EF_{ockf} (day/yr) x ED_{ockf} (yr) x IRS_{ock} (mg/day)] / BW_{ock} (kg)} + {[EF_{akf} (days/yr) x [ED_{akf} (yr) - ED_{ockf} (yr)] x IRS_{ak} (mg/day)] / BW_{ak} (kg)}

RBSL for Sediment Ingestion - Carcinogen trichloroethene (mg/kg) = [TR x 365 (day/yr) x LT (yr)] / {CSF_o (mg/kg-day)$^{-1}$ x 1E-6 (kg/mg) x ([CAF_o x IFS_{adjkf} (mg/kg)] + [MAF_o x IFS_{adjkf} (mg/kg) x ADAF])}
where IFS_{adjkf} (mg/kg) = {[EF_{ockf} (day/yr) x ED_{ockf} (yr) x IRS_{ock} (mg/day)] / BW_{ock} (kg)} + {[EF_{akf} (days/yr) x [ED_{akf} (yr) - ED_{ockf} (yr)] x IRS_{ak} (mg/day)] / BW_{ak} (kg)}
CAF_o = 0.804 MAF_o = 0.202

RBSL for Sediment Dermal Contact - Carcinogens (mg/kg) = [TR x 365 (day/yr) x LT (yr)] / {DFS_{adj} (mg/kg) x 1E-6 (kg/mg) x ABS x [CSF_o (mg/kg-day)$^{-1}$ / GIABS] ADAF}
where DFS_{adj} (mg/kg) = {[EF_{ockf} (days/yr) x ED_{ockf} (yr) x SA_{ock} (cm^2/day) x AF_{ock} (mg/cm^2) / BW_{ock} (kg)} + {[EF_{akf} (days/yr) x [ED_{akf} (yr) - ED_{ockf} (yr)] x SA_{ak} (cm^2/day) x AF_{ak} (mg/cm^2)] / BW_{ak} (kg)}

See Table 3 for ADAF values.

Table 6. Site-Specific Sediment RBSLs Calculated for Kayaker/Canoer—Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	Adult + Older Child RBSLs for Target Risk = 1E-7 (mg/kg)			Adult RBSLs for HQ = 0.01			Older Child RBSLs for HQ = 0.01			Kayaker/Canoer Sediment RBSL Future Use (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	Ingestion	Dermal	Total	

Total RBSL for Carcinogens (mg/kg) = 1 / {[1/Carcinogen RBSL for Sediment Ingestion (mg/kg)] + [1/Carcinogen RBSL for Dermal Contact (mg/kg)]}

RBSL for Sediment Ingestion - Adult, Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{akf} (yr) x BW_{ak} (kg)] / {EF_{akf} (day/yr) x ED_{akf} (yr) x IRS_{ak} (mg/day) x 1E-6 (kg/mg) x [1 / RfD_o (mg/kg-day)]}

RBSL for Sediment Dermal Contact - Adult, Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{akf} (yr) x BW_{ak} (kg)] / {EF_{akf} (day/yr) x ED_{akf} (yr) x SA_{ak} (cm^2/day) x AF_{ak} (mg/cm^2) x 1E-6 (kg/mg) x ABS x [1 / RfD_o (mg/kg-day) x GIABS]}

RBSL for Sediment Ingestion - Older Child, Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{ockf} (yr) x BW_{ock} (kg)] / {EF_{ockf} (day/yr) x ED_{ockf} (yr) x IRS_{ock} (mg/day) x 1E-6 (kg/mg) x [1 / RfD_o (mg/kg-day)]}

RBSL for Sediment Dermal Contact -Older Child, Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{ockf} (yr) x BW_{ock} (kg)] / {EF_{ockf} (day/yr) x ED_{ockf} (yr) x SA_{ock} (cm^2/day) x AF_{ock} (mg/cm^2) x 1E-6 (kg/mg) x ABS x [1 / RfDo (mg/kg-day) x GIABS]}

Total RBSL - Noncancer (mg/kg) = 1 / {[1/Noncancer RBSL for Sediment Ingestion (mg/kg)] + [1/Noncancer RBSL for Dermal Contact (mg/kg)]}

Table 7. Site-Specific Sediment RBSLs Calculated for Construction Worker—Current and Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	RBSLs for Target Risk = 1E-7 (mg/kg)			RBSLs for HQ = 0.01 (mg/kg)			Construction Sediment Worker RBSL (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	
Metals												
Aluminum	7429905	--	1.0	1.0	--	NA	NA	NA	2.2E+04	NA	2.2E+04	2.2E+04
Antimony	7440360	--	0.00040	0.15	--	NA	NA	NA	8.8E+00	NA	8.8E+00	8.8E+00
Arsenic	7440382	1.5	0.00030	1.0	0.030	1.0E+01	1.1E+02	9.4E+00	6.6E+00	7.0E+01	6.1E+00	6.1E+00
Barium	7440393	--	0.20	0.070	--	NA	NA	NA	4.4E+03	NA	4.4E+03	4.4E+03
Beryllium	7440417	--	0.0020	0.0070	--	NA	NA	NA	4.4E+01	NA	4.4E+01	4.4E+01
Cadmium	7440439	--	0.0010	0.025	0.0010	NA	NA	NA	2.2E+01	1.8E+02	2.0E+01	2.0E+01
Chromium (VI)	18540299	0.50	0.0030	0.025	--	3.1E+01	NA	3.1E+01	6.6E+01	NA	6.6E+01	3.1E+01
Chromium (total)	7440473	--	1.5	0.013	--	NA	NA	NA	3.3E+04	NA	3.3E+04	3.3E+04
Cobalt	7440484	--	0.00030	1.0	--	NA	NA	NA	6.6E+00	NA	6.6E+00	6.6E+00
Copper	7440508	--	0.040	1.0	--	NA	NA	NA	8.8E+02	NA	8.8E+02	8.8E+02
Iron	7439896	--	0.70	1.0	--	NA	NA	NA	1.5E+04	NA	1.5E+04	1.5E+04
Lead [a]	7439921	--	--	1.0	--	--	--	--	--	--	--	--
Manganese	7439965	--	0.14	1.0	--	NA	NA	NA	3.1E+03	NA	3.1E+03	3.1E+03
Mercury	7439976	--	0.00030	0.070	--	NA	NA	NA	6.6E+00	NA	6.6E+00	6.6E+00
Nickel	7440020	--	0.020	0.040	--	NA	NA	NA	4.4E+02	NA	4.4E+02	4.4E+02
Selenium	7782492	--	0.0050	1.0	--	NA	NA	NA	1.1E+02	NA	1.1E+02	1.1E+02
Silver	7440224	--	0.0050	0.040	--	NA	NA	NA	1.1E+02	NA	1.1E+02	1.1E+02
Thallium	7440280	--	0.000010	1.0	--	NA	NA	NA	2.2E-01	NA	2.2E-01	2.2E-01
Vanadium	7440622	--	0.0050	0.026	--	NA	NA	NA	1.1E+02	NA	1.1E+02	1.1E+02
Zinc	7440666	--	0.30	1.0	--	NA	NA	NA	6.6E+03	NA	6.6E+03	6.6E+03
Organometals												
Methyl mercury	22967926	--	0.00010	1.0	--	NA	NA	NA	2.2E+00	NA	2.2E+00	2.2E+00
PAHs												
Acenaphthene	83329	--	0.060	1.0	0.13	NA	NA	NA	1.3E+03	3.2E+03	9.4E+02	9.4E+02
Acenaphthylene	208968	--	0.060	1.0	0.13	NA	NA	NA	1.3E+03	3.2E+03	9.4E+02	9.4E+02
Anthracene	120127	--	0.30	1.0	0.13	NA	NA	NA	6.6E+03	1.6E+04	4.7E+03	4.7E+03
Benz[a]anthracene	56553	0.73	--	1.0	0.13	2.1E+01	5.2E+01	1.5E+01	NA	NA	NA	1.5E+01
Benzo[a]pyrene	50328	7.3	--	1.0	0.13	2.1E+00	5.2E+00	1.5E+00	NA	NA	NA	1.5E+00
Benzo[b]fluoranthene	205992	0.73	--	1.0	0.13	2.1E+01	5.2E+01	1.5E+01	NA	NA	NA	1.5E+01
Benzo[g,h,i]perylene	191242	-	0.030	1.0	0.13	NA	NA	NA	6.6E+02	1.6E+03	4.7E+02	4.7E+02
Benzo[k]fluoranthene	207089	0.073	--	1.0	0.13	2.1E+02	5.2E+02	1.5E+02	NA	NA	NA	1.5E+02
Chrysene	218019	0.0073	--	1.0	0.13	2.1E+03	5.2E+03	1.5E+03	NA	NA	NA	1.5E+03
Dibenz[a,h]anthracene	53703	7.3	--	1.0	0.13	2.1E+00	5.2E+00	1.5E+00	NA	NA	NA	1.5E+00
Dibenzofuran	132649	--	0.0010	1.0	0.030	NA	NA	NA	2.2E+01	2.3E+02	2.0E+01	2.0E+01
Fluoranthene	206440	--	0.040	1.0	0.13	NA	NA	NA	8.8E+02	2.2E+03	6.3E+02	6.3E+02

Table 7. Site-Specific Sediment RBSLs Calculated for Construction Worker—Current and Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	RBSLs for Target Risk = 1E-7 (mg/kg)			RBSLs for HQ = 0.01 (mg/kg)			Construction Sediment Worker RBSL (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	
Fluorene	86737	--	0.040	1.0	0.13	NA	NA	NA	8.8E+02	2.2E+03	6.3E+02	6.3E+02
Indeno[1,2,3-cd]pyrene	193395	0.73	--	1.0	0.13	2.1E+01	5.2E+01	1.5E+01	NA	NA	NA	1.5E+01
2-methylnaphthalene	91576	--	0.0040	1.0	0.13	NA	NA	NA	8.8E+01	2.2E+02	6.3E+01	6.3E+01
Naphthalene	91203	--	0.020	1.0	0.13	NA	NA	NA	4.4E+02	1.1E+03	3.1E+02	3.1E+02
Phenanthrene	85018	--	0.30	1.0	0.13	NA	NA	NA	6.6E+03	1.6E+04	4.7E+03	4.7E+03
Pyrene	129000	--	0.030	1.0	0.13	NA	NA	NA	6.6E+02	1.6E+03	4.7E+02	4.7E+02
Pesticides												
Aldrin	309002	17	0.000030	1.0	--	9.1E-01	NA	9.1E-01	6.6E-01	NA	6.6E-01	6.6E-01
Carbazole	86748	0.020	--	--	--	7.7E+02	NA	7.7E+02	NA	NA	NA	7.7E+02
alpha-Chlordane	5103719	0.35	0.00050	1.0	0.040	4.4E+01	3.5E+02	3.9E+01	1.1E+01	8.8E+01	9.8E+00	9.8E+00
gamma-Chlordane	5566347	0.35	0.00050	1.0	0.040	4.4E+01	3.5E+02	3.9E+01	1.1E+01	8.8E+01	9.8E+00	9.8E+00
4,4'-DDD	72548	0.24	--	1.0	0.10	6.5E+01	2.0E+02	4.9E+01	NA	NA	NA	4.9E+01
4,4'-DDE	72559	0.34	--	1.0	--	4.6E+01	NA	4.6E+01	NA	NA	NA	4.6E+01
4,4'-DDT	50293	0.34	0.00050	1.0	0.030	4.6E+01	4.8E+02	4.2E+01	1.1E+01	1.2E+02	1.0E+01	1.0E+01
Dieldrin	60571	16	0.000050	1.0	0.10	9.7E-01	3.1E+00	7.4E-01	1.1E+00	3.5E+00	8.4E-01	7.4E-01
Endosulfan I	959988	--	0.0060	1.0	--	NA	NA	NA	1.3E+02	NA	1.3E+02	1.3E+02
Endosulfan II	33213659	--	0.0060	1.0	--	NA	NA	NA	1.3E+02	NA	1.3E+02	1.3E+02
Endosulfan sulfate	1031078	--	0.0060	1.0	--	NA	NA	NA	1.3E+02	NA	1.3E+02	1.3E+02
Endrin	72208	--	0.00030	1.0	0.10	NA	NA	NA	6.6E+00	2.1E+01	5.0E+00	5.0E+00
Endrin aldehyde	7421934	--	0.00030	1.0	0.10	NA	NA	NA	6.6E+00	2.1E+01	5.0E+00	5.0E+00
Endrin ketone	53494705	--	0.00030	1.0	0.10	NA	NA	NA	6.6E+00	2.1E+01	5.0E+00	5.0E+00
Heptachlor	76448	4.5	0.00050	1.0	--	3.4E+00	NA	3.4E+00	1.1E+01	NA	1.1E+01	3.4E+00
Heptachlor epoxide	1024573	9.1	0.000013	1.0	--	1.7E+00	NA	1.7E+00	2.9E-01	NA	2.9E-01	2.9E-01
alpha-HCH	319846	6.3	0.0080	1.0	0.10	2.5E+00	7.8E+00	1.9E+00	1.8E+02	5.6E+02	1.3E+02	1.9E+00
beta-HCH	319857	1.8	--	1.0	0.10	8.6E+00	2.7E+01	6.5E+00	NA	NA	NA	6.5E+00
delta-HCH	319868	1.8	--	1.0	0.10	8.6E+00	2.7E+01	6.5E+00	NA	NA	NA	6.5E+00
gamma-HCH (Lindane)	58899	1.1	0.00030	1.0	0.040	1.4E+01	1.1E+02	1.2E+01	6.6E+00	5.3E+01	5.9E+00	5.9E+00
Methoxychlor	72435	--	0.0050	1.0	0.10	NA	NA	NA	1.1E+02	3.5E+02	8.4E+01	8.4E+01
Semivolatiles												
Acetophenone	98862	--	0.10	1.0	--	NA	NA	NA	2.2E+03	NA	2.2E+03	2.2E+03
Benzaldehyde	100527	--	0.10	1.0	--	NA	NA	NA	2.2E+03	NA	2.2E+03	2.2E+03
1,1'-biphenyl	92524	0.0080	0.50	1.0	--	1.9E+03	NA	1.9E+03	1.1E+04	NA	1.1E+04	1.9E+03
Butyl benzyl phthalate	85687	0.0019	0.20	1.0	0.10	8.1E+03	2.6E+04	6.2E+03	4.4E+03	1.4E+04	3.4E+03	3.4E+03
Caprolactam	105602	--	0.50	1.0	0.10	NA	NA	NA	1.1E+04	3.5E+04	8.4E+03	8.4E+03
4-chloroaniline	106478	0.20	0.0040	1.0	0.10	7.7E+01	2.5E+02	5.9E+01	8.8E+01	2.8E+02	6.7E+01	5.9E+01
3,3'-dichlorobenzidine	91941	0.45	--	1.0	0.10	3.4E+01	1.1E+02	2.6E+01	NA	NA	NA	2.6E+01

Table 7. Site-Specific Sediment RBSLs Calculated for Construction Worker—Current and Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	RBSLs for Target Risk = 1E-7 (mg/kg)			RBSLs for HQ = 0.01 (mg/kg)			Construction Sediment Worker RBSL (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	
2,4-dimethylphenol	105679	--	0.020	1.0	0.10	NA	NA	NA	4.4E+02	1.4E+03	3.4E+02	3.4E+02
2,4-dinitrotoluene	121142	0.31	0.0020	1.0	0.10	5.0E+01	1.6E+02	3.8E+01	4.4E+01	1.4E+02	3.3E+01	3.3E+01
2,6-dinitrotoluene	606202	1.5	0.00030	1.0	0.099	1.0E+01	3.3E+01	7.9E+00	6.6E+00	2.1E+01	5.1E+00	5.1E+00
Hexachlorobenzene	118741	1.6	0.00080	1.0	--	9.7E+00	NA	9.7E+00	1.8E+01	NA	1.8E+01	9.7E+00
Isophorone	78591	0.00095	0.20	1.0	0.10	1.6E+04	5.2E+04	1.2E+04	4.4E+03	1.4E+04	3.4E+03	3.4E+03
2-methylphenol	95487	--	0.050	1.0	0.10	NA	NA	NA	1.1E+03	3.5E+03	8.4E+02	8.4E+02
4-methylphenol	106445	--	0.10	1.0	0.10	NA	NA	NA	2.2E+03	7.0E+03	1.7E+03	1.7E+03
2-nitroaniline	88744	--	0.010	1.0	0.10	NA	NA	NA	2.2E+02	7.0E+02	1.7E+02	1.7E+02
3-nitroaniline	100016	0.020	0.0040	1.0	0.10	7.7E+02	2.5E+03	5.9E+02	8.8E+01	2.8E+02	6.7E+01	6.7E+01
N -nitrosodiphenylamine	86306	0.0049	--	1.0	0.10	3.2E+03	1.0E+04	2.4E+03	NA	NA	NA	2.4E+03
Phenol	108952	--	0.30	1.0	0.10	NA	NA	NA	6.6E+03	2.1E+04	5.0E+03	5.0E+03
bis(2-ethylhexyl)phthalate	117817	0.014	0.020	1.0	0.10	1.1E+03	3.5E+03	8.4E+02	4.4E+02	1.4E+03	3.4E+02	3.4E+02
Diethyl phthalate	84662	--	0.80	1.0	0.10	NA	NA	NA	1.8E+04	5.6E+04	1.3E+04	1.3E+04
Dimethyl phthalate	131113	--	0.80	1.0	0.10	NA	NA	NA	1.8E+04	5.6E+04	1.3E+04	1.3E+04
Di-*n* -butyl phthalate	84742	--	0.10	1.0	0.10	NA	NA	NA	2.2E+03	7.0E+03	1.7E+03	1.7E+03
Di-*n* -octylphthalate	117840	--	0.010	1.0	0.10	NA	NA	NA	2.2E+02	7.0E+02	1.7E+02	1.7E+02
2,4,6-trichlorophenol	88062	0.011	0.0010	1.0	0.10	1.4E+03	4.5E+03	1.1E+03	2.2E+01	7.0E+01	1.7E+01	1.7E+01
PCBs												
PCBs (total Aroclors)	(blank)	2.0	0.000020	1.0	0.14	7.7E+00	1.8E+01	5.4E+00	4.4E-01	1.0E+00	3.1E-01	3.1E-01
Volatiles												
Acetone	67641	--	0.90	1.0	--	NA	NA	NA	2.0E+04	NA	2.0E+04	2.0E+04
Benzene	71432	0.055	0.0040	1.0	--	2.8E+02	NA	2.8E+02	8.8E+01	NA	8.8E+01	8.8E+01
bis(2-chloroethyl)ether	111444	1.1	--	1.0	--	1.4E+01	NA	1.4E+01	-	NA	NA	1.4E+01
2-butanone	78933	--	0.60	1.0	--	NA	NA	NA	1.3E+04	NA	1.3E+04	1.3E+04
Carbon disulfide	75150	--	0.10	1.0	--	NA	NA	NA	2.2E+03	NA	2.2E+03	2.2E+03
Chlorobenzene	108907	--	0.020	1.0	--	NA	NA	NA	4.4E+02	NA	4.4E+02	4.4E+02
Chloroform	67663	0.031	0.010	1.0	--	5.0E+02	NA	5.0E+02	2.2E+02	NA	2.2E+02	2.2E+02
Chloromethane	74873	0.013	--	1.0	--	1.2E+03	NA	1.2E+03	-	NA	NA	1.2E+03
1,2-dichlorobenzene	95501	--	0.090	1.0	--	NA	NA	NA	2.0E+03	NA	2.0E+03	2.0E+03
1,3-dichlorobenzene	541731	--	0.020	--	--	NA	NA	NA	4.4E+02	NA	4.4E+02	4.4E+02
1,4-dichlorobenzene	106467	0.0054	0.070	1.0	--	2.9E+03	NA	2.9E+03	1.5E+03	NA	1.5E+03	1.5E+03
Dichlorobenzenes (total)	106467	0.0054	0.070	1.0	--	2.9E+03	NA	2.9E+03	1.5E+03	NA	1.5E+03	1.5E+03
1,1-dichloroethane	75343	0.0057	0.20	1.0	-	2.7E+03	NA	2.7E+03	4.4E+03	NA	4.4E+03	2.7E+03
cis -1,2-dichloroethene	156592	--	0.0020	1.0	--	NA	NA	NA	4.4E+01	NA	4.4E+01	4.4E+01
trans -1,2-dichloroethene	156605	--	0.020	1.0	--	NA	NA	NA	4.4E+02	NA	4.4E+02	4.4E+02
Ethylbenzene	100414	0.011	0.10	1.0	--	1.4E+03	NA	1.4E+03	2.2E+03	NA	2.2E+03	1.4E+03

Table 7. Site-Specific Sediment RBSLs Calculated for Construction Worker—Current and Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	RBSLs for Target Risk = 1E-7 (mg/kg)			RBSLs for HQ = 0.01 (mg/kg)			Construction Sediment Worker RBSL (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	
2-hexanone	591786	--	0.0050	1.0	--	NA	NA	NA	1.1E+02	NA	1.1E+02	1.1E+02
Isopropylbenzene	98828	--	0.10	1.0	--	NA	NA	NA	2.2E+03	NA	2.2E+03	2.2E+03
Methyl acetate	79209	--	1.0	1.0	--	NA	NA	NA	2.2E+04	NA	2.2E+04	2.2E+04
Methylene chloride	75092	0.0020	0.0060	1.0	--	7.7E+03	NA	7.7E+03	1.3E+02	NA	1.3E+02	1.3E+02
Styrene	100425	--	0.20	1.0	--	NA	NA	NA	4.4E+03	NA	4.4E+03	4.4E+03
Tetrachloroethene	127184	0.0021	0.0060	1.0	--	7.4E+03	NA	7.4E+03	1.3E+02	NA	1.3E+02	1.3E+02
Toluene	108883	--	0.080	1.0	--	NA	NA	NA	1.8E+03	NA	1.8E+03	1.8E+03
1,2,3-trichlorobenzene	87616	--	0.00080	1.0	--	NA	NA	NA	1.8E+01	NA	1.8E+01	1.8E+01
1,2,4-trichlorobenzene	120821	0.029	0.010	1.0	--	5.3E+02	NA	5.3E+02	2.2E+02	NA	2.2E+02	2.2E+02
Trichloroethene	79016	0.046	0.00050	1.0	--	3.4E+02	NA	3.4E+02	1.1E+01	NA	1.1E+01	1.1E+01
Trichlorotrifluoroethane	76131	--	30	1.0	--	NA	NA	NA	6.6E+05	NA	6.6E+05	6.6E+05
Vinyl chloride	75014	0.72	0.0030	1.0	--	2.2E+01	NA	2.2E+01	6.6E+01	NA	6.6E+01	2.2E+01
m,p -xylenes	13302070	--	0.20	1.0	--	NA	NA	NA	4.4E+03	NA	4.4E+03	4.4E+03
o -xylene	95476	--	0.20	1.0	--	NA	NA	NA	4.4E+03	NA	4.4E+03	4.4E+03
Xylenes	1330207	--	0.20	1.0	--	NA	NA	NA	4.4E+03	NA	4.4E+03	4.4E+03

Notes:

ABS_d = absorption factor
CAS = chemical abstract service
CSF = cancer slope factor
GIABS = gastrointestinal absorption factor
HCH = hexachlorocyclohexane
HQ = hazard quotient
NA = not calculated due to missing toxicity data or exposure pathway not relevant
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RBSL = risk-based screening level
RfD = reference dose
-- = no data available

[a] Lead screening value based on U.S. Environmental Protection Agency (EPA) regional screening level for industrial soils.

1,3-dichlorobenzene RfD value is based on the Agency for Toxic Substances and Disease Registry subchronic minimal risk level.
Carbazole oral CSF is based on the health effects assessment summary tables (HEAST) value.
Chloroethane RfD value is based on the provisional peer reviewed toxicity value (PPRTV) subchronic RfD.
Chloromethane CSF is based on the HEAST value.
Chromium values are based on toxicity criterion for chromium (III) as a surrogate.
Mercury values are based on toxicity criterion for mercuric chloride as a surrogate.
The cancer slope value for PCBs is based on the toxicity value for total PCBs.
Toxicity criteria for 3-nitroaniline are based on 4-nitroaniline as a surrogate.
Toxicity criteria for acenaphthylene are based on acenaphthene as a surrogate.
Toxicity criteria for alpha-chlordane are based on chlordane as a surrogate.
Toxicity criteria for benzo[g,h,i]perylene are based on pyrene as a surrogate.
Toxicity criteria for delta-HCH are based on technical HCH as a surrogate.
Toxicity criteria for dichlorobenzenes (total) are based on 1,4-dichlorobenzene as a surrogate.
Toxicity criteria for dimethyl phthalate are based on diethyl phthalate as a surrogate.

Table 7. Site-Specific Sediment RBSLs Calculated for Construction Worker—Current and Future Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	GIABS	ABS_d	RBSLs for Target Risk = 1E-7 (mg/kg)			RBSLs for HQ = 0.01 (mg/kg)			Construction Sediment Worker RBSL (mg/kg)
						Ingestion	Dermal	Total	Ingestion	Dermal	Total	

Toxicity criteria for endosulfan I are based on endosulfan as a surrogate.
Toxicity criteria for endosulfan II are based on endosulfan as a surrogate.
Toxicity criteria for endosulfan sulfate are based on endosulfan as a surrogate.
Toxicity criteria for endrin aldehyde are based on endrin as a surrogate.
Toxicity criteria for endrin ketone are based on endrin as a surrogate.
Toxicity criteria for gamma-chlordane are based on chlordane as a surrogate.
Toxicity criteria for *m,p* -xylenes are based on xylenes as a surrogate.
Toxicity criteria for phenanthrene are based on anthracene as a surrogate.

RBSL for Sediment Ingestion - Carcinogens (mg/kg) = [TR x 365 (day/yr) x LT (yr) x BW_{cw} (kg)] / [EF_{cw} (day/yr) x ED_{cw} (yr) x IRS_{cw} (mg/day) x 1E-6 (kg/mg) x CSF_o (mg/kg-day)$^{-1}$]

RBSL for Dermal Contact - Carcinogens (mg/kg) = [TR x 365 (day/yr) x LT (yr) x BW_{cw} (kg)] / {EF_{cw} (day/yr) x ED_{cw} (yr) x SA_{cw} (cm^2/day) x AF_{cw} (mg/cm^2) x 1E-6 (kg/mg) x ABS x [CSF_o (mg/kg-day)$^{-1}$ / GIABS]}

Total RBSL for Carcinogens (mg/kg) = 1 / {[1/Carcinogen RBSL for Sediment Ingestion (mg/kg)] + [1/Carcinogen RBSL for Dermal Contact (mg/kg)]}

RBSL for Sediment Ingestion - Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{cw} (yr) x BW_{cw} (kg)] / {EF_{cw} (day/yr) x ED_{cw} (yr) x IRS_{cw} (mg/day) x 1E-6 (kg/mg) x [1 / RfD_o (mg/kg-day)]}

RBSL for Dermal Contact - Noncancer (mg/kg) = [HQ x 365 (day/yr) x ED_{cw} (yr) x BW_{cw} (kg)] / {EF_{cw} (day/yr) x ED_{cw} (yr) x SA_{cw} (cm^2/day) x AF_{cw} (mg/cm^2) x 1E-6 (kg/mg) x ABS x [1 / RfD_o (mg/kg-day) x GIABS]}

Total RBSL - Noncancer (mg/kg) = 1 / {[1/Noncancer RBSL for Sediment Ingestion (mg/kg)] + [1/Noncancer RBSL for Dermal Contact (mg/kg)]}

Table 8. Site-Specific Fish/Blue Crab Tissue RBSLs Calculated for Angler/Crabber—Current Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	RBSLs for Target Risk = 1E-7 (mg/kg) [a]	Adult RBSLs for HQ = 0.01 (mg/kg)	Older Child RBSLs for HQ = 0.01 (mg/kg)	Younger Child RBSLs for HQ = 0.01 (mg/kg)	Angler/Crabber Tissue RBSL (mg/kg)
Metals								
Antimony	7440360	--	0.00040	NA	2.0E-01	1.8E-01	1.1E-01	1.1E-01
Arsenic	7440382	1.5	0.00030	7.2E-03	1.5E-01	1.3E-01	8.3E-02	7.2E-03
Barium	7440393	--	0.20	NA	9.8E+01	9.0E+01	5.6E+01	5.6E+01
Chromium (total)	7440473	--	1.5	NA	7.4E+02	6.7E+02	4.2E+02	4.2E+02
Copper	7440508	--	0.040	NA	2.0E+01	1.8E+01	1.1E+01	1.1E+01
Iron	7439896	--	0.70	NA	3.4E+02	3.1E+02	1.9E+02	1.9E+02
Lead [b]	7439921	--	--	--	--	--	--	--
Manganese	7439965	--	0.14	NA	6.9E+01	6.3E+01	3.9E+01	3.9E+01
Mercury	7439976	--	0.00030	NA	1.5E-01	1.3E-01	8.3E-02	8.3E-02
Nickel	7440020	--	0.020	NA	9.8E+00	9.0E+00	5.6E+00	5.6E+00
Selenium	7782492	--	0.0050	NA	2.5E+00	2.2E+00	1.4E+00	1.4E+00
Silver	7440224	--	0.0050	NA	2.5E+00	2.2E+00	1.4E+00	1.4E+00
Vanadium	7440622	--	0.0050	NA	2.5E+00	2.2E+00	1.4E+00	1.4E+00
Zinc	7440666	--	0.30	NA	1.5E+02	1.3E+02	8.3E+01	8.3E+01
Organometals								
Dimethylarsinic acid	75605	--	0.020	NA	9.8E+00	9.0E+00	5.6E+00	5.6E+00
Methyl mercury	22967926	--	0.00010	NA	4.9E-02	4.5E-02	2.8E-02	2.8E-02
PAHs								
Acenaphthene	83329	--	0.060	NA	2.9E+01	2.7E+01	1.7E+01	1.7E+01
Fluorene	86737	--	0.040	NA	2.0E+01	1.8E+01	1.1E+01	1.1E+01
Naphthalene	91203	--	0.020	NA	9.8E+00	9.0E+00	5.6E+00	5.6E+00
Phenanthrene	85018	--	0.30	NA	1.5E+02	1.3E+02	8.3E+01	8.3E+01
PCBs								
PCBs (total Aroclors)	--	2.0	0.000020	5.4E-03	9.8E-03	9.0E-03	5.6E-03	5.4E-03

Notes:

CAS = chemical abstract service
CSF = cancer slope factor
HQ = hazard quotient
PAH = polycyclic aromatic hydrocarbon
NA = not calculated due to missing toxicity data or exposure pathway not relevant
PCB = polychlorinated biphenyl
RBSL = risk-based screening level
RfD = reference dose
-- = no data available

[a] Based on age-weighted values for tissue ingestion rate.

[b] Lead screening value based on Food and Drug Adminstration (FDA) guidance value for crustacea.

Chromium values are based on toxicity criterion for chromium (III) as a surrogate.
Mercury value based on toxicity criterion for mercuric chloride as surrogate
Phenanthrene are based on toxicity crieria for anthracene as a surrogate.

Table 8. Site-Specific Fish/Blue Crab Tissue RBSLs Calculated for Angler/Crabber—Current Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	RBSLs for Target Risk = 1E-7 (mg/kg) [a]	Adult RBSLs for HQ = 0.01 (mg/kg)	Older Child RBSLs for HQ = 0.01 (mg/kg)	Younger Child RBSLs for HQ = 0.01 (mg/kg)	Angler/Crabber Tissue RBSL (mg/kg)

The cancer slope value for PCBs is based on the toxicity value for total PCBs.

RBSL for Fish Ingestion - Carcinogens (mg/kg) =
[TR x 365 (day/yr) x LT (yr)]/ [IRF_{adj} x 1E-6 (kg/mg) x CSF_o (mg/kg-day)$^{-1}$ x ADAF]
where IRF_{adj} (mg/kg) = {[EF_r (day/yr) x ED_{ycr} (yr) x IRF_{ycr} (mg/day) / BW_{yc} (kg)] + [EF_r (day/yr) x ED_{ocr} (yr) x IRF_{ocr} (mg/day) / BW_{ocr} (kg)] + [EF_r (day/yr) x ED_{ar} (yr) x IRF_{ar} (mg/day) / BW_{ar} (kg)]}

RBSL for Fish Ingestion - Adult, Noncancer (mg/kg) =
[HQ x 365 (day/yr) x ED_{ar} (yr) x BW_{ar} (kg)] / {EF_r (day/yr) x ED_{ar} (yr) x IRF_{ar} (mg/day) x 1E-6 (kg/mg) x [1 / RfD_o (mg/kg-day)]}

RBSL for Fish Ingestion - Older Child, Noncancer (mg/kg) =
[HQ x 365 (day/yr) x ED_{ocr} (yr) x BW_{ocr} (kg)] / {EF_r (day/yr) x ED_{ocr} (yr) x IRF_{ocr} (mg/day) x 1E-6 (kg/mg) x [1 / RfD_o (mg/kg-day)]}

RBSL for Fish Ingestion - Younger Child, Noncancer (mg/kg) =
[HQ x 365 (day/yr) x ED_{ycr} (yr) x BW_{yc} (kg)] / {EF_r (day/yr) x ED_{ycr} (yr) x IRF_{ycr} (mg/day) x 1E-6 (kg/mg) x [1 / RfD_o (mg/kg-day)]}

Table 9. Site-Specific Surface Water RBSLs Calculated for Kayaker/Canoer—Current Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	Adult + Older Child RBSLs for Target Risk = 1E-7 (µg/L)	Adult RBSLs for HQ = 0.01 (µg/L)	Older Child RBSLs for HQ = 0.01 (µg/L)	Kayaker/Canoer Surface Water RBSL Current Use (µg/L)
				Ingestion	Ingestion	Ingestion	
Metals							
Aluminum	7429905	--	1.0	NA	1.3E+06	7.9E+05	7.9E+05
Antimony	7440360	--	0.00040	NA	5.2E+02	3.2E+02	3.2E+02
Arsenic	7440382	1.5	0.00030	2.2E+01	3.9E+02	2.4E+02	2.2E+01
Barium	7440393	--	0.20	NA	2.6E+05	1.6E+05	1.6E+05
Beryllium	7440417	--	0.0020	NA	2.6E+03	1.6E+03	1.6E+03
Cadmium	7440439	--	0.0010	NA	1.3E+03	7.9E+02	7.9E+02
Chromium (total)	7440473	--	1.5	NA	1.9E+06	1.2E+06	1.2E+06
Cobalt	7440484	--	0.00030	NA	3.9E+02	2.4E+02	2.4E+02
Copper	7440508	--	0.040	NA	5.2E+04	3.2E+04	3.2E+04
Iron	7439896	--	0.70	NA	9.1E+05	5.5E+05	5.5E+05
Lead [a]	7439921	--	--	--	--	--	--
Manganese	7439965	--	0.14	NA	1.8E+05	1.1E+05	1.1E+05
Mercury	7439976	--	0.00030	NA	3.9E+02	2.4E+02	2.4E+02
Nickel	7440020	--	0.020	NA	2.6E+04	1.6E+04	1.6E+04
Selenium	7782492	--	0.0050	NA	6.5E+03	4.0E+03	4.0E+03
Silver	7440224	--	0.0050	NA	6.5E+03	4.0E+03	4.0E+03
Thallium	7440280	--	0.000010	NA	1.3E+01	7.9E+00	7.9E+00
Vanadium	7440622	--	0.0050	NA	6.5E+03	4.0E+03	4.0E+03
Zinc	7440666	--	0.30	NA	3.9E+05	2.4E+05	2.4E+05
Organometals							
Methyl mercury	22967926	--	0.00010	NA	1.3E+02	7.9E+01	7.9E+01
PAHs							
Acenaphthene	83329	--	0.060	NA	7.8E+04	4.7E+04	4.7E+04
Acenaphthylene	208968	--	0.060	NA	7.8E+04	4.7E+04	4.7E+04
Anthracene	120127	--	0.30	NA	3.9E+05	2.4E+05	2.4E+05
Benz[a]anthracene	56553	0.73	--	2.5E+01	NA	NA	2.5E+01
Benzo[a]pyrene	50328	7.3	--	2.5E+00	NA	NA	2.5E+00
Benzo[b]fluoranthene	205992	0.73	--	2.5E+01	NA	NA	2.5E+01
Benzo[g,h,i]perylene	191242	--	0.030	NA	3.9E+04	2.4E+04	2.4E+04
Benzo[k]fluoranthene	207089	0.073	--	2.5E+02	NA	NA	2.5E+02
Chrysene	218019	0.0073	--	2.5E+03	NA	NA	2.5E+03
Dibenz[a,h]anthracene	53703	7.3	--	2.5E+00	NA	NA	2.5E+00

Table 9. Site-Specific Surface Water RBSLs Calculated for Kayaker/Canoer—Current Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	Adult + Older Child RBSLs for Target Risk = 1E-7 (µg/L)	Adult RBSLs for HQ = 0.01 (µg/L)	Older Child RBSLs for HQ = 0.01 (µg/L)	Kayaker/Canoer Surface Water RBSL Current Use (µg/L)
				Ingestion	Ingestion	Ingestion	
Dibenzofuran	132649	--	0.0010	NA	1.3E+03	7.9E+02	7.9E+02
Fluoranthene	206440	--	0.040	NA	5.2E+04	3.2E+04	3.2E+04
Fluorene	86737	--	0.040	NA	5.2E+04	3.2E+04	3.2E+04
Indeno[1,2,3-cd]pyrene	193395	0.73	--	2.5E+01	NA	NA	2.5E+01
2-methylnaphthalene	91576	--	0.0040	NA	5.2E+03	3.2E+03	3.2E+03
Naphthalene	91203	--	0.020	NA	2.6E+04	1.6E+04	1.6E+04
Phenanthrene	85018	--	0.30	NA	3.9E+05	2.4E+05	2.4E+05
Pyrene	129000	--	0.030	NA	3.9E+04	2.4E+04	2.4E+04
Pesticides							
Aldrin	309002	17	0.000030	1.9E+00	3.9E+01	2.4E+01	1.9E+00
Carbazole	86748	0.020	--	1.6E+03	NA	NA	1.6E+03
alpha-Chlordane	5103719	0.35	0.00050	9.4E+01	6.5E+02	4.0E+02	9.4E+01
gamma-Chlordane	5566347	0.35	0.00050	9.4E+01	6.5E+02	4.0E+02	9.4E+01
4,4'-DDD	72548	0.24	--	1.4E+02	NA	NA	1.4E+02
4,4'-DDE	72559	0.34	--	9.7E+01	NA	NA	9.7E+01
4,4'-DDT	50293	0.34	0.00050	9.7E+01	6.5E+02	4.0E+02	9.7E+01
Dieldrin	60571	16	0.000050	2.1E+00	6.5E+01	4.0E+01	2.1E+00
Endosulfan I	959988	--	0.0060	NA	7.8E+03	4.7E+03	4.7E+03
Endosulfan II	33213659	--	0.0060	NA	7.8E+03	4.7E+03	4.7E+03
Endosulfan sulfate	1031078	--	0.0060	NA	7.8E+03	4.7E+03	4.7E+03
Endrin	72208	--	0.00030	NA	3.9E+02	2.4E+02	2.4E+02
Endrin aldehyde	7421934	--	0.00030	NA	3.9E+02	2.4E+02	2.4E+02
Endrin ketone	53494705	--	0.00030	NA	3.9E+02	2.4E+02	2.4E+02
Heptachlor	76448	4.5	0.00050	7.3E+00	6.5E+02	4.0E+02	7.3E+00
Heptachlor epoxide	1024573	9.1	0.000013	3.6E+00	1.7E+01	1.0E+01	3.6E+00
alpha-HCH	319846	6.3	0.0080	5.2E+00	1.0E+04	6.3E+03	5.2E+00
beta-HCH	319857	1.8	--	1.8E+01	NA	NA	1.8E+01
delta-HCH	319868	1.8	--	1.8E+01	NA	NA	1.8E+01
gamma-HCH (Lindane)	58899	1.1	0.00030	3.0E+01	3.9E+02	2.4E+02	3.0E+01
Methoxychlor	72435	--	0.0050	NA	6.5E+03	4.0E+03	4.0E+03
Semivolatiles							
Acetophenone	98862	--	0.10	NA	1.3E+05	7.9E+04	7.9E+04
Benzaldehyde	100527	--	0.10	NA	1.3E+05	7.9E+04	7.9E+04

Table 9. Site-Specific Surface Water RBSLs Calculated for Kayaker/Canoer—Current Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	Adult + Older Child RBSLs for Target Risk = 1E-7 (µg/L)	Adult RBSLs for HQ = 0.01 (µg/L)	Older Child RBSLs for HQ = 0.01 (µg/L)	Kayaker/Canoer Surface Water RBSL Current Use (µg/L)
				Ingestion	Ingestion	Ingestion	
1,1'-biphenyl	92524	0.0080	0.50	4.1E+03	6.5E+05	4.0E+05	4.1E+03
Butyl benzyl phthalate	85687	0.0019	0.20	1.7E+04	2.6E+05	1.6E+05	1.7E+04
Caprolactam	105602	--	0.50	NA	6.5E+05	4.0E+05	4.0E+05
2-chlorophenol	95578	--	0.0050	NA	6.5E+03	4.0E+03	4.0E+03
2,4-dichlorophenol	120832	--	0.0030	NA	3.9E+03	2.4E+03	2.4E+03
2,4-dimethylphenol	105679	--	0.020	NA	2.6E+04	1.6E+04	1.6E+04
2,4-dinitrophenol	51285	--	0.0020	NA	2.6E+03	1.6E+03	1.6E+03
2,6-dinitrotoluene	606202	1.5	0.00030	2.2E+01	3.9E+02	2.4E+02	2.2E+01
Hexachlorobenzene	118741	1.6	0.00080	2.1E+01	1.0E+03	6.3E+02	2.1E+01
Isophorone	78591	0.00095	0.20	3.5E+04	2.6E+05	1.6E+05	3.5E+04
2-methylphenol	95487	--	0.050	NA	6.5E+04	4.0E+04	4.0E+04
4-methylphenol	106445	--	0.10	NA	1.3E+05	7.9E+04	7.9E+04
4-chloro-3-methylphenol	59507	--	0.10	NA	1.3E+05	7.9E+04	7.9E+04
4,6-dinitro-2-methylphenol	534521	--	0.000080	NA	1.0E+02	6.3E+01	6.3E+01
3-nitroaniline	99092	0.020	0.0040	1.6E+03	5.2E+03	3.2E+03	1.6E+03
4-nitroaniline	100016	0.020	0.0040	1.6E+03	5.2E+03	3.2E+03	1.6E+03
N-nitrosodiphenylamine	86306	0.0049	--	6.7E+03	NA	NA	6.7E+03
Pentachlorophenol	87865	0.40	0.0050	8.2E+01	6.5E+03	4.0E+03	8.2E+01
Phenol	108952	--	0.30	NA	3.9E+05	2.4E+05	2.4E+05
bis(2-ethylhexyl)phthalate	117817	0.014	0.020	2.3E+03	2.6E+04	1.6E+04	2.3E+03
Diethyl phthalate	84662	--	0.80	NA	1.0E+06	6.3E+05	6.3E+05
Dimethyl phthalate	131113	--	0.80	NA	1.0E+06	6.3E+05	6.3E+05
Di-*n*-butyl phthalate	84742	--	0.10	NA	1.3E+05	7.9E+04	7.9E+04
Di-*n*-octylphthalate	117840	--	0.010	NA	1.3E+04	7.9E+03	7.9E+03
2,4,6-trichlorophenol	88062	0.011	0.0010	3.0E+03	1.3E+03	7.9E+02	7.9E+02
PCBs							
PCBs (total Aroclors)	--	2.0	0.000020	1.6E+01	2.6E+01	1.6E+01	1.6E+01
Volatiles							
Acetone	67641	--	0.90	NA	1.2E+06	7.1E+05	7.1E+05
Benzene	71432	0.055	0.0040	6.0E+02	5.2E+03	3.2E+03	6.0E+02
bis(2-chloroethyl)ether	111444	1.1	--	3.0E+01	NA	NA	3.0E+01
Bromodichloromethane	75274	0.062	0.020	5.3E+02	2.6E+04	1.6E+04	5.3E+02
2-butanone	78933	--	0.60	NA	7.8E+05	4.7E+05	4.7E+05
Carbon disulfide	75150	--	0.10	NA	1.3E+05	7.9E+04	7.9E+04

Table 9. Site-Specific Surface Water RBSLs Calculated for Kayaker/Canoer—Current Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	Adult + Older Child RBSLs for Target Risk = 1E-7 (µg/L)	Adult RBSLs for HQ = 0.01 (µg/L)	Older Child RBSLs for HQ = 0.01 (µg/L)	Kayaker/Canoer Surface Water RBSL Current Use (µg/L)
				Ingestion	Ingestion	Ingestion	
Chlorobenzene	108907	--	0.020	NA	2.6E+04	1.6E+04	1.6E+04
Chloroethane	75003	--	0.10	NA	1.3E+05	7.9E+04	7.9E+04
Chloroform	67663	0.031	0.010	1.1E+03	1.3E+04	7.9E+03	1.1E+03
Chloromethane	74873	0.013	--	2.5E+03	NA	NA	2.5E+03
1,2-dichlorobenzene	95501	--	0.090	NA	1.2E+05	7.1E+04	7.1E+04
1,3-dichlorobenzene	541731	--	0.020	NA	2.6E+04	1.6E+04	1.6E+04
1,4-dichlorobenzene	106467	0.0054	0.070	6.1E+03	9.1E+04	5.5E+04	6.1E+03
1,1-dichloroethane	75343	0.0057	0.20	5.8E+03	2.6E+05	1.6E+05	5.8E+03
1,2-dichloroethane	107062	0.091	0.0060	3.6E+02	7.8E+03	4.7E+03	3.6E+02
1,1-dichloroethene	75354	--	0.050	NA	6.5E+04	4.0E+04	4.0E+04
cis -1,2-dichloroethene	156592	--	0.0020	NA	2.6E+03	1.6E+03	1.6E+03
trans -1,2-dichloroethene	156605	--	0.020	NA	2.6E+04	1.6E+04	1.6E+04
Ethylbenzene	100414	0.011	0.10	3.0E+03	1.3E+05	7.9E+04	3.0E+03
4-methyl-2-pentanone	108101	--	0.080	NA	1.0E+05	6.3E+04	6.3E+04
Methylene chloride	75092	0.0020	0.0060	9.3E+03	7.8E+03	4.7E+03	4.7E+03
Tetrachloroethene	127184	0.0021	0.0060	1.6E+04	7.8E+03	4.7E+03	4.7E+03
Toluene	108883	--	0.080	NA	1.0E+05	6.3E+04	6.3E+04
1,2,3-trichlorobenzene	87616	--	0.00080	NA	1.0E+03	6.3E+02	6.3E+02
1,2,4-trichlorobenzene	120821	0.029	0.010	1.1E+03	1.3E+04	7.9E+03	1.1E+03
1,1,1-trichloroethane	71556	--	2.0	NA	2.6E+06	1.6E+06	1.6E+06
Trichloroethene	79016	0.046	0.00050	6.1E+02	6.5E+02	4.0E+02	4.0E+02
Vinyl chloride	75014	0.72	0.0030	5.4E-01	3.9E+03	2.4E+03	5.4E-01
m,p -xylenes	13302070	--	0.20	NA	2.6E+05	1.6E+05	1.6E+05
o -xylene	95476	--	0.20	NA	2.6E+05	1.6E+05	1.6E+05
Xylenes	1330207	--	0.20	NA	2.6E+05	1.6E+05	1.6E+05

Notes:

CAS = chemical abstract service
CSF = cancer slope factor
HCH = hexachlorocyclohexane
HQ = hazard quotient
NA = not calculated due to missing toxicity data or exposure pathway not relevant
PAH = polycyclic aromatic hydrocarb
PCB = polychlorinated biphenyl
RBSL = risk-based screening level
RfD = reference dose
-- = no data available

[a] Lead screening value based on U.S. Environmental Protection Agency (EPA) regional screening level for tapwater.

Table 9. Site-Specific Surface Water RBSLs Calculated for Kayaker/Canoer—Current Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	Adult + Older Child RBSLs for Target Risk = 1E-7 (µg/L)	Adult RBSLs for HQ = 0.01 (µg/L)	Older Child RBSLs for HQ = 0.01 (µg/L)	Kayaker/Canoer Surface Water RBSL Current Use (µg/L)
				Ingestion	Ingestion	Ingestion	

1,3-dichlorobenzene RfD value is based on the Agency for Toxic Substances and Disease Registry subchronic minimal risk level.
Carbazole oral CSF is based on the health effects assessment summary tables (HEAST) value.
Chloroethane RfD value is based on the provisional peer reviewed toxicity value (PPRTV) subchronic RfD.
Chloromethane CSF is based on the HEAST value.
Chromium values are based on toxicity criterion for chromium (III) as a surrogate.
Mercury values are based on toxicity criterion for mercuric chloride as a surrogate.
The cancer slope value for PCBs is based on the toxicity value for total PCBs.
Toxicity criteria for 3-nitroaniline are based on 4-nitroaniline as a surrogate.
Toxicity criteria for acenaphthylene are based on acenaphthene as a surrogate.
Toxicity criteria for alpha-chlordane are based on chlordane as a surrogate.
Toxicity criteria for benzo[g,h,i]perylene are based on pyrene as a surrogate.
Toxicity criteria for delta-HCH are based on technical HCH as a surrogate.
Toxicity criteria for dichlorobenzenes (total) are based on 1,4-dichlorobenzene as a surrogate.
Toxicity criteria for dimethyl phthalate are based on diethyl phthalate as a surrogate.
Toxicity criteria for endosulfan I are based on endosulfan as a surrogate.
Toxicity criteria for endosulfan II are based on endosulfan as a surrogate.
Toxicity criteria for endosulfan sulfate are based on endosulfan as a surrogate.
Toxicity criteria for endrin aldehyde are based on endrin as a surrogate.
Toxicity criteria for endrin ketone are based on endrin as a surrogate.
Toxicity criteria for gamma-chlordane are based on chlordane as a surrogate.
Toxicity criteria for *m,p* -xylenes are based on xylenes as a surrogate.
Toxicity criteria for phenanthrene are based on anthracene as a surrogate.

RBSL for Surface Water via Incidental Ingestion - Carcinogens (µg/L) = [TR x 365 (day/yr) x LT (yr) x 1,000 (µg/mg)] / [IFW_{adjkc} (L/Kg) x CSF_o (mg/kg-day)$^{-1}$ x ADAF]

where IFW_{adjkc} (L/kg) = {[EV_{swockc} (events/day) x ED_{ockc} (yr) x EF_{ockc} (days/yr) x ET_{swockc} (hrs/event) x IRW_{ock} (L/hr)] / BW_{ock} (kg)} +
{[EV_{swakc} (events/day) x [ED_{akc} (yr) - ED_{ockc} (yr)] x EF_{akc} (days/yr) x ET_{swakc} (hrs/event) x IRW_{ak} (L/hr)] / BW_{ak} (kg)}

See Table 3 for ADAF values.

RBSL for Surface Water via Incidental Ingestion - Carcinogen vinyl chloride (µg/L) = TR / {([CSF_o (mg/kg-day)$^{-1}$ x IFW_{adjkc} (L/Kg) x 1/1,000 (mg/µg)] / [365 (day/yr) x LT (yr)]) + ([CSF_o (mg/kg-day)-1 x IRW_{ock} (L/hr) x EV_{swockc} (events/day) x ET_{swockc} (hrs/event) x 1/1,000 (mg/µg)] / BW_{ock} (kg)])}

where IFW_{adjkc} (L/kg) = {[EV_{swockc} (events/day) x ED_{ockc} (yr) x EF_{ockc} (days/yr) x ET_{swockc} (hrs/event) x IRW_{ock} (L/hr)] / BW_{ock} (kg)} +
{[EV_{swakc} (events/day) x [ED_{akc} (yr) - ED_{ockc} (yr)] x EF_{akc} (days/yr) x ET_{swakc} (hrs/event) x IRW_{ak} (L/hr)] / BW_{ak} (kg)}

RBSL for Surface Water via incidental Ingestion - Carcinogen trichloroethene (µg/L) = [TR x 365 (day/yr) x LT (yr) x 1,000 (µg/mg)] / {CSF_o (mg/kg-day)$^{-1}$ x ([CAF_o x IFW_{adjkc} (L/kg)] + [MAF_o x IFW_{adjkc} (L/kg) x ADAF])}

Table 9. Site-Specific Surface Water RBSLs Calculated for Kayaker/Canoer—Current Use

Chemical	CAS Number	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	Adult + Older Child RBSLs for Target Risk = 1E-7 (µg/L)	Adult RBSLs for HQ = 0.01 (µg/L)	Older Child RBSLs for HQ = 0.01 (µg/L)	Kayaker/Canoer Surface Water RBSL Current Use (µg/L)
				Ingestion	Ingestion	Ingestion	

where IFW_{adjkc} (L/kg) = {[EV_{swockc} (events/day) x ED_{ockc} (yr) x EF_{ockc} (days/yr) x ET_{swockc} (hrs/event) x IRW_{ock} (L/hr)] / BW_{ock} (kg)} +
{[EV_{swakc} (events/day) x [ED_{akc} (yr) - ED_{ockc} (yr)] x EF_{akc} (days/yr) x ET_{swakc} (hrs/event) x IRW_{ak} (L/hr)] / BW_{ak} (kg)}

CAF_o = 0.804

MAF_o = 0.202

RBSL for Surface Water via Incidental Ingestion - Adult, Noncancer (µg/L) =
[HQ x 365 (day/yr) x ED_{akc} (yr) x BW_{ak} (kg) x 1,000 (µg/mg)] / [EF_{akc} (day/yr) x ED_{akc} (yr) x IRW_{ak} (L/hr) x EV_{swakc} (events/day) x ET_{swakc} (hours/event) x 1/RfD_o (mg/kg-day)]

RBSL for Surface Water via Incidental Ingestion - Older Child, Noncancer (µg/L) =
[HQ x 365 (day/yr) x ED_{ockc} (yr) x BW_{ock} (kg) x 1,000 (µg/mg)] / [EF_{ockc} (day/yr) x ED_{ockc} (yr) x IRW_{ock} (L/hr) x EV_{swockc} (events/day) x ET_{swockc} (hours/event) x 1/RfD_o (mg/kg-day)]

Table 10. Site-Specific Surface Water RBSLs Calculated for Kayaker/Canoer—Future Use

Chemical [a]	CAS Number	Chemical Name	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	Adult + Older Child RBSLs for Target Risk = 1E-7 (µg/L)	Adult RBSLs for HQ = 0.01 (µg/L)	Older Child RBSLs for HQ = 0.01 (µg/L)	Kayaker/Canoer Surface Water RBSL Future Use (µg/L)
					Ingestion	Ingestion	Ingestion	
Metals								
Aluminum	7429905	Aluminum	--	1.0	NA	6.0E+05	3.7E+05	3.7E+05
Antimony	7440360	Antimony	--	0.00040	NA	2.4E+02	1.5E+02	1.5E+02
Arsenic	7440382	Arsenic	1.5	0.00030	1.0E+01	1.8E+02	1.1E+02	1.0E+01
Barium	7440393	Barium	--	0.20	NA	1.2E+05	7.3E+04	7.3E+04
Beryllium	7440417	Beryllium	--	0.0020	NA	1.2E+03	7.3E+02	7.3E+02
Cadmium	7440439	Cadmium	--	0.0010	NA	6.0E+02	3.7E+02	3.7E+02
Chromium (total)	7440473	Chromium	--	1.5	NA	9.0E+05	5.5E+05	5.5E+05
Cobalt	7440484	Cobalt	--	0.00030	NA	1.8E+02	1.1E+02	1.1E+02
Copper	7440508	Copper	--	0.040	NA	2.4E+04	1.5E+04	1.5E+04
Iron	7439896	Iron	--	0.70	NA	4.2E+05	2.6E+05	2.6E+05
Lead [a]	7439921	Lead	--	--	--	--	--	--
Manganese	7439965	Manganese	--	0.14	NA	8.4E+04	5.1E+04	5.1E+04
Mercury	7439976	Mercury	--	0.00030	NA	1.8E+02	1.1E+02	1.1E+02
Nickel	7440020	Nickel	--	0.020	NA	1.2E+04	7.3E+03	7.3E+03
Selenium	7782492	Selenium	--	0.0050	NA	3.0E+03	1.8E+03	1.8E+03
Silver	7440224	Silver	--	0.0050	NA	3.0E+03	1.8E+03	1.8E+03
Thallium	7440280	Thallium	--	0.000010	NA	6.0E+00	3.7E+00	3.7E+00
Vanadium	7440622	Vanadium	--	0.0050	NA	3.0E+03	1.8E+03	1.8E+03
Zinc	7440666	Zinc	--	0.30	NA	1.8E+05	1.1E+05	1.1E+05
Organometals								
Methyl mercury	22967926	MethMerc	--	0.00010	NA	6.0E+01	3.7E+01	3.7E+01
PAHs								
Acenaphthene	83329	Acenaphthene	--	0.060	NA	3.6E+04	2.2E+04	2.2E+04
Acenaphthylene	208968	Acenaphthylene	--	0.060	NA	3.6E+04	2.2E+04	2.2E+04
Anthracene	120127	Anthracene	--	0.30	NA	1.8E+05	1.1E+05	1.1E+05
Benz[a]anthracene	56553	BzAAnthracene	0.73	--	1.2E+01	NA	NA	1.2E+01
Benzo[a]pyrene	50328	BzAPyrene	7.3	--	1.2E+00	NA	NA	1.2E+00
Benzo[b]fluoranthene	205992	BzBFluoranthene	0.73	--	1.2E+01	NA	NA	1.2E+01
Benzo[g,h,i]perylene	191242	BzGhiPerylene	--	0.030	NA	1.8E+04	1.1E+04	1.1E+04
Benzo[k]fluoranthene	207089	BzKFluoranthene	0.073	--	1.2E+02	NA	NA	1.2E+02
Chrysene	218019	Chrysene	0.0073	--	1.2E+03	NA	NA	1.2E+03
Dibenz[a,h]anthracene	53703	DiBzAhAnthracene	7.3	--	1.2E+00	NA	NA	1.2E+00
Dibenzofuran	132649	Dibenzofuran	--	0.0010	NA	6.0E+02	3.7E+02	3.7E+02
Fluoranthene	206440	Fluoranthene	--	0.040	NA	2.4E+04	1.5E+04	1.5E+04
Fluorene	86737	Fluorene	--	0.040	NA	2.4E+04	1.5E+04	1.5E+04
Indeno[1,2,3-cd]pyrene	193395	Ind123CdPyrene	0.73	--	1.2E+01	NA	NA	1.2E+01

Table 10. Site-Specific Surface Water RBSLs Calculated for Kayaker/Canoer—Future Use

Chemical [a]	CAS Number	Chemical Name	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	Adult + Older Child RBSLs for Target Risk = 1E-7 (µg/L)	Adult RBSLs for HQ = 0.01 (µg/L)	Older Child RBSLs for HQ = 0.01 (µg/L)	Kayaker/Canoer Surface Water RBSL Future Use (µg/L)
					Ingestion	Ingestion	Ingestion	
2-methylnaphthalene	91576	2MeNaphthalene	--	0.0040	NA	2.4E+03	1.5E+03	1.5E+03
Naphthalene	91203	Naphthalene	--	0.02	NA	1.2E+04	7.3E+03	7.3E+03
Phenanthrene	85018	Phenanthrene	--	0.30	NA	1.8E+05	1.1E+05	1.1E+05
Pyrene	129000	Pyrene	--	0.030	NA	1.8E+04	1.1E+04	1.1E+04
Pesticides								
Aldrin	309002	Aldrin	17	0.000030	8.9E-01	1.8E+01	1.1E+01	8.9E-01
Carbazole	86748	Carbazole	0.020	--	7.6E+02	NA	NA	7.6E+02
alpha-Chlordane	5103719	alphaChlordane	0.35	0.00050	4.3E+01	3.0E+02	1.8E+02	4.3E+01
gamma-Chlordane	5566347	gammaChlordane	0.35	0.00050	4.3E+01	3.0E+02	1.8E+02	4.3E+01
4,4'-DDD	72548	44DDD	0.24	--	6.3E+01	NA	NA	6.3E+01
4,4'-DDE	72559	44DDE	0.34	--	4.5E+01	NA	NA	4.5E+01
4,4'-DDT	50293	44DDT	0.34	0.00050	4.5E+01	3.0E+02	1.8E+02	4.5E+01
Dieldrin	60571	Dieldrin	16	0.000050	9.5E-01	3.0E+01	1.8E+01	9.5E-01
Endosulfan I	959988	Endosulfan_I	--	0.0060	NA	3.6E+03	2.2E+03	2.2E+03
Endosulfan II	33213659	Endosulfan_II	--	0.0060	NA	3.6E+03	2.2E+03	2.2E+03
Endosulfan sulfate	1031078	EndosulfanSulf	--	0.0060	NA	3.6E+03	2.2E+03	2.2E+03
Endrin	72208	Endrin	--	0.00030	NA	1.8E+02	1.1E+02	1.1E+02
Endrin aldehyde	7421934	Endrin aldehyde	--	0.00030	NA	1.8E+02	1.1E+02	1.1E+02
Endrin ketone	53494705	Endrin ketone	--	0.00030	NA	1.8E+02	1.1E+02	1.1E+02
Heptachlor	76448	Heptachlor	4.5	0.00050	3.4E+00	3.0E+02	1.8E+02	3.4E+00
Heptachlor epoxide	1024573	HeptachorEpox	9.1	0.000013	1.7E+00	7.8E+00	4.7E+00	1.7E+00
alpha-HCH	319846	alphaBHC	6.3	0.0080	2.4E+00	4.8E+03	2.9E+03	2.4E+00
beta-HCH	319857	betaBHC	1.8	--	8.4E+00	NA	NA	8.4E+00
delta-HCH	319868	deltaBHC	1.8	--	8.4E+00	NA	NA	8.4E+00
gamma-HCH (Lindane)	58899	gammaBHC	1.1	0.00030	1.4E+01	1.8E+02	1.1E+02	1.4E+01
Methoxychlor	72435	Methoxychlor	--	0.0050	NA	3.0E+03	1.8E+03	1.8E+03
Semivolatiles								
Acetophenone	98862	Acetophenone	--	0.1000	NA	6.0E+04	3.7E+04	3.7E+04
Benzaldehyde	100527	Benzaldehyde	--	0.1000	NA	6.0E+04	3.7E+04	3.7E+04
1,1'-biphenyl	92524	11Biphenyl	0.008	0.50	1.9E+03	3.0E+05	1.8E+05	1.9E+03
Butyl benzyl phthalate	85687	ButBzPhthalate	0.0019	0.20	8.0E+03	1.2E+05	7.3E+04	8.0E+03
Caprolactam	105602	Caprolactam	--	0.500000	NA	3.0E+05	1.8E+05	1.8E+05
2-chlorophenol	95578	2ClPhenol	--	0.005	NA	3.0E+03	1.8E+03	1.8E+03
2,4-dichlorophenol	120832	24DiClPhenol	--	0.003	NA	1.8E+03	1.1E+03	1.1E+03
2,4-dimethylphenol	105679	24DiMePhenol	--	0.02	NA	1.2E+04	7.3E+03	7.3E+03
2,4-dinitrophenol	51285	24DiNiPhenol	--	0.00	NA	1.2E+03	7.3E+02	7.3E+02
2,6-dinitrotoluene	606202	26DiNiToluene	1.5	0.00	1.0E+01	1.8E+02	1.1E+02	1.0E+01

Table 10. Site-Specific Surface Water RBSLs Calculated for Kayaker/Canoer—Future Use

Chemical [a]	CAS Number	Chemical Name	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	Adult + Older Child RBSLs for Target Risk = 1E-7 (µg/L)	Adult RBSLs for HQ = 0.01 (µg/L)	Older Child RBSLs for HQ = 0.01 (µg/L)	Kayaker/Canoer Surface Water RBSL Future Use (µg/L)
					Ingestion	Ingestion	Ingestion	
Hexachlorobenzene	118741	HxClBenzene	1.6	0.00	9.5E+00	4.8E+02	2.9E+02	9.5E+00
Isophorone	78591	Isophorone	0.00095	0.20	1.6E+04	1.2E+05	7.3E+04	1.6E+04
2-methylphenol	95487	2MePhenol	--	0.050	NA	3.0E+04	1.8E+04	1.8E+04
4-methylphenol	106445	4MePhenol	--	0.10	NA	6.0E+04	3.7E+04	3.7E+04
4-chloro-3-methylphenol	59507	4Cl3MePhenol	--	0.1000	NA	6.0E+04	3.7E+04	3.7E+04
4,6-dinitro-2-methylphenol	534521	46DiNi2MePhenol	--	0.00008	NA	4.8E+01	2.9E+01	2.9E+01
3-nitroaniline	99092	3NiAniline	0.02	0.0040	7.6E+02	2.4E+03	1.5E+03	7.6E+02
4-nitroaniline	100016	4NiAniline	0.02	0.004	7.6E+02	2.4E+03	1.5E+03	7.6E+02
N-nitrosodiphenylamine	86306	NNitDiPhenAmine	0.0049	--	3.1E+03	NA	NA	3.1E+03
Pentachlorophenol	87865	PenClPhenol	0.4	0.00500	3.8E+01	3.0E+03	1.8E+03	3.8E+01
Phenol	108952	Phenol	--	0.3000	NA	1.8E+05	1.1E+05	1.1E+05
bis(2-ethylhexyl)phthalate	117817	bs2EtHxPhthalate	0.014	0.02	1.1E+03	1.2E+04	7.3E+03	1.1E+03
Diethyl phthalate	84662	DiEtPhthalate	--	0.80	NA	4.8E+05	2.9E+05	2.9E+05
Dimethyl phthalate	131113	DiMePhthalate	--	0.8000	NA	4.8E+05	2.9E+05	2.9E+05
Di-n-butyl phthalate	84742	DiNButPhthalate	--	0.10	NA	6.0E+04	3.7E+04	3.7E+04
Di-n-octylphthalate	117840	DiNOctPhthalate	--	0.01	NA	6.0E+03	3.7E+03	3.7E+03
2,4,6-trichlorophenol	88062	246TriClPhenol	0.011	0.00	1.4E+03	6.0E+02	3.7E+02	3.7E+02
PCBs								
PCBs (total Aroclors)	(blank)	TotPCB485460NDx	2.0	0.000020	7.6E+00	1.2E+01	7.3E+00	7.3E+00
Volatiles								
Acetone	67641	Acetone	--	0.90	NA	5.4E+05	3.3E+05	3.3E+05
Benzene	71432	Benzene	0.055	0.0040	2.8E+02	2.4E+03	1.5E+03	2.8E+02
bis(2-chloroethyl)ether	111444	bs2ClEtOxEther	1.1	--	1.4E+01	NA	NA	1.4E+01
Bromodichloromethane	75274	BrDiClMeth	0.062	0.020	2.4E+02	1.2E+04	7.3E+03	2.4E+02
2-butanone	78933	MEK	--	0.60	NA	3.6E+05	2.2E+05	2.2E+05
Carbon disulfide	75150	Carbon Disulfide	--	0.10	NA	6.0E+04	3.7E+04	3.7E+04
Chlorobenzene	108907	ClBenzene	--	0.020	NA	1.2E+04	7.3E+03	7.3E+03
Chloroethane	75003	ClEthane	--	0.10	NA	6.0E+04	3.7E+04	3.7E+04
Chloroform	67663	Chloroform	0.031	0.010	4.9E+02	6.0E+03	3.7E+03	4.9E+02
Chloromethane	74873	ClMeth	0.013	--	1.2E+03	NA	NA	1.2E+03
1,2-dichlorobenzene	95501	12DiClBenzene	--	0.090	NA	5.4E+04	3.3E+04	3.3E+04
1,3-dichlorobenzene	541731	13DiClBenzene	--	0.020	NA	1.2E+04	7.3E+03	7.3E+03
1,4-dichlorobenzene	106467	14DiClBenzene	0.0054	0.070	2.8E+03	4.2E+04	2.6E+04	2.8E+03
1,1-dichloroethane	75343	11DiClEth	0.0057	0.20	2.7E+03	1.2E+05	7.3E+04	2.7E+03
1,2-dichloroethane	107062	12DiClEth	0.091	0.0060	1.7E+02	3.6E+03	2.2E+03	1.7E+02
1,1-dichloroethene	75354	11DiClEthe	--	0.050	NA	3.0E+04	1.8E+04	1.8E+04
cis -1,2-dichloroethene	156592	cis12DiClEthe	--	0.0020	NA	1.2E+03	7.3E+02	7.3E+02

Table 10. Site-Specific Surface Water RBSLs Calculated for Kayaker/Canoer—Future Use

Chemical [a]	CAS Number	Chemical Name	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	Adult + Older Child RBSLs for Target Risk = 1E-7 (µg/L)	Adult RBSLs for HQ = 0.01 (µg/L)	Older Child RBSLs for HQ = 0.01 (µg/L)	Kayaker/Canoer Surface Water RBSL Future Use (µg/L)
					Ingestion	Ingestion	Ingestion	
trans -1,2-dichloroethene	156605	trans12DiClEthe	--	0.020	NA	1.2E+04	7.3E+03	7.3E+03
Ethylbenzene	100414	Ethylbenzene	0.011	0.10	1.4E+03	6.0E+04	3.7E+04	1.4E+03
4-methyl-2-pentanone	108101	4Meth2Pentanone	--	0.080	NA	4.8E+04	2.9E+04	2.9E+04
Methylene chloride	75092	MethyleneCl	0.002	0.0060	4.3E+03	3.6E+03	2.2E+03	2.2E+03
Tetrachloroethene	127184	TetrClEth	0.0021	0.0060	7.2E+03	3.6E+03	2.2E+03	2.2E+03
Toluene	108883	Toluene	--	0.080	NA	4.8E+04	2.9E+04	2.9E+04
1,2,3-trichlorobenzene	87616	123TriClBenz	--	0.00080	NA	4.8E+02	2.9E+02	2.9E+02
1,2,4-trichlorobenzene	120821	124TriClBenzene	0.029	0.010	5.2E+02	6.0E+03	3.7E+03	5.2E+02
1,1,1-trichloroethane	71556	111TriClEth	--	2.0	NA	1.2E+06	7.3E+05	7.3E+05
Trichloroethene	79016	TriClEthene	0.046	0.00050	2.8E+02	3.0E+02	1.8E+02	1.8E+02
Vinyl chloride	75014	VinylCl	0.72	0.0030	5.3E-01	1.8E+03	1.1E+03	5.3E-01
m,p -xylenes	13302070	mpXylenes	--	0.20	NA	1.2E+05	7.3E+04	7.3E+04
o -xylene	95476	o-Xylene	--	0.20	NA	1.2E+05	7.3E+04	7.3E+04
Xylenes	1330207	Xylenes	--	0.20	NA	1.2E+05	7.3E+04	7.3E+04

Notes:

CAS = chemical abstract service
CSF = cancer slope factor
HCH = hexachlorocyclohexane
HQ = hazard quotient
NA = not calculated due to missing toxicity data or exposure pathway not relevant
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RBSL = risk-based screening level
RfD = reference dose
-- = no data available

[a] Lead screening value based on U.S. Environmental Protection Agency (EPA) regional screening level for tapwater.
1,3-dichlorobenzene RfD value is based on the Agency for Toxic Substances and Disease Registry subchronic minimal risk level.
Carbazole oral CSF is based on the health effects assessment summary tables (HEAST) value.
Chloroethane RfD value is based on the provisional peer reviewed toxicity value (PPRTV) subchronic RfD.
Chloromethane CSF is based on the HEAST value.
Chromium values are based on toxicity criterion for chromium (III) as a surrogate.
Mercury values are based on toxicity criterion for mercuric chloride as a surrogate.
The cancer slope value for PCBs is based on the toxicity value for total PCBs.
Toxicity criteria for 3-nitroaniline are based on 4-nitroaniline as a surrogate.
Toxicity criteria for acenaphthylene are based on acenaphthene as a surrogate.
Toxicity criteria for alpha-chlordane are based on chlordane as a surrogate.
Toxicity criteria for benzo[g,h,i]perylene are based on pyrene as a surrogate.
Toxicity criteria for delta-HCH are based on technical HCH as a surrogate.
Toxicity criteria for dichlorobenzenes (total) are based on 1,4-dichlorobenzene as a surrogate.
Toxicity criteria for dimethyl phthalate are based on diethyl phthalate as a surrogate.
Toxicity criteria for endosulfan I are based on endosulfan as a surrogate.
Toxicity criteria for endosulfan II are based on endosulfan as a surrogate.

Table 10. Site-Specific Surface Water RBSLs Calculated for Kayaker/Canoer—Future Use

Chemical [a]	CAS Number	Chemical Name	Ingestion CSF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	Adult + Older Child RBSLs for Target Risk = 1E-7 (µg/L)	Adult RBSLs for HQ = 0.01 (µg/L)	Older Child RBSLs for HQ = 0.01 (µg/L)	Kayaker/Canoer Surface Water RBSL Future Use (µg/L)
					Ingestion	Ingestion	Ingestion	

Toxicity criteria for endosulfan sulfate are based on endosulfan as a surrogate.
Toxicity criteria for endrin aldehyde are based on endrin as a surrogate.
Toxicity criteria for endrin ketone are based on endrin as a surrogate.
Toxicity criteria for gamma-chlordane are based on chlordane as a surrogate.
Toxicity criteria for *m,p* -xylenes are based on xylenes as a surrogate.
Toxicity criteria for phenanthrene are based on anthracene as a surrogate.

RBSL for Surface Water via Incidental Ingestion - Carcinogens (µg/L) = [TR x 365 (day/yr) x LT (yr) x 1,000 (µg/mg)] / [IFW_{adjkf} (L/Kg) x CSF_o (mg/kg-day)$^{-1}$ x ADAF]

where IFW_{adjkf} (L/kg) = {[EV_{swockf} (events/day) x ED_{ockf} (yr) x EF_{ockf} (days/yr) x ET_{swockf} (hrs/event) x IRW_{ock} (L/hr)] / BW_{ock} (kg)} +
{[EV_{swakf} (events/day) x ED_{akf} (yr) x EF_{akf} (days/yr) x ET_{swakf} (hrs/event) x IRW_{ak} (L/hr)] / BW_{ak} (kg)}

See Table 3 for ADAF values.

RBSL for Surface Water via Incidental Ingestion - Carcinogen vinyl chloride (µg/L) = TR / {([CSF_o (mg/kg-day)$^{-1}$ x IFW_{adjkf} (L/Kg) x 1/1,000 (mg/µg)] / [365 (day/yr) x LT (yr)]) + ([CSF_o (mg/kg-day)$^{-1}$ x IRW_{ock} (L/hr) x EV_{swockf} (events/day) x ET_{swockf} (hrs/event) x 1/1,000 (mg/µg)] / BW_{ock} (kg)])}

where IFW_{adjkf} (L/kg) = {[EV_{swockf} (events/day) x ED_{ockf} (yr) x EF_{ockf} (days/yr) x ET_{swockf} (hrs/event) x IRW_{ock} (L/hr)] / BW_{ock} (kg)} +
{[EV_{swakf} (events/day) x ED_{akf} (yr) x EF_{akf} (days/yr) x ET_{swakf} (hrs/event) x IRW_{ak} (L/hr)] / BW_{ak} (kg)}

RBSL for Surface Water via incidental Ingestion - Carcinogen trichloroethene (µg/L) = [TR x 365 (day/yr) x LT (yr) x 1,000 (µg/mg)] / {CSF_o (mg/kg-day)$^{-1}$ x ([CAF_o x IFW_{adjkf} (L/kg)] + [MAF_o x IFW_{adjkf} (L/kg) x ADAF])}

where IFW_{adjkf} (L/kg) = {[EV_{swockf} (events/day) x ED_{ockf} (yr) x EF_{ockf} (days/yr) x ET_{swockf} (hrs/event) x IRW_{ock} (L/hr)] / BW_{ock} (kg)} +
{[EV_{swakf} (events/day) x ED_{akf} (yr) x EF_{akf} (days/yr) x ET_{swakf} (hrs/event) x IRW_{ak} (L/hr)] / BW_{ak} (kg)}

CAF_o = 0.804

MAF_o = 0.202

RBSL for Surface Water via Incidental Ingestion - Adult, Noncancer (µg/L) =
[HQ x 365 (day/yr) x ED_{akf} (yr) x BW_{ak} (kg) x 1,000 (µg/mg)] / [EF_{akf} (day/yr) x ED_{akf} (yr) x IRW_{ak} (L/hr) x EV_{swakf} (events/day) x ET_{swakf} (hours/event) x 1/RfD_o (mg/kg-day)]

RBSL for Surface Water via Incidental Ingestion - Older Child, Noncancer (µg/L) =
[HQ x 365 (day/yr) x ED_{ockf} (yr) x BW_{ock} (kg) x 1,000 (µg/mg)] / [EF_{ockf} (day/yr) x ED_{ockf} (yr) x IRW_{ock} (L/hr) x EV_{swockf} (events/day) x ET_{swockf} (hours/event) x 1/RfD_o (mg/kg-day)]

Table 11. Summary of Sediment RBSLs for All Receptor Groups and Values Selected for COPC Screening

Chemical	Angler/Crabber Exposed to Sediment (mg/kg)	Kayaker Exposed to Sediment Current Use (mg/kg)	Kayaker Exposed to Sediment Future Use (mg/kg)	Construction Worker Exposed to Sediment for COPC Selection (mg/kg)	Minimum Sediment Recreational Only RBSL for COPC Selection (mg/kg)
Metals					
Aluminum	6.6E+04	9.9E+04	4.6E+04	2.2E+04	4.6E+04
Antimony	2.6E+01	4.0E+01	1.8E+01	8.8E+00	1.8E+01
Arsenic	1.2E+00	2.2E+00	1.0E+00	6.1E+00	1.0E+00
Barium	1.3E+04	2.0E+04	9.1E+03	4.4E+03	9.1E+03
Beryllium	1.3E+02	2.0E+02	9.1E+01	4.4E+01	9.1E+01
Cadmium	5.3E+01	7.9E+01	3.7E+01	2.0E+01	3.7E+01
Chromium (VI)	2.5E+00	4.6E+00	2.1E+00	3.1E+01	2.1E+00
Chromium (total)	9.9E+04	1.5E+05	6.9E+04	3.3E+04	6.9E+04
Cobalt	2.0E+01	3.0E+01	1.4E+01	6.6E+00	1.4E+01
Copper	2.6E+03	4.0E+03	1.8E+03	8.8E+02	1.8E+03
Iron	4.6E+04	6.9E+04	3.2E+04	1.5E+04	3.2E+04
Lead	1.9E+03	1.9E+03	1.9E+03	8.0E+02	1.9E+03
Manganese	9.2E+03	1.4E+04	6.4E+03	3.1E+03	6.4E+03
Mercury	2.0E+01	3.0E+01	1.4E+01	6.6E+00	1.4E+01
Nickel	1.3E+03	2.0E+03	9.1E+02	4.4E+02	9.1E+02
Selenium	3.3E+02	4.9E+02	2.3E+02	1.1E+02	2.3E+02
Silver	3.3E+02	4.9E+02	2.3E+02	1.1E+02	2.3E+02
Thallium	6.6E-01	9.9E-01	4.6E-01	2.2E-01	4.6E-01
Vanadium	3.3E+02	4.9E+02	2.3E+02	1.1E+02	2.3E+02
Zinc	2.0E+04	3.0E+04	1.4E+04	6.6E+03	1.4E+04
Organometals					
Methyl mercury	6.6E+00	9.9E+00	4.6E+00	2.2E+00	4.6E+00
PAHs					
Acenaphthene	2.2E+03	3.3E+03	1.5E+03	9.4E+02	1.5E+03
Acenaphthylene	2.2E+03	3.3E+03	1.5E+03	9.4E+02	1.5E+03
Anthracene	1.1E+04	1.6E+04	7.6E+03	4.7E+03	7.6E+03
Benz[a]anthracene	7.8E-01	1.5E+00	6.9E-01	1.5E+01	6.9E-01
Benzo[a]pyrene	7.8E-02	1.5E-01	6.9E-02	1.5E+00	6.9E-02
Benzo[b]fluoranthene	7.8E-01	1.5E+00	6.9E-01	1.5E+01	6.9E-01
Benzo[g,h,i]perylene	1.1E+03	1.6E+03	7.6E+02	4.7E+02	7.6E+02
Benzo[k]fluoranthene	7.8E+00	1.5E+01	6.9E+00	1.5E+02	6.9E+00
Chrysene	7.8E+01	1.5E+02	6.9E+01	1.5E+03	6.9E+01
Dibenz[a,h]anthracene	7.8E-02	1.5E-01	6.9E-02	1.5E+00	6.9E-02
Dibenzofuran	5.6E+01	8.3E+01	3.8E+01	2.0E+01	3.8E+01
Fluoranthene	1.5E+03	2.2E+03	1.0E+03	6.3E+02	1.0E+03
Fluorene	1.5E+03	2.2E+03	1.0E+03	6.3E+02	1.0E+03
Indeno[1,2,3-cd]pyrene	7.8E-01	1.5E+00	6.9E-01	1.5E+01	6.9E-01
2-methylnaphthalene	1.5E+02	2.2E+02	1.0E+02	6.3E+01	1.0E+02
Naphthalene	7.3E+02	1.1E+03	5.1E+02	3.1E+02	5.1E+02
Phenanthrene	1.1E+04	1.6E+04	7.6E+03	4.7E+03	7.6E+03
Pyrene	1.1E+03	1.6E+03	7.6E+02	4.7E+02	7.6E+02
Pesticides					
Aldrin	1.3E-01	2.4E-01	1.1E-01	6.6E-01	1.1E-01
Carbazole	1.1E+02	2.1E+02	9.5E+01	7.7E+02	9.5E+01
alpha-Chlordane	4.6E+00	8.7E+00	4.0E+00	9.8E+00	4.0E+00
gamma-Chlordane	4.6E+00	8.7E+00	4.0E+00	9.8E+00	4.0E+00
4,4'-DDD	4.8E+00	9.2E+00	4.3E+00	4.9E+01	4.3E+00
4,4'-DDE	6.6E+00	1.2E+01	5.6E+00	4.6E+01	5.6E+00
4,4'-DDT	5.1E+00	9.6E+00	4.4E+00	1.0E+01	4.4E+00
Dieldrin	7.2E-02	1.4E-01	6.4E-02	7.4E-01	6.4E-02

Table 11. Summary of Sediment RBSLs for All Receptor Groups and Values Selected for COPC Screening

Chemical	Angler/Crabber Exposed to Sediment (mg/kg)	Kayaker Exposed to Sediment Current Use (mg/kg)	Kayaker Exposed to Sediment Future Use (mg/kg)	Construction Worker Exposed to Sediment for COPC Selection (mg/kg)	Minimum Sediment Recreational Only RBSL for COPC Selection (mg/kg)
Endosulfan I	4.0E+02	5.9E+02	2.7E+02	1.3E+02	2.7E+02
Endosulfan II	4.0E+02	5.9E+02	2.7E+02	1.3E+02	2.7E+02
Endosulfan sulfate	4.0E+02	5.9E+02	2.7E+02	1.3E+02	2.7E+02
Endrin	1.2E+01	1.8E+01	8.4E+00	5.0E+00	8.4E+00
Endrin aldehyde	1.2E+01	1.8E+01	8.4E+00	5.0E+00	8.4E+00
Endrin ketone	1.2E+01	1.8E+01	8.4E+00	5.0E+00	8.4E+00
Heptachlor	5.0E-01	9.1E-01	4.2E-01	3.4E+00	4.2E-01
Heptachlor epoxide	2.5E-01	4.5E-01	2.1E-01	2.9E-01	2.1E-01
alpha-HCH	1.8E-01	3.5E-01	1.6E-01	1.9E+00	1.6E-01
beta-HCH	6.4E-01	1.2E+00	5.7E-01	6.5E+00	5.7E-01
delta-HCH	6.4E-01	1.2E+00	5.7E-01	6.5E+00	5.7E-01
gamma-HCH (Lindane)	1.5E+00	2.8E+00	1.3E+00	5.9E+00	1.3E+00
Methoxychlor	2.0E+02	3.1E+02	1.4E+02	8.4E+01	1.4E+02
Semivolatiles					
Acetophenone	6.6E+03	9.9E+03	4.6E+03	2.2E+03	4.6E+03
Benzaldehyde	6.6E+03	9.9E+03	4.6E+03	2.2E+03	4.6E+03
1,1'-biphenyl	2.8E+02	5.1E+02	2.4E+02	1.9E+03	2.4E+02
Butyl benzyl phthalate	6.0E+02	1.2E+03	5.4E+02	3.4E+03	5.4E+02
Caprolactam	2.0E+04	3.1E+04	1.4E+04	8.4E+03	1.4E+04
4-chloroaniline	5.7E+00	1.1E+01	5.1E+00	5.9E+01	5.1E+00
3,3'-dichlorobenzidine	2.6E+00	4.9E+00	2.3E+00	2.6E+01	2.3E+00
2,4-dimethylphenol	8.1E+02	1.2E+03	5.6E+02	3.4E+02	5.6E+02
2,4-dinitrotoluene	3.7E+00	7.1E+00	3.3E+00	3.3E+01	3.3E+00
2,6-dinitrotoluene	7.7E-01	1.5E+00	6.8E-01	5.1E+00	6.8E-01
Hexachlorobenzene	1.4E+00	2.6E+00	1.2E+00	9.7E+00	1.2E+00
Isophorone	1.2E+03	2.3E+03	1.1E+03	3.4E+03	1.1E+03
2-methylphenol	2.0E+03	3.1E+03	1.4E+03	8.4E+02	1.4E+03
4-methylphenol	4.1E+03	6.1E+03	2.8E+03	1.7E+03	2.8E+03
2-nitroaniline	4.1E+02	6.1E+02	2.8E+02	1.7E+02	2.8E+02
3-nitroaniline	5.7E+01	1.1E+02	5.1E+01	6.7E+01	5.1E+01
N -nitrosodiphenylamine	2.3E+02	4.5E+02	2.1E+02	2.4E+03	2.1E+02
Phenol	1.2E+04	1.8E+04	8.4E+03	5.0E+03	8.4E+03
bis(2-ethylhexyl)phthalate	8.2E+01	1.6E+02	7.3E+01	3.4E+02	7.3E+01
Diethyl phthalate	3.3E+04	4.9E+04	2.3E+04	1.3E+04	2.3E+04
Dimethyl phthalate	3.3E+04	4.9E+04	2.3E+04	1.3E+04	2.3E+04
Di-*n* -butyl phthalate	4.1E+03	6.1E+03	2.8E+03	1.7E+03	2.8E+03
Di-*n* -octylphthalate	4.1E+02	6.1E+02	2.8E+02	1.7E+02	2.8E+02
2,4,6-trichlorophenol	4.1E+01	6.1E+01	2.8E+01	1.7E+01	2.8E+01
PCBs					
PCBs (total Aroclors)	4.8E-01	9.3E-01	4.3E-01	3.1E-01	4.3E-01
Volatiles					
Acetone	5.9E+04	8.9E+04	4.1E+04	2.0E+04	4.1E+04
Benzene	4.1E+01	7.5E+01	3.4E+01	8.8E+01	3.4E+01
bis(2-chloroethyl)ether	2.0E+00	3.7E+00	1.7E+00	1.4E+01	1.7E+00
2-butanone	4.0E+04	5.9E+04	2.7E+04	1.3E+04	2.7E+04
Carbon disulfide	6.6E+03	9.9E+03	4.6E+03	2.2E+03	4.6E+03
Chlorobenzene	1.3E+03	2.0E+03	9.1E+02	4.4E+02	9.1E+02
Chloroform	7.3E+01	1.3E+02	6.1E+01	2.2E+02	6.1E+01
Chloromethane	1.7E+02	3.2E+02	1.5E+02	1.2E+03	1.5E+02
1,2-dichlorobenzene	5.9E+03	8.9E+03	4.1E+03	2.0E+03	4.1E+03
1,3-dichlorobenzene	1.3E+03	2.0E+03	9.1E+02	4.4E+02	9.1E+02

Table 11. Summary of Sediment RBSLs for All Receptor Groups and Values Selected for COPC Screening

Chemical	Angler/Crabber Exposed to Sediment (mg/kg)	Kayaker Exposed to Sediment Current Use (mg/kg)	Kayaker Exposed to Sediment Future Use (mg/kg)	Construction Worker Exposed to Sediment for COPC Selection (mg/kg)	Minimum Sediment Recreational Only RBSL for COPC Selection (mg/kg)
1,4-dichlorobenzene	4.2E+02	7.6E+02	3.5E+02	1.5E+03	3.5E+02
Dichlorobenzenes (total)	4.2E+02	7.6E+02	3.5E+02	1.5E+03	3.5E+02
1,1-dichloroethane	3.9E+02	7.2E+02	3.3E+02	2.7E+03	3.3E+02
cis -1,2-dichloroethene	1.3E+02	2.0E+02	9.1E+01	4.4E+01	9.1E+01
trans -1,2-dichloroethene	1.3E+03	2.0E+03	9.1E+02	4.4E+02	9.1E+02
Ethylbenzene	2.0E+02	3.7E+02	1.7E+02	1.4E+03	1.7E+02
2-hexanone	3.3E+02	4.9E+02	2.3E+02	1.1E+02	2.3E+02
Isopropylbenzene	6.6E+03	9.9E+03	4.6E+03	2.2E+03	4.6E+03
Methyl acetate	6.6E+04	9.9E+04	4.6E+04	2.2E+04	4.6E+04
Methylene chloride	4.0E+02	5.9E+02	2.7E+02	1.3E+02	2.7E+02
Styrene	1.3E+04	2.0E+04	9.1E+03	4.4E+03	9.1E+03
Tetrachloroethene	4.0E+02	5.9E+02	2.7E+02	1.3E+02	2.7E+02
Toluene	5.3E+03	7.9E+03	3.7E+03	1.8E+03	3.7E+03
1,2,3-trichlorobenzene	5.3E+01	7.9E+01	3.7E+01	1.8E+01	3.7E+01
1,2,4-trichlorobenzene	7.8E+01	1.4E+02	6.5E+01	2.2E+02	6.5E+01
Trichloroethene	3.3E+01	4.9E+01	2.3E+01	1.1E+01	2.3E+01
Trichlorotrifluoroethane	2.0E+06	3.0E+06	1.4E+06	6.6E+05	1.4E+06
Vinyl chloride	6.6E-02	6.7E-02	6.6E-02	2.2E+01	6.6E-02
m,p -xylenes	1.3E+04	2.0E+04	9.1E+03	4.4E+03	9.1E+03
o -xylene	1.3E+04	2.0E+04	9.1E+03	4.4E+03	9.1E+03
Xylenes	1.3E+04	2.0E+04	9.1E+03	4.4E+03	9.1E+03

Notes:

COPC = chemical of potential concern
HCH = hexachlorocyclohexane
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RBSL = risk-based screening level

1,3-dichlorobenzene RfD value is based on the Agency for Toxic Substances and Disease Registry subchronic minimal risk level.
Carbazole oral CSF is based on the health effects assessment summary tables (HEAST) value.
Chloromethane CSF is based on the HEAST value.
Lead values for recreational receptors were calculated using the Adult Lead Methodology. Value for construction worker based on U.S. Environmental Protection Agency (EPA) regional screening level for industrial soil. See text.
Mercury value based on toxicity criterion for mercuric chloride as surrogate
The cancer slope value for PCBs is based on the toxicity value for total PCBs.
Chromium values are based on toxicity criterion for chromium (III) as a surrogate.
3-nitroaniline are based on toxicity crieria for 4-nitroaniline as a surrogate.
Acenaphthylene are based on toxicity crieria for acenaphthene as a surrogate.
alpha-Chlordane are based on toxicity crieria for chlordane as a surrogate.
Benzo[g,h,i]perylene are based on toxicity crieria for pyrene as a surrogate.
delta-HCH are based on toxicity crieria for technical HCH as a surrogate
Dichlorobenzenes (total) are based on toxicity crieria for 1,4-dichlorobenzene as a surrogate.
Dimethyl phthalate are based on toxicity crieria for diethyl phthalate as a surrogate.
Endosulfan I are based on toxicity crieria for endosulfan as a surrogate.
Endosulfan II are based on toxicity crieria for endosulfan as a surrogate.
Endosulfan sulfate are based on toxicity crieria for endosulfan as a surrogate.
Endrin aldehyde values are based on toxicity crieria for endrin as a surrogate.
Endrin ketone are based on toxicity crieria for endrin as a surrogate.
m,p -xylenes are based on toxicity crieria for xylenes as a surrogate.
gamma-Chlordane are based on toxicity crieria for chlordane as a surrogate.
Phenanthrene are based on toxicity crieria for anthracene as a surrogate.

Table 12. Summary of Fish/Blue Crab Tissue RBSLs for Angler/Crabber and Values Selected for COPC Screening

Chemical	Angler/Crabber Fish/Blue Crab Tissue Ingestion (mg/kg)	Minimum Fish/Crab RBSL for COPC Selection (mg/kg)
Metals		
Antimony	1.1E-01	1.1E-01
Arsenic	7.2E-03	7.2E-03
Barium	5.6E+01	5.6E+01
Chromium (total)	4.2E+02	4.2E+02
Copper	1.1E+01	1.1E+01
Iron	1.9E+02	1.9E+02
Lead	1.5E+00	1.5E+00
Manganese	3.9E+01	3.9E+01
Mercury	8.3E-02	8.3E-02
Nickel	5.6E+00	5.6E+00
Selenium	1.4E+00	1.4E+00
Silver	1.4E+00	1.4E+00
Zinc	8.3E+01	8.3E+01
Organometals		
Dimethylarsinic acid	5.6E+00	5.6E+00
Methyl mercury	2.8E-02	2.8E-02
PAHs		
Acenaphthene	1.7E+01	1.7E+01
Fluorene	1.1E+01	1.1E+01
Naphthalene	5.6E+00	5.6E+00
Phenanthrene	8.3E+01	8.3E+01
PCBs		
PCBs (total Aroclors)	5.4E-03	5.4E-03

Notes:

COPC = chemical of potential concern
HCH = hexachlorocyclohexane
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RBSL = risk-based screening level

Chromium values are based on toxicity criterion for chromium (III) as a surrogate.
Lead value based on historical Food and Drug Administration (FDA) guidance value.
Mercury value based on toxicity criterion for mercuric chloride as surrogate
Phenanthrene are based on toxicity crieria for anthracene as a surrogate.
The cancer slope value for PCBs is based on the toxicity value for total PCBs.

Table 13. Summary of Surface Water RBSLs for All Receptor Groups and Values Selected for COPC Screening

Chemical	Kayaker/Canoer Exposed to Surface Water Current Use (µg/L)	Kayaker/Canoer Exposed to Surface Water Future Use (µg/L)	Minimum Surface Water RBSL for COPC Selection (µg/L)
Metals			
Aluminum	7.9E+05	3.7E+05	3.7E+05
Antimony	3.2E+02	1.5E+02	1.5E+02
Arsenic	2.2E+01	1.0E+01	1.0E+01
Barium	1.6E+05	7.3E+04	7.3E+04
Beryllium	1.6E+03	7.3E+02	7.3E+02
Cadmium	7.9E+02	3.7E+02	3.7E+02
Chromium (total)	1.2E+06	5.5E+05	5.5E+05
Cobalt	2.4E+02	1.1E+02	1.1E+02
Copper	3.2E+04	1.5E+04	1.5E+04
Iron	5.5E+05	2.6E+05	2.6E+05
Lead	1.5E+01	1.5E+01	1.5E+01
Manganese	1.1E+05	5.1E+04	5.1E+04
Mercury	2.4E+02	1.1E+02	1.1E+02
Nickel	1.6E+04	7.3E+03	7.3E+03
Selenium	4.0E+03	1.8E+03	1.8E+03
Silver	4.0E+03	1.8E+03	1.8E+03
Thallium	7.9E+00	3.7E+00	3.7E+00
Vanadium	4.0E+03	1.8E+03	1.8E+03
Zinc	2.4E+05	1.1E+05	1.1E+05
Organometals			
Methyl mercury	7.9E+01	3.7E+01	3.7E+01
PAHs			
Acenaphthene	4.7E+04	2.2E+04	2.2E+04
Acenaphthylene	4.7E+04	2.2E+04	2.2E+04
Anthracene	2.4E+05	1.1E+05	1.1E+05
Benz[a]anthracene	2.5E+01	1.2E+01	1.2E+01
Benzo[a]pyrene	2.5E+00	1.2E+00	1.2E+00
Benzo[b]fluoranthene	2.5E+01	1.2E+01	1.2E+01
Benzo[g,h,i]perylene	2.4E+04	1.1E+04	1.1E+04
Benzo[k]fluoranthene	2.5E+02	1.2E+02	1.2E+02
Chrysene	2.5E+03	1.2E+03	1.2E+03
Dibenz[a,h]anthracene	2.5E+00	1.2E+00	1.2E+00
Dibenzofuran	7.9E+02	3.7E+02	3.7E+02
Fluoranthene	3.2E+04	1.5E+04	1.5E+04
Fluorene	3.2E+04	1.5E+04	1.5E+04
Indeno[1,2,3-cd]pyrene	2.5E+01	1.2E+01	1.2E+01
2-methylnaphthalene	3.2E+03	1.5E+03	1.5E+03
Naphthalene	1.6E+04	7.3E+03	7.3E+03
Phenanthrene	2.4E+05	1.1E+05	1.1E+05
Pyrene	2.4E+04	1.1E+04	1.1E+04
Pesticides			
Aldrin	1.9E+00	8.9E-01	8.9E-01
Carbazole	1.6E+03	7.6E+02	7.6E+02
alpha-Chlordane	9.4E+01	4.3E+01	4.3E+01
gamma-Chlordane	9.4E+01	4.3E+01	4.3E+01
4,4'-DDD	1.4E+02	6.3E+01	6.3E+01
4,4'-DDE	9.7E+01	4.5E+01	4.5E+01

Table 13. Summary of Surface Water RBSLs for All Receptor Groups and Values Selected for COPC Screening

Chemical	Kayaker/Canoer Exposed to Surface Water Current Use (µg/L)	Kayaker/Canoer Exposed to Surface Water Future Use (µg/L)	Minimum Surface Water RBSL for COPC Selection (µg/L)
4,4'-DDT	9.7E+01	4.5E+01	4.5E+01
Dieldrin	2.1E+00	9.5E-01	9.5E-01
Endosulfan I	4.7E+03	2.2E+03	2.2E+03
Endosulfan II	4.7E+03	2.2E+03	2.2E+03
Endosulfan sulfate	4.7E+03	2.2E+03	2.2E+03
Endrin	2.4E+02	1.1E+02	1.1E+02
Endrin aldehyde	2.4E+02	1.1E+02	1.1E+02
Endrin ketone	2.4E+02	1.1E+02	1.1E+02
Heptachlor	7.3E+00	3.4E+00	3.4E+00
Heptachlor epoxide	3.6E+00	1.7E+00	1.7E+00
alpha-HCH	5.2E+00	2.4E+00	2.4E+00
beta-HCH	1.8E+01	8.4E+00	8.4E+00
delta-HCH	1.8E+01	8.4E+00	8.4E+00
gamma-HCH (Lindane)	3.0E+01	1.4E+01	1.4E+01
Methoxychlor	4.0E+03	1.8E+03	1.8E+03
Semivolatiles			
Acetophenone	7.9E+04	3.7E+04	3.7E+04
Benzaldehyde	7.9E+04	3.7E+04	3.7E+04
1,1'-biphenyl	4.1E+03	1.9E+03	1.9E+03
Butyl benzyl phthalate	1.7E+04	8.0E+03	8.0E+03
Caprolactam	4.0E+05	1.8E+05	1.8E+05
2-chlorophenol	4.0E+03	1.8E+03	1.8E+03
2,4-dichlorophenol	2.4E+03	1.1E+03	1.1E+03
2,4-dimethylphenol	1.6E+04	7.3E+03	7.3E+03
2,4-dinitrophenol	1.6E+03	7.3E+02	7.3E+02
2,6-dinitrotoluene	2.2E+01	1.0E+01	1.0E+01
Hexachlorobenzene	2.1E+01	9.5E+00	9.5E+00
Isophorone	3.5E+04	1.6E+04	1.6E+04
2-methylphenol	4.0E+04	1.8E+04	1.8E+04
4-methylphenol	7.9E+04	3.7E+04	3.7E+04
4-chloro-3-methylphenol	7.9E+04	3.7E+04	3.7E+04
4,6-dinitro-2-methylphenol	6.3E+01	2.9E+01	2.9E+01
3-nitroaniline	1.6E+03	7.6E+02	7.6E+02
4-nitroaniline	1.6E+03	7.6E+02	7.6E+02
N -nitrosodiphenylamine	6.7E+03	3.1E+03	3.1E+03
Pentachlorophenol	8.2E+01	3.8E+01	3.8E+01
Phenol	2.4E+05	1.1E+05	1.1E+05
bis(2-ethylhexyl)phthalate	2.3E+03	1.1E+03	1.1E+03
Diethyl phthalate	6.3E+05	2.9E+05	2.9E+05
Dimethyl phthalate	6.3E+05	2.9E+05	2.9E+05
Di-*n* -butyl phthalate	7.9E+04	3.7E+04	3.7E+04
Di-*n* -octylphthalate	7.9E+03	3.7E+03	3.7E+03
2,4,6-trichlorophenol	7.9E+02	3.7E+02	3.7E+02
PCBs			
PCBs (total Aroclors)	1.6E+01	7.3E+00	7.3E+00
Volatiles			
Acetone	7.1E+05	3.3E+05	3.3E+05
Benzene	6.0E+02	2.8E+02	2.8E+02

Table 13. Summary of Surface Water RBSLs for All Receptor Groups and Values Selected for COPC Screening

Chemical	Kayaker/Canoer Exposed to Surface Water Current Use (µg/L)	Kayaker/Canoer Exposed to Surface Water Future Use (µg/L)	Minimum Surface Water RBSL for COPC Selection (µg/L)
bis(2-chloroethyl)ether	3.0E+01	1.4E+01	1.4E+01
Bromodichloromethane	5.3E+02	2.4E+02	2.4E+02
2-butanone	4.7E+05	2.2E+05	2.2E+05
Carbon disulfide	7.9E+04	3.7E+04	3.7E+04
Chlorobenzene	1.6E+04	7.3E+03	7.3E+03
Chloroethane	7.9E+04	3.7E+04	3.7E+04
Chloroform	1.1E+03	4.9E+02	4.9E+02
Chloromethane	2.5E+03	1.2E+03	1.2E+03
1,2-dichlorobenzene	7.1E+04	3.3E+04	3.3E+04
1,3-dichlorobenzene	1.6E+04	7.3E+03	7.3E+03
1,4-dichlorobenzene	6.1E+03	2.8E+03	2.8E+03
1,1-dichloroethane	5.8E+03	2.7E+03	2.7E+03
1,2-dichloroethane	3.6E+02	1.7E+02	1.7E+02
1,1-dichloroethene	4.0E+04	1.8E+04	1.8E+04
cis -1,2-dichloroethene	1.6E+03	7.3E+02	7.3E+02
trans -1,2-dichloroethene	1.6E+04	7.3E+03	7.3E+03
Ethylbenzene	3.0E+03	1.4E+03	1.4E+03
4-methyl-2-pentanone	6.3E+04	2.9E+04	2.9E+04
Methylene chloride	4.7E+03	2.2E+03	2.2E+03
Tetrachloroethene	4.7E+03	2.2E+03	2.2E+03
Toluene	6.3E+04	2.9E+04	2.9E+04
1,2,3-trichlorobenzene	6.3E+02	2.9E+02	2.9E+02
1,2,4-trichlorobenzene	1.1E+03	5.2E+02	5.2E+02
1,1,1-trichloroethane	1.6E+06	7.3E+05	7.3E+05
Trichloroethene	4.0E+02	1.8E+02	1.8E+02
Vinyl chloride	5.4E-01	5.3E-01	5.3E-01
m,p -xylenes	1.6E+05	7.3E+04	7.3E+04
o -xylene	1.6E+05	7.3E+04	7.3E+04
Xylenes	1.6E+05	7.3E+04	7.3E+04

Notes:

COPC = chemical of potential concern
HCH = hexachlorocyclohexane
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RBSL = risk-based screening level

1,3-dichlorobenzene RfD value is based on the Agency for Toxic Substances and Disease Registry subchronic minimal risk level.
Carbazole oral CSF is based on the health effects assessment summary tables (HEAST) value.
3-nitroaniline are based on toxicity crieria for 4-nitroaniline as a surrogate.
Acenaphthylene are based on toxicity crieria for acenaphthene as a surrogate.
alpha-Chlordane are based on toxicity crieria for chlordane as a surrogate.
Benzo[g,h,i]perylene are based on toxicity crieria for pyrene as a surrogate.
Chloroethane RfD value is based on the provisional peer reviewed toxicity value (PPRTV) subchronic RfD.
Chloromethane CSF is based on the HEAST value.
Chromium values are based on toxicity criterion for chromium (III) as a surrogate.
delta-HCH are based on toxicity crieria for technical HCH as a surrogate.
Dichlorobenzenes (total) are based on toxicity crieria for 1,4-dichlorobenzene as a surrogate.
Dimethyl phthalate are based on toxicity crieria for diethyl phthalate as a surrogate.
Endosulfan I are based on toxicity crieria for endosulfan as a surrogate.
Endosulfan II are based on toxicity crieria for endosulfan as a surrogate.
Endosulfan sulfate are based on toxicity crieria for endosulfan as a surrogate.

Table 13. Summary of Surface Water RBSLs for All Receptor Groups and Values Selected for COPC Screening

Chemical	Kayaker/Canoer Exposed to Surface Water Current Use (µg/L)	Kayaker/Canoer Exposed to Surface Water Future Use (µg/L)	Minimum Surface Water RBSL for COPC Selection (µg/L)

Endrin aldehyde values are based on toxicity crieria for endrin as a surrogate.
Endrin ketone are based on toxicity crieria for endrin as a surrogate.
gamma-Chlordane are based on toxicity crieria for chlordane as a surrogate.
m,p -xylenes are based on toxicity crieria for xylenes as a surrogate.
Mercury value based on toxicity criterion for mercuric chloride as surrogate
Phenanthrene are based on toxicity crieria for anthracene as a surrogate.
The cancer slope value for PCBs is based on the toxicity value for total PCBs.

Table 14. Summary of Input Values used in Adult Lead Model and Resulting Site-Specific Sediment RBSLs for Recreational Receptor Exposures to Lead in Sediment

Variable	Description of Variable	Units	RME Angler/ Crabber (Current, Future)	RME Kayaker/ Canoer (Current)	RME Kayaker/ Canoer (Future)	Assumption Notes and Sources
$PbB_{fetal, 0.95}$	95th percentile PbB in fetus	µg/dL	10	10	10	Default value (USEPA 2003a).
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.90	0.90	0.90	Default value (USEPA 2003a).
BKSF	Biokinetic slope factor	µg/dL per µg/day	0.40	0.40	0.40	Default value (USEPA 2003a).
GSD_i	Geometric standard deviation	--	1.8	1.8	1.8	Default value (USEPA 2009).
PbB_0	Baseline PbB	µg/dL	1.0	1.0	1.0	Default value (USEPA 2009).
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.10	0.10	0.10	Assumed RME IR for angler/crabbers and kayaker/canoers (BCSA Group 2015a).
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.30	0.30	0.30	Upper end of range provided for adolescents (USEPA 2015a).[a]
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	27	18	39	Assumed RME EF for angler/crabbers and kayaker/canoers (future) (BCSA Group 2015a).
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	189	126	270	Angler/crabber assumes exposure occurs over 27 weeks of the year in order to meet the limitations of the lead model, which requires that a minimum exposure of 1 day per week occurs. In a similar manner, the current kayaker/canoer assumes exposure occurs over 18 weeks (exposure of 1 day per week). In line with the assumptions outlined in the MESA, the future kayaker/canoer assumes that exposure occurs over 9 months.
PRG		**ppm**	**1,881**	**1,881**	**1,861**	

Notes:

MESA = memorandum on human exposure scenarios and assumptions
PRG = preliminary remediation goal
RBSL = risk-based screening level
RME = reasonable maximum exposure
-- = not available

[a] The absorption fraction for an older child was assumed as this is greater than the default value for adults.

Sources:

BCSA Group (2015a)
USEPA (2003a)
USEPA (2009)
USEPA (2015a)

Table 15. Summary of COPCs by Receptor Group

Chemical	Construction Worker	Recreator		
	Sediment (All Depths)	Surface Sediment	Surface Water	Tissue
Metals				
Aluminum	X	--	--	--
Antimony	X	X	--	X
Arsenic	X	X	X	--
Cadmium	X	X	--	--
Chromium (VI)	X	X	--	--
Cobalt	X	X	--	--
Copper	X	X	--	X
Iron	X	X	--	X
Manganese	X	X	--	X
Mercury [a]	X	X	--	X
Nickel	X	X	--	--
Selenium	--	--	--	X
Thallium	X	X	X	--
Vanadium	X	--	--	--
Zinc	X	X	--	--
Organometals				
Methyl mercury	--	--	--	X
PAHs				
Benz[a]anthracene	--	X	--	--
Benzo[a]pyrene	X	X	X	--
Benzo[b]fluoranthene	--	X	--	--
Dibenz[a,h]anthracene	X	X	X	--
Indeno[1,2,3-cd]pyrene	--	X	--	--
Pesticides				
Aldrin	X	X	--	--
Heptachlor	X	--	--	--
Heptachlor epoxide	X	X	--	--
PCBs				
PCBs (total Aroclors)	X	X	--	X
Volatiles				
Trichloroethene	X	--	--	--
Vinyl chloride	--	--	X	--
Total	***21***	***20***	***5***	***8***

Notes:
COPC = chemical of potential concern
PAH = polycylic aromatic hydrocarbon
PCB = polychlorinated biphenyl
-- = not selected as COPC for this media and receptor

[a] Also selected as COPC in air.

Table 16. Detected Chemicals with No RBSL Screening Criteria

Chemical Class	CAS Number	Chemical (Short Name)	Minimum Detected Conc.	Minimum Detected Qualifier	Maximum Detected Conc.	Maximum Detected Qualifier	Maximum Detected Units	Location Maximum Detect	Detection Frequency	Detection Limit Range
Sediment (All Depths)										
Metals	7440702	Calcium	7.1E+02		1.2E+05	J	mg/kg	BAZ-1059	873/874	1.9E+02 – 1.9E+02
	7439954	Magnesium	7.0E+02	J	1.1E+04	J	mg/kg	DWC-204	869/874	8.8E+00 – 2.7E+02
	7440097	Potassium	1.5E+02	J	5.7E+03		mg/kg	WC-D.4	682/874	6.6E+00 – 9.5E+03
	7440235	Sodium	8.9E+01		3.2E+04	J	mg/kg	MRH-206	857/874	6.9E+01 – 1.9E+03
Volatiles	110827	Cyclohexane	7.5E-03	J	2.9E-02	J	mg/kg	TBZ-129	4/466	1.7E-04 – 1.4E-01
	108872	Methylcyclohexane	1.1E-03	J	1.5E-01	J	mg/kg	DWC-315	14/466	6.1E-04 – 1.3E-01
Surface Sediment (0–15 cm)										
Metals	7440702	Calcium	1.2E+03	J	3.1E+04		mg/kg	BAZ-1018	462/463	1.9E+02 – 1.9E+02
	7439954	Magnesium	1.1E+03	J	1.0E+04		mg/kg	WC-D.3	458/463	8.8E+00 – 2.7E+02
	7440097	Potassium	1.5E+02	J	5.2E+03		mg/kg	WC-D.3	347/463	7.7E+00 – 6.5E+03
	7440235	Sodium	8.9E+01		3.2E+04	J	mg/kg	MRH-206	459/463	6.9E+01 – 1.4E+03
Surface Water										
Metals	7440702	Calcium	3.0E+03	J	3.1E+05		µg/L	MBM-101	1,147/1,148	2.2E+01 – 2.2E+01
	7439954	Magnesium	1.1E+03	J	7.5E+05	J	µg/L	MIP-201	1,145/1,147	1.7E+01 – 1.7E+01
	7440097	Potassium	1.2E+03		2.8E+05	J	µg/L	MIP-201	1,140/1,148	8.3E+00 – 4.2E+02
	7440235	Sodium	3.8E+03		5.7E+06	J	µg/L	MIP-201	1,148/1,148	--
Semivolatiles	88755	2-nitrophenol	2.1E-02	J	6.0E-02	J	µg/L	BAZT-3060	6/391	1.3E-02 – 1.4E+00
Tissue										
Metals	7440702	Calcium	1.8E+02	J	8.9E+03	J	mg/kg	BAZ-1073	24/24	--
	7439954	Magnesium	2.1E+02	J	6.7E+02	J	mg/kg	BAZ-1073	14/24	5.1E+00 – 5.1E+00
	7440097	Potassium	2.6E+03		4.2E+03		mg/kg	BAZ-1040	24/24	--
	7440235	Sodium	5.6E+02		3.2E+03		mg/kg	BAZ-1059	24/24	--
PCBs	--	PCBs (total congeners)	4.5E-02	J	4.9E+00	J	mg/kg	BAZT-3050	75/75	--

Notes:
CAS = chemical abstracts service
Conc. = concentration
J = estimated concentration
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RBSL = risk-based screening level
-- = not available

Draft
Exhibit 1: RAGS D Table 2 COPC Screening

COPC Selection

Berry's Creek Study Area
Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

RAGS D Table 2.1
Occurrence, Distribution, and Selection of Chemicals of Potential Concern
Berry's Creek Study Area

Scenario Timeframe:	**Current / Future**
Medium:	**Surface Sediment (0–15 cm)**
Exposure Medium:	**Surface Sediment (0–15 cm)**

Exposure Point	CAS Number	Chemical		Minimum Concentration (Qualifier)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Reporting Limits	Concentration Used for Screening (1)	Risk-based Screening Level	COPC Flag (Y/N)	Rationl for Selection or Deletion (2)
Surface Sediment (0–15 cm, Mudflats and Marsh, All Reaches)	***Metals***															
	7429905	Aluminum		1.4E+03		2.7E+04		mg/kg	WC-D.3	475/476	100%	37-37	2.7E+04	4.6E+04	N	B
	7440360	Antimony		5.6E-01	J	2.7E+01	J	mg/kg	MRH-255	100/476	21%	0.41-21	2.7E+01	1.8E+01	Y	A
	7440382	Arsenic		1.5E+00		2.6E+02	J	mg/kg	MRH-329	477/477	100%	--	2.6E+02	1.0E+00	Y	A
	7440393	Barium		2.2E+01	J	2.8E+03	J	mg/kg	TBZ-185	421/477	88%	0.09-130	2.8E+03	9.1E+03	N	B
	7440417	Beryllium		9.7E-02	J	1.5E+00		mg/kg	WC-D.3	164/477	34%	0.048-2.4	1.5E+00	9.1E+01	N	B
	7440439	Cadmium		1.9E-01	J	1.4E+02	J	mg/kg	TBZ-185	441/477	93%	0.058-0.68	1.4E+02	3.7E+01	Y	A
	18540299	Chromium (VI)		1.5E+00		4.5E+01		mg/kg	WC-D.2	4/6	67%	2.8-3.5	4.5E+01	2.1E+00	Y	A
	7440473	Chromium (total)	3	8.1E+00		7.9E+03	J	mg/kg	MRH-260	475/475	100%	--	7.9E+03	6.9E+04	N	B
	7440484	Cobalt		2.4E+00	J	1.7E+02	J	mg/kg	MRH-233	450/477	94%	0.28-32	1.7E+02	1.4E+01	Y	A
	7440508	Copper		1.2E+01		5.2E+03	J	mg/kg	MRH-329	475/475	100%	--	5.2E+03	1.8E+03	Y	A
	7439896	Iron		4.9E+03	J	1.4E+05	J	mg/kg	MRH-233	644/644	100%	--	1.4E+05	3.2E+04	Y	A
	7439921	Lead	4	1.2E+01	J	1.6E+03	J	mg/kg	TBZ-185	477/477	100%	--	1.8E+02	1.9E+03	N	C
	7439965	Manganese		6.7E+01	J	5.3E+04	J	mg/kg	MRH-233	643/643	100%	--	5.3E+04	6.4E+03	Y	A
	7439976	Mercury	5	1.8E-02	J	1.6E+03	J	mg/kg	TBZ-185	1244/1249	100%	0.046-0.16	1.6E+03	1.4E+01	Y	A
	7440020	Nickel		6.3E+00	J	1.1E+03	J	mg/kg	MRH-329	477/477	100%	--	1.1E+03	9.1E+02	Y	A
	7782492	Selenium		6.5E-01		6.8E+01	J	mg/kg	MRH-329	160/477	34%	0.47-24	6.8E+01	2.3E+02	N	B
	7440224	Silver		1.9E-01	J	1.0E+02		mg/kg	WC-E.5	413/476	87%	0.11-8	1.0E+02	2.3E+02	N	B
	7440280	Thallium		6.1E-01	J	1.8E+02	J	mg/kg	MRH-235	156/477	33%	0.33-30	1.8E+02	4.6E-01	Y	A
	7440622	Vanadium		8.4E+00	J	2.0E+02	J	mg/kg	MRH-329	475/477	100%	0.21-0.51	2.0E+02	2.3E+02	N	B
	7440666	Zinc		5.3E+01		2.0E+04	J	mg/kg	MRH-254	475/475	100%	--	2.0E+04	1.4E+04	Y	A
	Organometals															
	22967926	Methyl mercury		4.8E-05	J	6.6E-01	J	mg/kg	MRH-384	1267/1270	100%	0.000087-0.0065	6.6E-01	4.6E+00	N	B
	PAHs															
	83329	Acenaphthene		6.0E-03	J	5.3E-01	J	mg/kg	TOX-325	180/243	74%	0.0014-0.052	5.3E-01	1.5E+03	N	B
	208968	Acenaphthylene	6	6.2E-03	J	8.9E-01	J	mg/kg	TBZ-185	217/244	89%	0.0014-0.058	8.9E-01	1.5E+03	N	B
	120127	Anthracene		7.6E-03	J	1.3E+00	J	mg/kg	TBZ-179	233/243	96%	0.0012-0.063	1.3E+00	7.6E+03	N	B
	56553	Benz[a]anthracene		1.6E-02	J	3.3E+00	J	mg/kg	TBZ-179	241/244	99%	0.0011-0.037	3.3E+00	6.9E-01	Y	A
	50328	Benzo[a]pyrene		5.6E-02	J	3.2E+00	J	mg/kg	BAZT-3070	238/244	98%	0.0026-0.055	3.2E+00	6.9E-02	Y	A
	205992	Benzo[b]fluoranthene		7.5E-02		4.1E+00		mg/kg	BAZ-1117	238/244	98%	0.0065-0.06	4.1E+00	6.9E-01	Y	A
	191242	Benzo[g,h,i]perylene	7	4.9E-02	J	2.3E+00		mg/kg	DWC-315, BAZ-1025	238/244	98%	0.0029-0.067	2.3E+00	7.6E+02	N	B
	207089	Benzo[k]fluoranthene		2.0E-02	J	1.5E+00	J	mg/kg	BAZ-1025	147/241	61%	0.0029-0.11	1.5E+00	6.9E+00	N	B
	218019	Chrysene		1.9E-02	J	3.7E+00	J	mg/kg	TBZ-179	241/244	99%	0.0019-0.039	3.7E+00	6.9E+01	N	B
	53703	Dibenz[a,h]anthracene		8.3E-03	J	1.3E+00	J	mg/kg	BAZT-3070	205/244	84%	0.0015-0.061	1.3E+00	6.9E-02	Y	A
	132649	Dibenzofuran		5.6E-03	J	3.4E-01	J	mg/kg	DWC-249	120/244	49%	0.008-0.27	3.4E-01	3.8E+01	N	B
	206440	Fluoranthene		3.0E-02	J	9.3E+00	J	mg/kg	TBZ-179	242/244	99%	0.0013-0.05	9.3E+00	1.0E+03	N	B

RAGS D Table 2.1
Occurrence, Distribution, and Selection of Chemicals of Potential Concern
Berry's Creek Study Area

Scenario Timeframe:	**Current / Future**
Medium:	**Surface Sediment (0–15 cm)**
Exposure Medium:	**Surface Sediment (0–15 cm)**

Exposure Point	CAS Number	Chemical		Minimum Concentration (Qualifier)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Reporting Limits	Concentration Used for Screening (1)	Risk-based Screening Level	COPC Flag (Y/N)	Rationl for Selection or Deletion (2)
Surface Sediment (0–15 cm, Mudflats and Marsh, All Reaches)	86737	Fluorene		7.4E-03	J	5.1E-01	J	mg/kg	TBZ-185	147/243	61%	0.0016-0.073	5.1E-01	1.0E+03	N	B
	193395	Indeno[1,2,3-cd]pyrene		3.4E-02	J	2.4E+00	J	mg/kg	TBZ-179,BAZ-1025	238/244	98%	0.0027-0.063	2.4E+00	6.9E-01	Y	A
	91576	2-methylnaphthalene		4.5E-03	J	1.8E-01		mg/kg	BAZ-1076	173/244	71%	0.0017-0.42	1.8E-01	1.0E+02	N	B
	91203	Naphthalene		4.0E-03	J	1.5E+00	J	mg/kg	DWC-249	186/244	76%	0.00052-0.049	1.5E+00	5.1E+02	N	B
	85018	Phenanthrene	8	1.8E-02	J	5.6E+00	J	mg/kg	TBZ-179	237/244	97%	0.0018-0.082	5.6E+00	7.6E+03	N	B
	129000	Pyrene		2.5E-02	J	5.3E+00	J	mg/kg	TBZ-179	242/244	99%	0.0014-0.044	5.3E+00	7.6E+02	N	B
	Pesticides															
	309002	Aldrin		6.9E-04	J	3.3E-01	J	mg/kg	TBZ-184	99/200	50%	0.000043-0.008	3.3E-01	1.1E-01	Y	A
	86748	Carbazole		8.2E-03	J	5.2E-01	J	mg/kg	TBZ-179	160/243	66%	0.0018-0.16	5.2E-01	9.5E+01	N	B
	5103719	alpha-chlordane	9	7.8E-04	J	1.2E-01	J	mg/kg	TBZ-185	106/187	57%	0.000066-0.0037	1.2E-01	4.0E+00	N	B
	5566347	gamma-chlordane	16	5.3E-04	J	3.9E-01	J	mg/kg	TBZ-184	188/216	87%	0.000048-0.0088	3.9E-01	4.0E+00	N	B
	72548	4,4'-DDD		7.1E-04	J	2.3E-01	J	mg/kg	MRH-207	92/143	64%	0.000071-0.0025	2.3E-01	4.3E+00	N	B
	72559	4,4'-DDE		4.5E-04	J	9.8E-02	J	mg/kg	MRH-207	127/173	73%	0.00007-0.0028	9.8E-02	5.6E+00	N	B
	50293	4,4'-DDT		1.0E-03	J	2.3E-01	J	mg/kg	TOX-325	61/182	34%	0.00007-0.0067	2.3E-01	4.4E+00	N	B
	60571	Dieldrin		4.8E-04	J	5.9E-02	J	mg/kg	TOX-313	54/163	33%	0.000079-0.0075	5.9E-02	6.4E-02	N	B
	959988	Endosulfan I	11	4.9E-04	J	2.0E-02	J	mg/kg	TOX-331	52/209	25%	0.000051-0.0084	2.0E-02	2.7E+02	N	B
	33213659	Endosulfan II	12	5.6E-04	J	1.5E-02	J	mg/kg	TOX-325	56/196	29%	0.000043-0.0079	1.5E-02	2.7E+02	N	B
	1031078	Endosulfan sulfate	13	4.4E-04	J	3.6E-02	J	mg/kg	TOX-325	128/208	62%	0.000025-0.0047	3.6E-02	2.7E+02	N	B
	72208	Endrin		4.3E-04	J	1.1E-01	J	mg/kg	DWC-302	132/200	66%	0.000047-0.0075	1.1E-01	8.4E+00	N	B
	7421934	Endrin aldehyde	14	2.0E-04	J	1.3E-02	J	mg/kg	TOX-331	58/206	28%	0.000065-0.0087	1.3E-02	8.4E+00	N	B
	53494705	Endrin ketone	15	2.9E-04	J	1.4E-01	J	mg/kg	TOX-325	97/177	55%	0.000038-0.007	1.4E-01	8.4E+00	N	B
	76448	Heptachlor		8.3E-04	J	9.5E-02	J	mg/kg	TBZ-185	38/159	24%	0.000054-0.0086	9.5E-02	4.2E-01	N	B
	1024573	Heptachlor epoxide		5.0E-04	J	2.9E-01	J	mg/kg	TBZ-185	125/182	69%	0.000053-0.0075	2.9E-01	2.1E-01	Y	A
	319846	alpha-HCH		6.6E-05	J	3.3E-02	J	mg/kg	BAZ-3028	37/212	18%	0.00004-0.0073	3.3E-02	1.6E-01	N	B
	319857	beta-HCH		5.3E-04	J	1.3E-01	J	mg/kg	TOX-321	110/204	54%	0.000063-0.012	1.3E-01	5.7E-01	N	B
	319868	delta-HCH	10	2.7E-04	J	1.6E-01	J	mg/kg	TBZ-184	88/177	50%	0.000042-0.0059	1.6E-01	5.7E-01	N	B
	58899	gamma-HCH (Lindane)		8.6E-05	J	2.8E-02	J	mg/kg	BAZ-2010	69/195	35%	0.000043-0.0079	2.8E-02	1.3E+00	N	B
	72435	Methoxychlor		1.1E-03	J	1.7E-01	J	mg/kg	BAZ-2036	78/203	38%	0.000051-0.0094	1.7E-01	1.4E+02	N	B
	Semivolatiles															
	98862	Acetophenone		1.1E-02	J	4.1E-01		mg/kg	DWC-315	'65/244	27%	0.0073-0.23	4.1E-01	4.6E+03	N	B
	100527	Benzaldehyde		1.7E-02	J	2.4E+00	J	mg/kg	BAZ-2002	'149/239	62%	0.0054-0.41	2.4E+00	4.6E+03	N	B
	92524	1,1'-biphenyl		6.5E-03	J	3.0E-01	J	mg/kg	TBZ-185	'28/244	12%	0.0061-0.25	3.0E-01	2.4E+02	N	B
	85687	Butyl benzyl phthalate		2.1E-02	J	7.4E+00		mg/kg	BAZ-1117	'94/244	39%	0.012-0.38	7.4E+00	5.4E+02	N	B
	105602	Caprolactam		3.4E-02	J	2.2E-01	J	mg/kg	MRH-1017	'13/244	5.3%	0.016-2.1	2.2E-01	1.4E+04	N	B
	106478	4-chloroaniline		6.7E-03	J	7.9E-01	J	mg/kg	TBZ-164	'70/243	29%	0.0044-0.22	7.9E-01	5.1E+00	N	B
	91941	3,3'-dichlorobenzidine		--		--		mg/kg	--	'0/227	0.0%	0.0092-0.34	--	2.3E+00	N	B
	105679	2,4-dimethylphenol		6.9E-02	J	6.9E-02	J	mg/kg	BAZ-1006	'1/238	0.40%	0.006-0.57	6.9E-02	5.6E+02	N	B
	121142	2,4-dinitrotoluene		--		--		mg/kg	--	'0/244	0.0%	0.0056-0.22	--	3.3E+00	N	B

RAGS D Table 2.1
Occurrence, Distribution, and Selection of Chemicals of Potential Concern
Berry's Creek Study Area

Scenario Timeframe:	**Current / Future**
Medium:	**Surface Sediment (0–15 cm)**
Exposure Medium:	**Surface Sediment (0–15 cm)**

Exposure Point	CAS Number	Chemical		Minimum Concentration (Qualifier)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Reporting Limits	Concentration Used for Screening (1)	Risk-based Screening Level	COPC Flag (Y/N)	Rationl for Selection or Deletion (2)
Surface Sediment (0–15 cm, Mudflats and Marsh, All Reaches)	606202	2,6-dinitrotoluene		1.0E-01	J	1.6E-01	J	mg/kg	TBZ-118	'2/244	0.80%	0.0072-0.29	1.6E-01	6.8E-01	N	B
	118741	Hexachlorobenzene		--		--		mg/kg	--	'0/244	0.0%	0.0015-0.23	--	1.2E+00	N	B
	78591	Isophorone		--		--		mg/kg	--	'0/244	0.0%	0.0052-0.21	--	1.1E+03	N	B
	95487	2-methylphenol		1.2E-02	J	7.8E-02	J	mg/kg	BAZ-1006	'3/244	1.2%	0.0048-0.45	7.8E-02	1.4E+03	N	B
	106445	4-methylphenol		1.2E-02	J	2.6E-01	J	mg/kg	BAZ-1028	'33/218	15%	0.0063-0.27	2.6E-01	2.8E+03	N	B
	88744	2-nitroaniline		--		--		mg/kg	--	'0/244	0.0%	0.0087-1.2	--	2.8E+02	N	B
	99092	3-nitroaniline	17	--		--		mg/kg	--	'0/243	0.0%	0.0047-1.1	--	5.1E+01	N	B
	86306	*N* -nitrosodiphenylamine		1.0E-02	J	1.1E+00	J	mg/kg	TBZ-185	'43/244	18%	0.0058-0.26	1.1E+00	2.1E+02	N	B
	108952	Phenol		5.3E-03	J	4.5E-01	J	mg/kg	MRH-253	'66/244	27%	0.0016-0.44	4.5E-01	8.4E+03	N	B
	117817	bis(2-ethylhexyl)phthalate		5.0E-02	J	6.4E+01	J	mg/kg	TOX-325	'235/244	96%	0.028-0.1	6.4E+01	7.3E+01	N	B
	84662	Diethyl phthalate		1.2E-02	J	1.3E+00	J	mg/kg	TBZ-117	'20/243	8.2%	0.0076-0.3	1.3E+00	2.3E+04	N	B
	131113	Dimethyl phthalate	18	4.8E-02	J	7.7E-01	J	mg/kg	BAZ-1020	'36/244	15%	0.0048-0.3	7.7E-01	2.3E+04	N	B
	84742	Di-*n* -butyl phthalate		1.5E-02	J	1.6E+00	J	mg/kg	TBZ-185	'93/243	38%	0.0087-0.35	1.6E+00	2.8E+03	N	B
	117840	Di-*n* -octylphthalate		1.8E-02	J	4.1E-01	J	mg/kg	DWC-218	'44/244	18%	0.0037-0.29	4.1E-01	2.8E+02	N	B
	88062	2,4,6-trichlorophenol		--		--		mg/kg	--	0/230	0.0%	0.0071-0.95	--	2.8E+01	N	B
	PCBs															
	--	PCBs (total Aroclors)	19	3.5E-03		3.2E+01	J	mg/kg	DWC-310	974/994	98%	--	3.2E+01	4.3E-01	Y	A
	Volatiles															
	67641	Acetone		1.0E-02	J	9.5E-01		mg/kg	WC-D.4	67/206	33%	0.0052-0.93	9.5E-01	4.1E+04	N	B
	71432	Benzene		5.7E-03		2.3E-02	J	mg/kg	DWC-249	3/206	1.5%	0.00074-0.18	2.3E-02	3.4E+01	N	B
	111444	bis(2-chloroethyl)ether		--		--		mg/kg	--	0/244	0.0%	0.0019-0.22	--	1.7E+00	N	B
	78933	2-butanone		4.2E-03	J	2.8E-01		mg/kg	WC-D.4	25/206	12%	0.00096-0.2	2.8E-01	2.7E+04	N	B
	75150	Carbon disulfide		1.5E-03	J	2.9E-01	J	mg/kg	DWC-315	70/206	34%	0.00037-0.0066	2.9E-01	4.6E+03	N	B
	108907	Chlorobenzene		1.5E-03	J	9.9E-02	J	mg/kg	DWC-249	16/206	7.8%	0.00083-0.098	9.9E-02	9.1E+02	N	B
	67663	Chloroform		3.3E-03	J	3.3E-03	J	mg/kg	DWC-249	1/206	0.50%	0.0005-0.19	3.3E-03	6.1E+01	N	B
	74873	Chloromethane		--		--		mg/kg	--	0/206	0.0%	0.0004-0.26	--	1.5E+02	N	B
	95501	1,2-dichlorobenzene		1.9E-03	J	1.5E-01		mg/kg	SC-4D.2	46/205	22%	0.00044-0.01	1.5E-01	4.1E+03	N	B
	541731	1,3-dichlorobenzene		1.7E-03	J	9.7E-03	J	mg/kg	DWC-249	14/205	6.8%	0.00046-0.095	9.7E-03	9.1E+02	N	B
	106467	1,4-dichlorobenzene		1.8E-03	J	3.4E-02	J	mg/kg	DWC-249	46/205	22%	0.00038-0.098	3.4E-02	3.5E+02	N	B
	25321226	Dichlorobenzenes (total)	20	9.3E-04		5.4E-01		mg/kg	SC-D.2	9/9	100%	--	5.4E-01	3.5E+02	N	B
	75343	1,1-dichloroethane		--		--		mg/kg	--	0/206	0.0%	0.00033-0.19	--	3.3E+02	N	B
	1.6E+05	*cis* -1,2-dichloroethene		1.7E-03	J	1.7E-03	J	mg/kg	WC-D.3	1/206	0.50%	0.00024-0.12	1.7E-03	9.1E+01	N	B
	156605	*trans* -1,2-dichloroethene		--		--		mg/kg	--	0/206	0.0%	0.00065-0.14	--	9.1E+02	N	B
	100414	Ethylbenzene		1.2E-03	J	4.5E-01	J	mg/kg	DWC-315	4/206	1.9%	0.00061-0.01	4.5E-01	1.7E+02	N	B
	591786	2-hexanone		1.5E-02	J	1.5E-02	J	mg/kg	TBZ-171	1/206	0.50%	0.00075-0.11	1.5E-02	2.3E+02	N	B
	98828	Isopropylbenzene		3.8E-03	J	1.8E-02	J	mg/kg	TBZ-184	3/206	1.5%	0.00038-0.099	1.8E-02	4.6E+03	N	B
	79209	Methyl acetate		2.0E-02		5.1E+00		mg/kg	DWC-315	12/206	5.8%	0.00098-0.016	5.1E+00	4.6E+04	N	B
	75092	Methylene chloride		2.5E-03	J	2.5E-03	J	mg/kg	TBZ-186	1/206	0.50%	0.00054-0.2	2.5E-03	2.7E+02	N	B

RAGS D Table 2.1
Occurrence, Distribution, and Selection of Chemicals of Potential Concern
Berry's Creek Study Area

Scenario Timeframe:	**Current / Future**
Medium:	**Surface Sediment (0–15 cm)**
Exposure Medium:	**Surface Sediment (0–15 cm)**

Exposure Point	CAS Number	Chemical		Minimum Concentration (Qualifier)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Reporting Limits	Concentration Used for Screening (1)	Risk-based Screening Level	COPC Flag (Y/N)	Rationl for Selection or Deletion (2)
Surface Sediment (0–15 cm, Mudflats and Marsh, All Reaches)	100425	Styrene		3.0E-03	J	3.0E-03	J	mg/kg	TBZ-171	1/205	0.50%	0.00026-0.12	3.0E-03	9.1E+03	N	B
	127184	Tetrachloroethene		6.4E-01	J	6.4E-01	J	mg/kg	DWC-315	1/206	0.50%	0.00035-0.0088	6.4E-01	2.7E+02	N	B
	108883	Toluene		1.6E-03		3.7E-01	J	mg/kg	DWC-315	11/206	5.3%	0.00067-0.0094	3.7E-01	3.7E+03	N	B
	87616	1,2,3-trichlorobenzene		7.0E-03	J	2.8E-02	J	mg/kg	MRH-348	4/180	2.2%	0.00092-0.12	2.8E-02	3.7E+01	N	B
	120821	1,2,4-trichlorobenzene		2.1E-03	J	1.7E-02	J	mg/kg	DWC-219	12/204	5.9%	0.00044-0.07	1.7E-02	6.5E+01	N	B
	79016	Trichloroethene		2.2E-03	J	9.8E-01		mg/kg	DWC-315	4/206	1.9%	0.00052-0.0085	9.8E-01	2.3E+01	N	B
	76131	Trichlorotrifluoroethane		1.3E-02		1.3E-02		mg/kg	SL04,SL06	2/206	1.0%	0.00047-0.062	1.3E-02	1.4E+06	N	B
	75014	Vinyl chloride		--		--		mg/kg	--	0/206	0.0%	0.00043-0.24	--	6.6E-02	N	B
	13302070	*m,p* -xylenes	21	9.2E-04	J	5.8E-01	J	mg/kg	DWC-315	6/193	3.1%	0.00078-0.019	5.8E-01	9.1E+03	N	B
	95476	*o* -xylene		1.2E-02		1.7E-01	J	mg/kg	DWC-315	4/193	2.1%	0.00033-0.01	1.7E-01	9.1E+03	N	B
	1330207	Xylenes		9.20E-04	J	2.00E-02		mg/kg	SC-D.3	2/25	8.0%	0.00041-0.0055	2.0E-02	9.1E+03	N	B

Notes:
CAS = Chemical Abstract Service
cm = centimeters
COPC = chemical of potential concern
J = estimated value
mg/kg = milligram per kilogram
N = no
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
Y = yes
-- = not available

(1) Maximum detected value except for lead where average was used.
(2) A = Maximum detected value above screening value, considered a COPC.
B = No detected value or maximum detected value below screening value, not considered a COPC.
C = Lead mean detected concentration used for screening and is below screening value, not considered a COPC. Max detected value is not appropriate for adult exposure, see text.
(3) Chromium risk-based screening level values are based on toxicity criterion for Chromium (III).
(4) Lead screening level based on site-specfic use of Adult Lead Model. See text.
(5) Risk-based screening level for total mercury is based on Mercuric chloride.
(6) Acenaphthylene risk-based screening level values are based on toxicity criteria for Acenaphthene.
(7) Benzo[g,h,i]perylene risk-based screening level values are based on toxicity criteria for Pyrene.
(8) Phenanthrene risk-based screening level values are based on toxicity criteria for Anthracene.
(9) alpha-Chlordane risk-based screening level values are based on toxicity criteria for Chlordane.
(10) delta-HCH risk-based screening level values are based on toxicity criteria for technical HCH.
(11) Endosulfan I risk-based screening level values are based on toxicity criteria for Endosulfan.
(12) Endosulfan II risk-based screening level values are based on toxicity criteria for Endosulfan.
(13) Endosulfan sulfate risk-based screening level values are based on toxicity criteria for Endosulfan.
(14) Endrin aldehyde risk-based screening level values are based on toxicity criteria for Endrin.
(15) Endrin ketone risk-based screening level values are based on toxicity criteria for Endrin.
(16) gamma-Chlordane risk-based screening level values are based on toxicity criteria for Chlordane.
(17) 3-Nitroaniline risk-based screening level values are based on toxicity criteria for 4-Nitroaniline.
(18) Dimethyl phthalate risk-based screening level values are based on toxicity criteria for Diethyl phthalate.
(19) Total of Aroclors risk-based screening level value is based on the toxicity value for Aroclor 1254. The cancer slope value is based on the toxicity value for total PCBs.
(20) Dichlorobenzenes (total) risk-based screening level values are based on toxicity criteria for 1,4-Dichlorobenzene.
(21) *m,-p* -xylenes risk-based screening level values are based on toxicity criteria for Xylenes.

RAGS D Table 2.2
Occurrence, Distribution, and Selection of Chemicals of Potential Concern
Berry's Creek Study Area

Scenario Timeframe:	**Current / Future**
Medium:	**Sediment**
Exposure Medium:	**Sediment**

Exposure Point	CAS Number	Chemical		Minimum Concentration (Qualifier)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Reporting Limits	Concentration Used for Screening (1)	Risk-based Screening Level	COPC Flag (Y/N)	Rationl for Selection or Deletion (2)
Sediment (All Depths, Waterway and Marsh, All Reaches)	***Metals***															
	7429905	Aluminum		9.2E+02	J	2.7E+04		mg/kg	WC-D.3	880/881	100%	37-37	2.7E+04	2.2E+04	Y	A
	7440360	Antimony		5.6E-01	J	2.7E+01	J	mg/kg	MRH-255	181/881	21%	0.32-21	2.7E+01	8.8E+00	Y	A
	7440382	Arsenic		1.3E+00		2.6E+02	J	mg/kg	MRH-329	876/882	99%	2.5-19	2.6E+02	6.1E+00	Y	A
	7440393	Barium		1.5E+01	J	3.4E+03	J	mg/kg	MRH-253	788/882	89%	0.088-190	3.4E+03	4.4E+03	N	B
	7440417	Beryllium		5.1E-02	J	2.7E+00		mg/kg	SC-D.2	347/882	39%	0.046-2.4	2.7E+00	4.4E+01	N	B
	7440439	Cadmium		5.1E-02	J	3.4E+02	J	mg/kg	DWC-225	776/881	88%	0.038-4.8	3.4E+02	2.0E+01	Y	A
	18540299	Chromium (VI)		1.5E+00		4.5E+01		mg/kg	WC-D.2	7/18	39%	0.97-8	4.5E+01	3.1E+01	Y	A
	7440473	Chromium (total)	3	3.6E+00	J	7.9E+03	J	mg/kg	MRH-260	883/883	100%	--	7.9E+03	3.3E+04	N	B
	7440484	Cobalt		1.4E+00	J	1.7E+02	J	mg/kg	MRH-233	831/882	94%	0.14-48	1.7E+02	6.6E+00	Y	A
	7440508	Copper		2.0E+00	J	5.8E+03	J	mg/kg	DWC-245	877/880	100%	5.1-6.6	5.8E+03	8.8E+02	Y	A
	7439896	Iron		1.4E+03	J	2.9E+05		mg/kg	SC-D.2	1201/1201	100%	--	2.9E+05	1.5E+04	Y	A
	7439921	Lead	4	2.7E+00	J	1.6E+03	J	mg/kg	TBZ-185	877/881	100%	1.6-19	1.6E+02	8.0E+02	N	C
	7439965	Manganese		3.6E+01		5.3E+04	J	mg/kg	MRH-233	1198/1198	100%	--	5.3E+04	3.1E+03	Y	A
	7439976	Mercury	5	1.7E-02	J	2.2E+03	J	mg/kg	TBZ-186	2516/2595	97%	0.014-0.33	2.2E+03	6.6E+00	Y	A
	7440020	Nickel		4.8E+00	J	1.8E+03	J	mg/kg	DWC-225	875/882	99%	0.45-38	1.8E+03	4.4E+02	Y	A
	7782492	Selenium		6.4E-01		6.8E+01	J	mg/kg	MRH-329	295/882	33%	0.37-43	6.8E+01	1.1E+02	N	B
	7440224	Silver		8.7E-02	J	1.0E+02		mg/kg	WC-E.5	692/881	79%	0.11-8	1.0E+02	1.1E+02	N	B
	7440280	Thallium		6.1E-01	J	1.8E+02	J	mg/kg	MRH-235	270/882	31%	0.33-30	1.8E+02	2.2E-01	Y	A
	7440622	Vanadium		2.0E+00	J	2.0E+02	J	mg/kg	DWC-307,MRH-329	877/882	99%	0.21-48	2.0E+02	1.1E+02	Y	A
	7440666	Zinc		5.7E+00		5.5E+04	J	mg/kg	MRH-253	878/878	100%	--	5.5E+04	6.6E+03	Y	A
	Organometals															
	22967926	Methyl mercury		3.0E-05	J	6.6E-01	J	mg/kg	MRH-384	1995/2046	98%	0.00001-0.0065	6.6E-01	2.2E+00	N	B
	PAHs															
	83329	Acenaphthene		1.7E-03	J	2.0E+00	J	mg/kg	TBZ-110	380/523	73%	0.00066-0.083	2.0E+00	9.4E+02	N	B
	208968	Acenaphthylene	6	6.2E-03	J	3.2E+00	J	mg/kg	TBZ-110	437/524	83%	0.00042-0.091	3.2E+00	9.4E+02	N	B
	120127	Anthracene		1.7E-03	J	4.8E+00	J	mg/kg	TBZ-110	469/523	90%	0.00029-0.1	4.8E+00	4.7E+03	N	B
	56553	Benz[a]anthracene		5.9E-03	J	9.7E+00	J	mg/kg	TBZ-110	488/524	93%	0.00025-0.093	9.7E+00	1.5E+01	N	B
	50328	Benzo[a]pyrene		4.1E-03	J	9.7E+00	J	mg/kg	TBZ-140	478/524	91%	0.00061-0.087	9.7E+00	1.5E+00	Y	A
	205992	Benzo[b]fluoranthene		6.6E-03	J	9.8E+00	J	mg/kg	TBZ-140	482/524	92%	0.0014-0.095	9.8E+00	1.5E+01	N	B
	191242	Benzo[g,h,i]perylene	7	5.4E-03	J	5.2E+00	J	mg/kg	TBZ-110	476/524	91%	0.00065-0.11	5.2E+00	4.7E+02	N	B
	207089	Benzo[k]fluoranthene		2.2E-03	J	1.5E+00	J	mg/kg	BAZ-1025	259/520	50%	0.00068-0.17	1.5E+00	1.5E+02	N	B
	218019	Chrysene		5.5E-03	J	9.5E+00	J	mg/kg	TBZ-110	487/524	93%	0.00046-0.097	9.5E+00	1.5E+03	N	B
	53703	Dibenz[a,h]anthracene		8.3E-03	J	1.8E+00	J	mg/kg	TBZ-110	416/524	79%	0.00053-0.097	1.8E+00	1.5E+00	Y	A
	132649	Dibenzofuran		1.5E-03	J	1.3E+00	J	mg/kg	TBZ-161	241/524	46%	0.0015-0.28	1.3E+00	2.0E+01	N	B
	206440	Fluoranthene		1.1E-03	J	1.5E+01	J	mg/kg	TBZ-161	489/524	93%	0.0003-0.13	1.5E+01	6.3E+02	N	B
	86737	Fluorene		2.8E-03	J	3.0E+00	J	mg/kg	TBZ-110	275/523	53%	0.00075-0.12	3.0E+00	6.3E+02	N	B
	193395	Indeno[1,2,3-cd]pyrene		3.5E-03	J	5.0E+00	J	mg/kg	TBZ-110	479/524	91%	0.00049-0.099	5.0E+00	1.5E+01	N	B

RAGS D Table 2.2
Occurrence, Distribution, and Selection of Chemicals of Potential Concern
Berry's Creek Study Area

Scenario Timeframe:	**Current / Future**
Medium:	**Sediment**
Exposure Medium:	**Sediment**

Exposure Point	CAS Number	Chemical		Minimum Concentration (Qualifier)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Reporting Limits	Concentration Used for Screening (1)	Risk-based Screening Level	COPC Flag (Y/N)	Rationl for Selection or Deletion (2)
Sediment (All Depths, Waterway and Marsh, All Reaches)	91576	2-methylnaphthalene		8.0E-04	J	1.3E+00	J	mg/kg	TBZ-110	365/524	70%	0.0017-0.42	1.3E+00	6.3E+01	N	B
	91203	Naphthalene		1.5E-03	J	3.2E+00	J	mg/kg	TBZ-110	367/524	70%	0.00049-0.12	3.2E+00	3.1E+02	N	B
	85018	Phenanthrene	8	2.9E-03	J	2.4E+01	J	mg/kg	TBZ-161	477/524	91%	0.00044-0.13	2.4E+01	4.7E+03	N	B
	129000	Pyrene		1.4E-03	J	1.1E+01	J	mg/kg	TBZ-110	491/524	94%	0.00033-0.11	1.1E+01	4.7E+02	N	B
	Pesticides															
	309002	Aldrin		1.5E-04	J	1.8E+00	J	mg/kg	DWC-249	219/422	52%	0.000043-0.0088	1.8E+00	6.6E-01	Y	A
	86748	Carbazole		1.4E-03	J	2.0E+00	J	mg/kg	TBZ-161	309/523	59%	0.0008-0.16	2.0E+00	7.7E+02	N	B
	5103719	alpha-chlordane	9	5.8E-04	J	1.8E-01	J	mg/kg	MRH-253	196/411	48%	0.000053-0.011	1.8E-01	9.8E+00	N	B
	5566347	gamma-chlordane	16	2.4E-04	J	2.5E+00		mg/kg	DWC-249	378/449	84%	0.000048-0.0088	2.5E+00	9.8E+00	N	B
	72548	4,4'-DDD		5.5E-04	J	2.8E-01		mg/kg	TBZ-182	178/307	58%	0.000035-0.0073	2.8E-01	4.9E+01	N	B
	72559	4,4'-DDE		2.1E-04	J	2.2E-01	J	mg/kg	DWC-307,BAZ-1060	267/383	70%	0.000041-0.0092	2.2E-01	4.6E+01	N	B
	50293	4,4'-DDT		2.0E-04	J	4.7E-01	J	mg/kg	DWC-307	118/404	29%	0.00004-0.0091	4.7E-01	1.0E+01	N	B
	60571	Dieldrin		1.6E-04	J	2.1E-01		mg/kg	DWC-315	73/343	21%	0.000045-0.01	2.1E-01	7.4E-01	N	B
	959988	Endosulfan I	11	1.3E-04	J	3.7E-01	J	mg/kg	DWC-249	88/437	20%	0.000051-0.011	3.7E-01	1.3E+02	N	B
	33213659	Endosulfan II	12	2.2E-04	J	3.0E-02	J	mg/kg	DWC-315	86/421	20%	0.000047-0.011	3.0E-02	1.3E+02	N	B
	1031078	Endosulfan sulfate	13	2.9E-04	J	5.7E-02	J	mg/kg	DWC-315	253/436	58%	0.000025-0.0064	5.7E-02	1.3E+02	N	B
	72208	Endrin		4.3E-04	J	2.3E-01	J	mg/kg	DWC-244	240/422	57%	0.000047-0.0085	2.3E-01	5.0E+00	N	B
	7421934	Endrin aldehyde	14	2.0E-04	J	3.4E-02	J	mg/kg	DWC-244	90/439	21%	0.00005-0.012	3.4E-02	5.0E+00	N	B
	53494705	Endrin ketone	15	2.9E-04	J	1.4E-01	J	mg/kg	TOX-325	158/357	44%	0.000038-0.0095	1.4E-01	5.0E+00	N	B
	76448	Heptachlor		8.3E-04	J	3.5E+00	J	mg/kg	DWC-249	64/329	20%	0.000054-0.012	3.5E+00	3.4E+00	Y	A
	1024573	Heptachlor epoxide		1.6E-04	J	2.0E+00	J	mg/kg	DWC-249	225/366	62%	0.000052-0.0075	2.0E+00	2.9E-01	Y	A
	319846	alpha-HCH		6.6E-05	J	3.3E-02	J	mg/kg	BAZ-3028	69/427	16%	0.00004-0.0099	3.3E-02	1.9E+00	N	B
	319857	beta-HCH		5.3E-04	J	4.6E-01	J	mg/kg	TBZ-178	190/424	45%	0.000063-0.016	4.6E-01	6.5E+00	N	B
	319868	delta-HCH	10	2.7E-04	J	3.2E+00	J	mg/kg	DWC-249	145/341	43%	0.000041-0.0059	3.2E+00	6.5E+00	N	B
	58899	gamma-HCH (Lindane)		8.6E-05	J	2.8E-02	J	mg/kg	BAZ-2010	110/412	27%	0.000043-0.011	2.8E-02	5.9E+00	N	B
	72435	Methoxychlor		2.5E-04	J	1.1E+00		mg/kg	DWC-249	129/435	30%	0.000051-0.012	1.1E+00	8.4E+01	N	B
	Semivolatiles															
	98862	Acetophenone		4.8E-03	J	4.1E-01		mg/kg	DWC-315	108/524	21%	0.002-0.24	4.1E-01	2.2E+03	N	B
	100527	Benzaldehyde		7.5E-03	J	6.7E+00	J	mg/kg	DWC-249	301/518	58%	0.0011-0.43	6.7E+00	2.2E+03	N	B
	92524	1,1'-biphenyl		2.3E-03	J	8.5E-01		mg/kg	DWC-249	97/524	19%	0.0019-0.26	8.5E-01	1.9E+03	N	B
	85687	Butyl benzyl phthalate		9.4E-03	J	7.4E+00		mg/kg	BAZ-1117	161/524	31%	0.0031-0.4	7.4E+00	3.4E+03	N	B
	105602	Caprolactam		9.9E-03	J	6.4E-01	J	mg/kg	TBZ-101	45/522	8.6%	0.011-2.2	6.4E-01	8.4E+03	N	B
	106478	4-chloroaniline		6.7E-03	J	1.2E+00	J	mg/kg	DWC-307	174/521	33%	0.0013-0.23	1.2E+00	5.9E+01	N	B
	91941	3,3'-dichlorobenzidine		1.5E-01	J	5.1E-01	J	mg/kg	BAZ-1010	3/496	0.60%	0.0046-0.76	5.1E-01	2.6E+01	N	B
	105679	2,4-dimethylphenol		2.3E-02	J	2.3E-01	J	mg/kg	DWC-315	6/515	1.2%	0.0018-0.57	2.3E-01	3.4E+02	N	B
	121142	2,4-dinitrotoluene		1.8E-02	J	1.8E-02	J	mg/kg	TBZ-168	1/523	0.20%	0.002-0.23	1.8E-02	3.3E+01	N	B
	606202	2,6-dinitrotoluene		1.0E-01	J	1.6E-01	J	mg/kg	TBZ-118	3/523	0.60%	0.0022-0.3	1.6E-01	5.1E+00	N	B
	118741	Hexachlorobenzene		--		--		mg/kg	--	0/524	0.0%	0.00092-0.23	--	9.7E+00	N	B

RAGS D Table 2.2
Occurrence, Distribution, and Selection of Chemicals of Potential Concern
Berry's Creek Study Area

Scenario Timeframe:	**Current / Future**
Medium:	**Sediment**
Exposure Medium:	**Sediment**

Exposure Point	CAS Number	Chemical		Minimum Concentration (Qualifier)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Reporting Limits	Concentration Used for Screening (1)	Risk-based Screening Level	COPC Flag (Y/N)	Rationl for Selection or Deletion (2)
Sediment (All Depths, Waterway and Marsh, All Reaches)	78591	Isophorone		2.5E-01	J	2.5E-01	J	mg/kg	BAZ-1002	1/524	0.20%	0.0017-0.22	2.5E-01	3.4E+03	N	B
	95487	2-methylphenol		1.2E-02	J	7.8E-02	J	mg/kg	BAZ-1006	6/524	1.1%	0.0016-0.45	7.8E-02	8.4E+02	N	B
	106445	4-methylphenol		6.2E-03	J	4.9E-01	J	mg/kg	TBZ-110	103/457	23%	0.0019-0.28	4.9E-01	1.7E+03	N	B
	88744	2-nitroaniline		4.5E-02	J	8.5E-01	J	mg/kg	MRH-253	2/524	0.40%	0.0026-1.3	8.5E-01	1.7E+02	N	B
	99092	3-nitroaniline	17	2.0E-02	J	2.0E-02	J	mg/kg	TBZ-108	1/522	0.20%	0.0014-1.2	2.0E-02	6.7E+01	N	B
	86306	*N* -nitrosodiphenylamine		8.2E-03	J	1.8E+00	J	mg/kg	TBZ-184	77/523	15%	0.0017-0.27	1.8E+00	2.4E+03	N	B
	108952	Phenol		1.2E-03	J	4.5E-01	J	mg/kg	MRH-253	135/524	26%	0.0016-0.44	4.5E-01	5.0E+03	N	B
	117817	bis(2-ethylhexyl)phthalate		1.3E-02	J	6.5E+01		mg/kg	DWC-315	475/524	91%	0.0038-0.25	6.5E+01	3.4E+02	N	B
	84662	Diethyl phthalate		1.2E-02	J	1.3E+00	J	mg/kg	TBZ-117	31/522	5.9%	0.0024-0.32	1.3E+00	1.3E+04	N	B
	131113	Dimethyl phthalate	18	2.6E-02	J	2.3E+00	J	mg/kg	BAZ-1073	66/524	13%	0.0014-0.32	2.3E+00	1.3E+04	N	B
	84742	Di-n-butyl phthalate		6.3E-03	J	1.6E+00	J	mg/kg	TBZ-185	207/523	40%	0.0054-0.36	1.6E+00	1.7E+03	N	B
	117840	Di-n-octylphthalate		1.4E-03	J	4.8E+01	J	mg/kg	BAZ-1067	90/524	17%	0.0011-0.31	4.8E+01	1.7E+02	N	B
	88062	2,4,6-trichlorophenol		4.4E-01	J	4.4E-01	J	mg/kg	DWC-249	1/524	0.20%	0.0021-0.95	4.4E-01	1.7E+01	N	B
	PCBs															
	--	PCBs (total Aroclors)	19	2.0E-03	J	1.6E+02	J	mg/kg	DWC-250	2088/2290	91%	--	1.6E+02	3.1E-01	Y	A
	Volatiles															
	67641	Acetone		6.7E-03	J	9.5E-01		mg/kg	WC-D.4	205/474	43%	0.0025-1.2	9.5E-01	2.0E+04	N	B
	71432	Benzene		3.8E-03	J	1.1E+00		mg/kg	DWC-315	18/474	3.8%	0.00038-0.18	1.1E+00	8.8E+01	N	B
	111444	bis(2-chloroethyl)ether		--		--		mg/kg	--	0/524	0.0%	0.00075-0.22	--	1.4E+01	N	B
	78933	2-butanone		4.2E-03	J	2.8E-01		mg/kg	WC-D.4	90/474	19%	0.00076-0.25	2.8E-01	1.3E+04	N	B
	75150	Carbon disulfide		1.3E-03	J	2.5E+00		mg/kg	DWC-315	228/474	48%	0.00035-0.0089	2.5E+00	2.2E+03	N	B
	108907	Chlorobenzene		1.3E-03	J	1.2E+00		mg/kg	DWC-315	51/474	11%	0.00037-0.098	1.2E+00	4.4E+02	N	B
	67663	Chloroform		3.3E-03	J	3.3E-03	J	mg/kg	DWC-249	1/474	0.20%	0.00035-0.23	3.3E-03	2.2E+02	N	B
	74873	Chloromethane		--		--		mg/kg	--	0/474	0.0%	0.00018-0.32	--	1.2E+03	N	B
	95501	1,2-dichlorobenzene		1.3E-03	J	1.2E+00		mg/kg	DWC-315	107/473	23%	0.0003-0.16	1.2E+00	2.0E+03	N	B
	541731	1,3-dichlorobenzene		1.0E-03	J	1.3E-02	J	mg/kg	TBZ-132	41/473	8.7%	0.0003-0.12	1.3E-02	4.4E+02	N	B
	106467	1,4-dichlorobenzene		1.2E-03	J	3.4E-02	J	mg/kg	DWC-249	129/473	27%	0.00036-0.12	3.4E-02	1.5E+03	N	B
	25321226	Dichlorobenzenes (total)	20	9.3E-04		6.1E+00		mg/kg	SC-D.2	18/18	100%	--	6.1E+00	1.5E+03	N	B
	75343	1,1-dichloroethane		1.3E+00		1.6E+00		mg/kg	DWC-315	2/474	0.40%	0.00015-0.19	1.6E+00	2.7E+03	N	B
	156592	*cis* -1,2-dichloroethene		4.2E-04	J	1.3E-01	J	mg/kg	DWC-315	9/474	1.9%	0.00023-0.15	1.3E-01	4.4E+01	N	B
	156605	*trans* -1,2-dichloroethene		5.3E-03	J	5.3E-03	J	mg/kg	WC-E.5	1/474	0.20%	0.00049-0.17	5.3E-03	4.4E+02	N	B
	100414	Ethylbenzene		1.2E-03	J	3.7E+00		mg/kg	DWC-315	14/474	3.0%	0.00041-0.011	3.7E+00	1.4E+03	N	B
	591786	2-hexanone		1.5E-02	J	1.5E-02	J	mg/kg	TBZ-171	1/474	0.20%	0.00059-0.13	1.5E-02	1.1E+02	N	B
	98828	Isopropylbenzene		3.3E-03	J	1.8E-02	J	mg/kg	TBZ-184	12/474	2.5%	0.00036-0.12	1.8E-02	2.2E+03	N	B
	79209	Methyl acetate		2.5E-03	J	5.1E+00		mg/kg	DWC-315	40/474	8.4%	0.00077-0.04	5.1E+00	2.2E+04	N	B
	75092	Methylene chloride		1.5E-03	J	2.4E-02	J	mg/kg	WC-D.4	12/474	2.5%	0.00025-0.25	2.4E-02	1.3E+02	N	B
	100425	Styrene		3.0E-03	J	3.0E-03	J	mg/kg	TBZ-171	1/472	0.20%	0.00012-0.15	3.0E-03	4.4E+03	N	B
	127184	Tetrachloroethene		6.4E-01	J	1.5E+01		mg/kg	DWC-315	2/474	0.40%	0.00016-0.19	1.5E+01	1.3E+02	N	B

RAGS D Table 2.2
Occurrence, Distribution, and Selection of Chemicals of Potential Concern
Berry's Creek Study Area

Scenario Timeframe:	**Current / Future**
Medium:	**Sediment**
Exposure Medium:	**Sediment**

Exposure Point	CAS Number	Chemical		Minimum Concentration (Qualifier)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Reporting Limits	Concentration Used for Screening (1)	Risk-based Screening Level	COPC Flag (Y/N)	Rationl for Selection or Deletion (2)
Sediment (All Depths, Waterway and Marsh, All Reaches)	108883	Toluene		8.5E-04	J	1.3E+01		mg/kg	DWC-315	41/474	8.6%	0.00032-0.013	1.3E+01	1.8E+03	N	B
	87616	1,2,3-trichlorobenzene		3.1E-03	J	2.0E-01	J	mg/kg	DWC-315	8/407	2.0%	0.00072-0.12	2.0E-01	1.8E+01	N	B
	120821	1,2,4-trichlorobenzene		9.1E-04	J	1.9E-01	J	mg/kg	DWC-315	35/472	7.4%	0.00038-0.07	1.9E-01	2.2E+02	N	B
	79016	Trichloroethene		1.6E-03	J	4.3E+01		mg/kg	DWC-315	8/474	1.7%	0.0005-0.18	4.3E+01	1.1E+01	Y	A
	76131	Trichlorotrifluoroethane		1.3E-02		3.0E-01	J	mg/kg	DWC-315	3/474	0.60%	0.00045-0.076	3.0E-01	6.6E+05	N	B
	75014	Vinyl chloride		5.9E-01	J	5.9E-01	J	mg/kg	DWC-315	1/474	0.20%	0.0002-0.3	5.9E-01	2.2E+01	N	B
	13302070	*m,p* -xylenes	21	6.2E-04	J	1.1E+01		mg/kg	DWC-315	29/452	6.4%	0.00075-0.2	1.1E+01	4.4E+03	N	B
	95476	*o* -xylene		1.7E-03		2.8E+00		mg/kg	DWC-315	28/452	6.2%	0.00031-0.12	2.8E+00	4.4E+03	N	B
	1330207	Xylenes		6.2E-04	J	5.7E-02		mg/kg	SC-D.3	8/66	12%	0.0004-0.0087	5.7E-02	4.4E+03	N	B

Notes:
CAS = Chemical Abstract Service
COPC = chemical of potential concern
J = estimated value
N = no
mg/kg = milligrams per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
Y = yes
-- = not available

(1) Maximum detected value except for lead where average was used.
(2) A = Maximum detected value above screening value, considered a COPC.
B = No detected value or maximum detected value below screening value, not considered a COPC.
C = Mean detected concentration used for screening is below screening value, not considered a COPC. Max detected value is not appropriate for adult exposure, see text.
(3) Chromium risk-based screening level values are based on toxicity criterion for Chromium (III).
(4) Lead screening level based on U.S. Environmental Protection Agency (EPA) screening level for industrial soil.
(5) Risk-based screening level for total mercury is based on Mercuric chloride.
(6) Acenaphthylene risk-based screening level values are based on toxicity criteria for Acenaphthene.
(7) Benzo[g,h,i]perylene risk-based screening level values are based on toxicity crieria for Pyrene.
(8) Phenanthrene risk-based screening level values are based on toxicity crieria for Anthracene.
(9) alpha-Chlordane risk-based screening level values are based on toxicity crieria for Chlordane.
(10) delta-HCH risk-based screening level values are based on toxicity crieria for technical HCH.
(11) Endosulfan I risk-based screening level values are based on toxicity crieria for Endosulfan.
(12) Endosulfan II risk-based screening level values are based on toxicity crieria for Endosulfan.
(13) Endosulfan sulfate risk-based screening level values are based on toxicity crieria for Endosulfan.
(14) Endrin aldehyde risk-based screening level values are based on toxicity crieria for Endrin.
(15) Endrin ketone risk-based screening level values are based on toxicity crieria for Endrin.
(16) gamma-Chlordane risk-based screening level values are based on toxicity crieria for Chlordane.
(17) 3-Nitroaniline risk-based screening level values are based on toxicity crieria for 4-Nitroaniline.
(18) Dimethyl phthalate risk-based screening level values are based on toxicity crieria for Diethyl phthalate.
(19) Total of Aroclors risk-based screening level value is based on the toxicity value for Aroclor 1254. The cancer slope value is based on the toxicity value for total PCBs.
(20) Dichlorobenzenes (total) risk-based screening level values are based on toxicity crieria for 1,4-Dichlorobenzene.
(21) *m,-p* -xylenes risk-based screening level values are based on toxicity criteria for Xylenes.

RAGS D Table 2.3
Occurrence, Distribution, and Selection of Chemicals of Potential Concern
Berry's Creek Study Area

Scenario Timeframe:	**Current / Future**
Medium:	**Tissue**
Exposure Medium:	**Tissue**

Exposure Point	CAS Number	Chemical		Minimum Concentration (Qualifier)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Reporting Limits	Concentration Used for Screening (1)	Risk-based Screening Level	COPC Flag (Y/N)	Rationl for Selection or Deletion (2)
Tissue (White Perch Fillet and Blue Crab Muscle plus Hepatopancreas, All Reaches)	***Metals***															
	7440360	Antimony		4.3E-01	J	4.7E-01	J	mg/kg	BAZ-1036	2/24	8.3%	0.39-0.39	4.7E-01	1.1E-01	Y	A
	7440382	Arsenic		3.2E-01	J	1.6E+00		mg/kg	BAZ-1008	16/24	67%	0.3-0.3	1.6E+00	7.2E-03	N	C
	7440393	Barium		9.4E-02	J	2.6E-01	J	mg/kg	BAZ-1059	12/24	50%	0.071-0.071	2.6E-01	5.6E+01	N	B
	7440473	Chromium (total)	3	2.1E-01	J	8.6E+00		mg/kg	BAZ-1029	6/24	25%	0.2-0.2	8.6E+00	4.2E+02	N	B
	7440508	Copper		9.1E-01	J	2.0E+01		mg/kg	BTA-105	23/24	96%	0.74-0.74	2.0E+01	1.1E+01	Y	A
	7439896	Iron		5.0E+00	J	2.6E+02	J	mg/kg	BAZ-1029	20/24	83%	4.9-4.9	2.6E+02	1.9E+02	Y	A
	7439921	Lead	4	1.9E-01	J	1.2E+00	J	mg/kg	BTA-137	4/24	17%	0.19-0.19	5.5E-01	1.5E+00	N	D
	7439965	Manganese		1.8E-01	J	6.2E+01	J	mg/kg	BAZ-1073	24/24	100%	--	6.2E+01	3.9E+01	Y	A
	7439976	Mercury	5	6.3E-02	J	1.4E+00		mg/kg	BAZT-3065	257/258	100%	0.045-0.045	1.4E+00	8.3E-02	Y	A
	7440020	Nickel		1.1E+00	J	1.1E+00	J	mg/kg	BAZ-1029	1/24	4.2%	0.27-0.27	1.1E+00	5.6E+00	N	B
	7782492	Selenium		4.9E-01	J	1.5E+00		mg/kg	BAZ-1084,BAZ-1008	89/99	90%	0.36-0.45	1.5E+00	1.4E+00	Y	A
	7440224	Silver		1.5E-01	J	6.0E-01		mg/kg	BAZ-1040	12/24	50%	0.1-0.1	6.0E-01	1.4E+00	N	B
	7440666	Zinc		7.0E+00	J	5.0E+01		mg/kg	BAZ-1040	24/24	100%	--	5.0E+01	8.3E+01	N	B
	Organometals															
	75605	Dimethylarsinic acid		2.0E-03	J	4.0E-03	J	mg/kg	BAZT-3061,BAZT-3070	10/20	50%	0.002-0.002	4.0E-03	5.6E+00	N	B
	22967926	Methyl mercury		1.3E-02		1.2E+00	J	mg/kg	BAZT-3069	301/301	100%	--	1.2E+00	2.8E-02	Y	A
	PAHs															
	83329	Acenaphthene		2.2E-03	J	2.9E-03	J	mg/kg	BAZ-1059	2/3	67%	0.0016-0.0016	2.9E-03	1.7E+01	N	B
	86737	Fluorene		1.6E-03	J	1.6E-03	J	mg/kg	BAZ-1098	1/3	33%	0.001-0.0015	1.6E-03	1.1E+01	N	B
	91203	Naphthalene		2.1E-03	J	2.1E-03	J	mg/kg	BAZ-1098	1/3	33%	0.001-0.0015	2.1E-03	5.6E+00	N	B
	85018	Phenanthrene	6	4.7E-03	J	4.7E-03	J	mg/kg	BAZ-1036	1/3	33%	0.00082-0.00092	4.7E-03	8.3E+01	N	B
	PCBs															
	--	PCBs (total Aroclors)	7	1.6E-03	J	3.4E+00		mg/kg	BAZT-3067	327/338	97%	--	3.4E+00	5.4E-03	Y	A

Notes: CAS = Chemical Abstract Service; COPC = chemical of potential concern; J = estimated value; mg/kg = milligrams per kilogram; N = no; PAH = polycyclic aromatic hydrocarbon; PCI = polychlorinated biphenyl; Y = yes; -- = not available

(1) Maximum detected value except for lead where average was used, see text.
(2) A = Maximum detected value above screening value, considered a COPC.
B = No detected value or maximum detected value below screening value, not considered a COPC.
C = Form of arsenic is organic arsenic, is a non-toxic form. Not selected as COPC, see text.
D = Lead mean detected concentration used for screening is below screening value, not considered a COPC.
(3) Chromium risk-based screening level values are based on toxicity criterion for Chromium (III) as a surrogate.
(4) Lead screening level based on historical Food and Drug Adminstration (FDA) guideline value.
(5) Risk-based screening level for total mercury is based on Mercuric chloride as surrogate.
(6) Phenanthrene risk-based screening level values are based on toxicity criteria for Anthracene.
(7) Total of Aroclors risk-based screening level value is based on the toxicity value for Aroclor 1254. The cancer slope value is based on the toxicity value for total PCBs.

RAGS D Table 2.4
Occurrence, Distribution, and Selection of Chemicals of Potential Concern
Berry's Creek Study Area

Scenario Timeframe:	**Current / Future**
Medium:	**Surface Water**
Exposure Medium:	**Surface Water**

Exposure Point	CAS Number	Chemical		Minimum Concentration (Qualifier)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Reporting Limits	Concentration Used for Screening (1)	Risk-based Screening Level	COPC Flag (Y/N)	Rationl for Selection or Deletion (2)
Surface Water (All Reaches)	***Metals***															
	7429905	Aluminum		7.9E+00	J	1.8E+04		µg/l	MHS-01-03	866/1197	72%	7.5-950	1.8E+04	3.7E+05	N	B
	7440360	Antimony		1.5E-01	J	6.7E+01	J	µg/l	MHS-05	635/1197	53%	0.11-6.5	6.7E+01	1.5E+02	N	B
	7440382	Arsenic		5.5E-01	J	5.0E+01	J	µg/l	MHS-07,MHS-02,MHS-05,MHS-06	906/1198	76%	0.063-20	5.0E+01	1.0E+01	Y	A
	7440393	Barium		4.5E+00	J	2.6E+02	J	µg/l	MSW-236	1098/1198	92%	0.67-0.67	2.6E+02	7.3E+04	N	B
	7440417	Beryllium		3.1E-02	J	5.0E+00	J	µg/l	ASWM-204	76/1198	6.3%	0.031-10	5.0E+00	7.3E+02	N	B
	7440439	Cadmium		2.6E-02	J	5.8E+01	J	µg/l	MHS-01	318/1198	27%	0.026-6.5	5.8E+01	3.7E+02	N	B
	7440473	Chromium (total)	3	2.1E-01	J	2.1E+02	J	µg/l	MHS-06	929/1198	78%	0.13-36	2.1E+02	5.5E+05	N	B
	7440484	Cobalt		7.6E-02	J	4.9E+01		µg/l	MSW-16	653/1198	55%	0.02-2.9	4.9E+01	1.1E+02	N	B
	7440508	Copper		5.5E-01	J	1.1E+03	J	µg/l	MIP-205	897/1195	75%	0.24-15	1.1E+03	1.5E+04	N	B
	7439896	Iron		1.6E+01	J	3.7E+04		µg/l	MHS-01-03	877/1198	73%	12-1300	3.7E+04	2.6E+05	N	B
	7439921	Lead	4	1.1E-01	J	1.1E+02		µg/l	MHS-01-03	882/1198	74%	0.11-9	7.3E+00	1.5E+01	N	C
	7439965	Manganese		2.8E+01		4.5E+03		µg/l	ASWM-203	1252/1252	100%	--	4.5E+03	5.1E+04	N	B
	7439976	Mercury	5	2.9E-04	J	3.1E+01	J	µg/l	MHS-07	1770/1793	99%	0.00012-0.2	3.1E+01	1.1E+02	N	B
	7440020	Nickel		7.4E-01	J	1.9E+02		µg/l	MSW-16	1130/1187	95%	0.088-10	1.9E+02	7.3E+03	N	B
	7782492	Selenium		2.5E-01	J	5.8E+00		µg/l	MSW-211	178/1198	15%	0.25-60	5.8E+00	1.8E+03	N	B
	7440224	Silver		1.3E-02	J	1.7E+00		µg/l	MHS-01-03	165/1198	14%	0.0083-4	1.7E+00	1.8E+03	N	B
	7440280	Thallium		1.3E-01	J	7.7E+00	J	µg/l	MIP-202	61/1198	5.1%	0.074-7	7.7E+00	3.7E+00	Y	A
	7440622	Vanadium		5.0E-01	J	3.8E+01		µg/l	MHS-01-03	993/1198	83%	0.15-22	3.8E+01	1.8E+03	N	B
	7440666	Zinc		2.1E+00	J	1.6E+03	J	µg/l	MSW-16	741/1186	63%	2.1-120	1.6E+03	1.1E+05	N	B
	Organometals															
	22967926	Methyl mercury		2.7E-05	J	2.4E-02		µg/l	MHS-06	1483/1503	99%	0.0000086-0.00026	2.4E-02	3.7E+01	N	B
	PAHs															
	83329	Acenaphthene		1.4E-02	J	1.3E-01	J	µg/l	MSW-38	76/391	19%	0.014-0.43	1.3E-01	2.2E+04	N	B
	208968	Acenaphthylene	6	1.0E-02	J	9.1E-02	J	µg/l	BAZ-1022	7/391	1.8%	0.008-0.32	9.1E-02	2.2E+04	N	B
	120127	Anthracene		8.7E-03	J	5.0E-01	J	µg/l	MSW-21	106/391	27%	0.0081-0.19	5.0E-01	1.1E+05	N	B
	56553	Benz[a]anthracene		2.0E-02	J	4.7E+00		µg/l	MIP-206	76/391	19%	0.014-0.14	4.7E+00	1.2E+01	N	B
	50328	Benzo[a]pyrene		1.2E-02	J	3.2E+00		µg/l	MSW-21	63/391	16%	0.011-0.11	3.2E+00	1.2E+00	Y	A
	205992	Benzo[b]fluoranthene		2.0E-02	J	3.6E+00		µg/l	BBM-105	72/391	18%	0.015-0.29	3.6E+00	1.2E+01	N	B
	191242	Benzo[g,h,i]perylene	7	2.3E-02	J	4.4E+00		µg/l	MSW-21	51/391	13%	0.0081-0.14	4.4E+00	1.1E+04	N	B
	207089	Benzo[k]fluoranthene		2.0E-02	J	3.9E+00		µg/l	MSW-21	52/391	13%	0.015-0.44	3.9E+00	1.2E+02	N	B
	218019	Chrysene		1.3E-02	J	4.3E+00		µg/l	MSW-21,MIP-206	77/391	20%	0.01-0.13	4.3E+00	1.2E+03	N	B
	53703	Dibenz[a,h]anthracene		1.3E-02	J	4.7E+00		µg/l	MSW-21	45/391	12%	0.012-0.18	4.7E+00	1.2E+00	Y	A
	132649	Dibenzofuran		1.7E-02	J	8.5E-02	J	µg/l	MSW-38	71/391	18%	0.017-0.35	8.5E-02	3.7E+02	N	B
	206440	Fluoranthene		1.3E-02	J	3.5E+00		µg/l	BAZ-1022	199/391	51%	0.0094-0.2	3.5E+00	1.5E+04	N	B
	86737	Fluorene		1.2E-02	J	1.0E-01	J	µg/l	BAZ-1022	84/391	22%	0.0093-0.31	1.0E-01	1.5E+04	N	B
	193395	Indeno[1,2,3-cd]pyrene		2.0E-02	J	4.4E+00		µg/l	MSW-21	53/391	14%	0.015-0.15	4.4E+00	1.2E+01	N	B
	91576	2-methylnaphthalene		1.1E-02	J	2.3E-01		µg/l	BAZT-3060	80/391	21%	0.011-0.77	2.3E-01	1.5E+03	N	B

RAGS D Table 2.4
Occurrence, Distribution, and Selection of Chemicals of Potential Concern
Berry's Creek Study Area

Scenario Timeframe:	**Current / Future**
Medium:	**Surface Water**
Exposure Medium:	**Surface Water**

Exposure Point	CAS Number	Chemical		Minimum Concentration (Qualifier)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Reporting Limits	Concentration Used for Screening (1)	Risk-based Screening Level	COPC Flag (Y/N)	Rationl for Selection or Deletion (2)
	91203	Naphthalene		1.8E-02	J	1.8E-01	J	µg/l	BAZ-1011	87/391	22%	0.013-0.5	1.8E-01	7.3E+03	N	B
	85018	Phenanthrene	8	3.0E-02	J	9.0E-01		µg/l	BAZ-1022	181/391	46%	0.027-0.24	9.0E-01	1.1E+05	N	B
	129000	Pyrene		1.5E-02	J	2.4E+00		µg/l	MIP-206	180/391	46%	0.01-0.18	2.4E+00	1.1E+04	N	B
	Pesticides															
	309002	Aldrin		1.3E-03		3.9E-02	J	µg/l	MSW-236	35/195	18%	0.00078-0.041	3.9E-02	8.9E-01	N	B
	86748	Carbazole		1.5E-02	J	2.2E+00		µg/l	MIP-206	81/391	21%	0.013-0.19	2.2E+00	7.6E+02	N	B
	5103719	alpha-chlordane	9	1.4E-03	J	2.8E-02	J	µg/l	BAZ-1011	15/199	7.5%	0.00092-0.048	2.8E-02	4.3E+01	N	B
	5566347	gamma-chlordane	16	1.3E-03	J	1.7E-01		µg/l	MSW-226	'70/196	36%	0.0009-0.047	1.7E-01	4.3E+01	N	B
	72548	4,4'-DDD		0.00081	J	0.014		µg/l	BAZ-1032	24/200	12%	0.00063-0.033	0.014	6.3E+01	N	B
	72559	4,4'-DDE		7.7E-04	J	1.3E-02		µg/l	MSW-235	15/200	7.5%	0.00074-0.039	1.3E-02	4.5E+01	N	B
	50293	4,4'-DDT		8.7E-04	J	8.2E-02		µg/l	BAZ-1032	64/200	32%	0.0007-0.036	8.2E-02	4.5E+01	N	B
	60571	Dieldrin		8.0E-04	J	9.7E-03	J	µg/l	MSW-226	26/200	13%	0.00077-0.04	9.7E-03	9.5E-01	N	B
	959988	Endosulfan I	11	1.3E-03	J	6.2E-03	J	µg/l	MSW-09	'9/195	4.6%	0.00088-0.046	6.2E-03	2.2E+03	N	B
	33213659	Endosulfan II	12	1.2E-03	J	1.3E-02	J	µg/l	MSW-23	'66/171	39%	0.00092-0.048	1.3E-02	2.2E+03	N	B
	1031078	Endosulfan sulfate	13	1.9E-03	J	1.0E-02		µg/l	MSW-20	'7/199	3.5%	0.00054-0.028	1.0E-02	2.2E+03	N	B
	72208	Endrin		1.3E-03	J	7.4E-03	J	µg/l	MSW-235	11/195	5.6%	0.0009-0.047	7.4E-03	1.1E+02	N	B
	7421934	Endrin aldehyde	14	2.0E-03	J	4.8E-03	J	µg/l	MSW-23	'3/196	1.5%	0.00085-0.044	4.8E-03	1.1E+02	N	B
	53494705	Endrin ketone	15	1.1E-03	J	2.5E-02	J	µg/l	MIP-205	'9/198	4.5%	0.00086-0.045	2.5E-02	1.1E+02	N	B
	76448	Heptachlor		1.2E-03	J	3.1E-02	J	µg/l	MIP-205	56/167	34%	0.00093-0.049	3.1E-02	3.4E+00	N	B
Surface Water (All Reaches)	1024573	Heptachlor epoxide		9.8E-04	J	1.6E-02	J	µg/l	MSW-236	17/196	8.7%	0.00091-0.048	1.6E-02	1.7E+00	N	B
	319846	alpha-HCH		8.9E-04	J	2.5E-02		µg/l	MSW-230	14/198	7.1%	0.00062-0.032	2.5E-02	2.4E+00	N	B
	319857	beta-HCH		1.8E-03		1.7E-02		µg/l	MSW-226	28/200	14%	0.00094-0.049	1.7E-02	8.4E+00	N	B
	319868	delta-HCH	10	1.7E-03	J	1.3E-02	J	µg/l	MSW-236	5/185	2.7%	0.00036-0.019	1.3E-02	8.4E+00	N	B
	58899	gamma-HCH (Lindane)		1.2E-03	J	5.1E-02	J	µg/l	BBM-105	90/187	48%	0.00076-0.039	5.1E-02	1.4E+01	N	B
	72435	Methoxychlor		1.0E-03	J	8.2E-03	J	µg/l	MSW-04	21/196	11%	0.00086-0.045	8.2E-03	1.8E+03	N	B
	Semivolatiles															
	98862	Acetophenone		2.3E-02	J	4.4E-01	J	µg/l	MSW-09	187/391	48%	0.021-0.46	4.4E-01	3.7E+04	N	B
	100527	Benzaldehyde		5.2E-02	J	5.2E+00	J	µg/l	MSW-220	257/391	66%	0.047-0.47	5.2E+00	3.7E+04	N	B
	92524	1,1'-biphenyl		1.5E-02	J	5.3E-02	J	µg/l	BAZT-3060	29/391	7.4%	0.014-0.49	5.3E-02	1.9E+03	N	B
	85687	Butyl benzyl phthalate		1.3E-01	J	1.4E+00		µg/l	MIP-206	72/391	18%	0.13-1.6	1.4E+00	8.0E+03	N	B
	105602	Caprolactam		7.2E-01	J	5.2E+00		µg/l	MSW-02	55/391	14%	0.2-3.8	5.2E+00	1.8E+05	N	B
	95578	2-chlorophenol		6.8E-02	J	6.8E-02	J	µg/l	BAZT-3044	1/391	0.30%	0.02-1.2	6.8E-02	1.8E+03	N	B
	120832	2,4-dichlorophenol		1.6E-02	J	1.0E-01	J	µg/l	MSW-226	21/390	5.4%	0.013-1.4	1.0E-01	1.1E+03	N	B
	105679	2,4-dimethylphenol		5.1E-02	J	5.3E-02	J	µg/l	BAZT-3044	2/389	0.50%	0.0075-1.9	5.3E-02	7.3E+03	N	B
	51285	2,4-dinitrophenol		1.0E+00	J	1.9E+00	J	µg/l	BAZ-1032	12/391	3.1%	0.58-3.3	1.9E+00	7.3E+02	N	B
	606202	2,6-dinitrotoluene		3.9E-02	J	1.2E-01	J	µg/l	MSW-13	3/391	0.80%	0.018-0.38	1.2E-01	1.0E+01	N	B
	118741	Hexachlorobenzene		6.8E-02	J	1.0E+00		µg/l	BBM-105	7/391	1.8%	0.017-0.31	1.0E+00	9.5E+00	N	B
	78591	Isophorone		3.1E-02	J	5.6E-02	J	µg/l	MSW-226	3/391	0.80%	0.027-0.29	5.6E-02	1.6E+04	N	B
	95487	2-methylphenol		1.4E-02	J	1.6E-01	J	µg/l	MSW-230	26/391	6.6%	0.013-1.3	1.6E-01	1.8E+04	N	B

RAGS D Table 2.4
Occurrence, Distribution, and Selection of Chemicals of Potential Concern
Berry's Creek Study Area

Scenario Timeframe:	**Current / Future**
Medium:	**Surface Water**
Exposure Medium:	**Surface Water**

Exposure Point	CAS Number	Chemical		Minimum Concentration (Qualifier)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Reporting Limits	Concentration Used for Screening (1)	Risk-based Screening Level	COPC Flag (Y/N)	Rationl for Selection or Deletion (2)
Surface Water (All Reaches)	106445	4-methylphenol		1.7E-02	J	1.0E+00		µg/l	MSW-16	30/381	7.9%	0.017-0.099	1.0E+00	3.7E+04	N	B
	59507	4-chloro-3-methylphenol		1.1E-01	J	2.3E+00		µg/l	MSW-16	4/391	1.0%	0.024-1.2	2.3E+00	3.7E+04	N	B
	534521	4,6-dinitro-2-methylphenol		2.6E-01	J	2.6E-01	J	µg/l	MIP-206	1/391	0.30%	0.21-4.1	2.6E-01	2.9E+01	N	B
	99092	3-nitroaniline	17	3.9E-02	J	3.9E-02	J	µg/l	BAZ-1043	1/387	0.30%	0.024-0.37	3.9E-02	7.6E+02	N	B
	100016	4-nitroaniline		7.1E-01	J	7.1E-01	J	µg/l	MIP-206	1/387	0.30%	0.021-0.21	7.1E-01	7.6E+02	N	B
	86306	*N* -nitrosodiphenylamine		8.0E-02	J	8.0E-02	J	µg/l	MSW-08	1/391	0.30%	0.046-0.26	8.0E-02	3.1E+03	N	B
	87865	Pentachlorophenol		9.8E-02	J	8.9E-01	J	µg/l	MIP-206	9/391	2.3%	0.062-1	8.9E-01	3.8E+01	N	B
	108952	Phenol		4.3E-02	J	1.9E+00		µg/l	MSW-16	67/391	17%	0.022-0.67	1.9E+00	1.1E+05	N	B
	117817	bis(2-ethylhexyl)phthalate		8.2E-02	J	6.6E+00		µg/l	MSW-220	129/391	33%	0.043-1.2	6.6E+00	1.1E+03	N	B
	84662	Diethyl phthalate		4.5E-02	J	2.9E+00		µg/l	MSW-226	96/391	25%	0.042-0.24	2.9E+00	2.9E+05	N	B
	131113	Dimethyl phthalate	18	1.8E-01	J	1.8E-01	J	µg/l	MSW-15	1/391	0.3%	0.013-0.26	1.8E-01	2.9E+05	N	B
	84742	Di-*n* -butyl phthalate		4.9E-02	J	6.1E+00		µg/l	MSW-20	130/391	33%	0.028-0.22	6.1E+00	3.7E+04	N	B
	117840	Di-*n* -octylphthalate		1.6E-02	J	3.7E+00		µg/l	MIP-206	45/391	12%	0.015-0.46	3.7E+00	3.7E+03	N	B
	88062	2,4,6-trichlorophenol		6.8E-02	J	1.3E-01	J	µg/l	MSW-226	2/391	0.50%	0.0086-1.4	1.3E-01	3.7E+02	N	B
	PCBs															
	--	PCBs (total Aroclors)	19	2.7E-03	J	2.0E+00		µg/l	MSW-236	'855/1639	52%	--	2.0E+00	7.3E+00	N	B
	Volatiles															
	67641	Acetone		2.5E+00	J	1.9E+01		µg/l	MIP-201	113/209	54%	2.5-2.9	1.9E+01	3.3E+05	N	B
	71432	Benzene		1.1E-01	J	3.6E-01	J	µg/l	MSW-19	9/210	4.3%	0.11-0.23	3.6E-01	2.8E+02	N	B
	111444	bis(2-chloroethyl)ether		4.0E-02	J	2.3E-01		µg/l	MSW-235	8/391	2.0%	0.024-0.36	2.3E-01	1.4E+01	N	B
	75274	Bromodichloromethane		1.5E-01	J	1.6E-01	J	µg/l	MSW-236	2/210	1.0%	0.13-0.22	1.6E-01	2.4E+02	N	B
	78933	2-butanone		5.7E-01	J	1.3E+01		µg/l	MSW-29	35/210	17%	0.55-1.6	1.3E+01	2.2E+05	N	B
	75150	Carbon disulfide		2.1E-01	J	1.1E+00		µg/l	MSW-16	14/210	6.7%	0.21-0.74	1.1E+00	3.7E+04	N	B
	108907	Chlorobenzene		1.5E-01	J	6.5E+00		µg/l	MSW-226	42/210	20%	0.14-0.39	6.5E+00	7.3E+03	N	B
	75003	Chloroethane		3.1E-01	J	5.3E-01	J	µg/l	MSW-16	'2/210	1.0%	0.21-0.37	5.3E-01	3.7E+04	N	B
	67663	Chloroform		1.8E-01	J	1.0E+00		µg/l	MSW-226	27/210	13%	0.17-0.23	1.0E+00	4.9E+02	N	B
	74873	Chloromethane		2.9E-01	J	2.9E-01	J	µg/l	BBM-111	2/210	1.0%	0.28-0.29	2.9E-01	1.2E+03	N	B
	95501	1,2-dichlorobenzene		1.5E-01	J	1.8E+00		µg/l	MSW-219	48/210	23%	0.15-0.26	1.8E+00	3.3E+04	N	B
	541731	1,3-dichlorobenzene		1.1E-01	J	2.0E-01	J	µg/l	MSW-05	'9/209	4.3%	0.11-0.25	2.0E-01	7.3E+03	N	B
	106467	1,4-dichlorobenzene		2.2E-01	J	4.0E-01	J	µg/l	MSW-235	12/210	5.7%	0.21-0.28	4.0E-01	2.8E+03	N	B
	75343	1,1-dichloroethane		2.2E-01	J	7.2E-01	J	µg/l	MSW-226	4/210	1.9%	0.12-0.29	7.2E-01	2.7E+03	N	B
	107062	1,2-dichloroethane		2.6E-01	J	5.0E-01	J	µg/l	MSW-226	4/210	1.9%	0.21-0.33	5.0E-01	1.7E+02	N	B
	75354	1,1-dichloroethene		3.7E-01	J	6.8E-01	J	µg/l	MSW-33	2/210	1.0%	0.3-0.4	6.8E-01	1.8E+04	N	B
	156592	*cis* -1,2-dichloroethene		2.4E-01	J	1.0E+01		µg/l	MSW-38	80/210	38%	0.22-0.24	1.0E+01	7.3E+02	N	B
	156605	*trans* -1,2-dichloroethene		4.8E-01	J	4.8E-01	J	µg/l	MSW-39	1/210	0.5%	0.17-0.25	4.8E-01	7.3E+03	N	B
	100414	Ethylbenzene		2.3E-01	J	2.6E-01	J	µg/l	MSW-19	3/210	1.4%	0.23-0.27	2.6E-01	1.4E+03	N	B
	108101	4-methyl-2-pentanone		1.1E+00	J	1.1E+00	J	µg/l	MSW-16	1/210	0.50%	0.53-0.86	1.1E+00	2.9E+04	N	B
	75092	Methylene chloride		1.6E-01	J	2.4E-01	J	µg/l	MIP-206	4/210	1.9%	0.15-0.3	2.4E-01	2.2E+03	N	B
	127184	Tetrachloroethene		1.5E-01	J	2.2E+00		µg/l	MSW-38	50/210	24%	0.15-0.27	2.2E+00	2.2E+03	N	B

RAGS D Table 2.4
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Berry's Creek Study Area

Scenario Timeframe:	**Current / Future**
Medium:	**Surface Water**
Exposure Medium:	**Surface Water**

Exposure Point	CAS Number	Chemical		Minimum Concentration (Qualifier)		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Reporting Limits	Concentration Used for Screening (1)	Risk-based Screening Level	COPC Flag (Y/N)	Rationl for Selection or Deletion (2)
Surface Water (All Reaches)	108883	Toluene		1.5E-01	J	1.7E+00		µg/l	MSW-226	50/210	24%	0.15-0.3	1.7E+00	2.9E+04	N	B
	87616	1,2,3-trichlorobenzene		1.7E-01	J	2.1E-01	J	µg/l	MSW-21	3/200	1.5%	0.15-0.15	2.1E-01	2.9E+02	N	B
	120821	1,2,4-trichlorobenzene		2.7E-01	J	4.2E-01	J	µg/l	MSW-236	5/210	2.4%	0.27-0.56	4.2E-01	5.2E+02	N	B
	71556	1,1,1-trichloroethane		3.1E-01	J	3.9E-01	J	µg/l	MSW-38	3/210	1.4%	0.26-0.29	3.9E-01	7.3E+05	N	B
	79016	Trichloroethene		1.4E-01	J	1.4E+00		µg/l	MSW-23	59/210	28%	0.14-0.24	1.4E+00	1.8E+02	N	B
	75014	Vinyl chloride		2.4E-01	J	2.1E+00		µg/l	MSW-226	24/210	11%	0.23-0.44	2.1E+00	5.3E-01	Y	A
	13302070	*m,p* -xylenes	20	4.6E-01	J	1.1E+00	J	µg/l	MSW-19	4/200	2.0%	0.41-0.41	1.1E+00	7.3E+04	N	B
	95476	*o* -xylene		1.1E-01	J	3.9E-01	J	µg/l	MSW-19	9/200	4.5%	0.11-0.11	3.9E-01	7.3E+04	N	B
	1330207	Xylenes		2.9E-01	J	3.8E-01	J	µg/l	PI02	2/10	20%	0.25-0.25	3.8E-01	7.3E+04	N	B

Notes:
CAS = Chemical Abstract Service
COPC = chemical of potential concern
J = estimated value
N = no
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
µg/l = micrograms per liter
Y = yes
-- = not available

(1) Maximum detected value.
(2) A = Maximum detected value above screening value, considered a COPC.
B = No detected value or maximum detected value below screening value, not considered a COPC.
C = Mean detected concentration used for screening is below screening value, not considered a COPC. Max detected value is not appropriate for adult exposure, see text.
(3) Chromium risk-based screening level values are based on toxicity criterion for Chromium (III).
(4) Screening level based on US Environmental Protection Agency (USEPA) tap water screening level.
(5) Risk-based screening level for total mercury is based on Mercuric chloride.
(6) Acenaphthylene risk-based screening level values are based on toxicity criteria for Acenaphthene.
(7) Benzo[g,h,i]perylene risk-based screening level values are based on toxicity criteria for Pyrene.
(8) Phenanthrene risk-based screening level values are based on toxicity criteria for Anthracene.
(9) alpha-Chlordane risk-based screening level values are based on toxicity criteria for Chlordane.
(10) delta-HCH risk-based screening level values are based on toxicity criteria for technical HCH.
(11) Endosulfan I risk-based screening level values are based on toxicity criteria for Endosulfan.
(12) Endosulfan II risk-based screening level values are based on toxicity criteria for Endosulfan.
(13) Endosulfan sulfate risk-based screening level values are based on toxicity criteria for Endosulfan.
(14) Endrin aldehyde risk-based screening level values are based on toxicity criteria for Endrin.
(15) Endrin ketone risk-based screening level values are based on toxicity criteria for Endrin.
(16) gamma-Chlordane risk-based screening level values are based on toxicity criteria for Chlordane.
(17) 3-Nitroaniline risk-based screening level values are based on toxicity criteria for 4-Nitroaniline.
(18) Dimethyl phthalate risk-based screening level values are based on toxicity criteria for Diethyl phthalate.
(19) Total of Aroclors risk-based screening level value is based on the toxicity value for Aroclor 1254. The cancer slope value is based on the toxicity value for total PCBs.
(20) *m,-p* -xylenes risk-based screening level values are based on toxicity criteria for Xylenes.

Draft
Attachment M2: Toxicological Criteria
Baseline Human Health Risk Assessment

Berry's Creek Study Area
Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

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INTRODUCTION

A baseline human health risk assessment (BHHRA) was conducted as part of the remedial investigation (RI) of the Berry's Creek Study Area (BCSA). Chemical-specific toxicological criteria were used in combination with calculated intakes for the exposure pathways evaluated in the BHHRA to assess cancer and/or noncancer health effects associated with the respective chemicals of potential concern (COPCs).

Toxicological criteria are numerical expressions of chemical dose and response. Criteria are available for cancer and noncancer effects. For carcinogens (chemicals assumed to have the potential to cause cancer), the toxicological criteria developed typically reflect the assumption that there is no threshold dose for carcinogenic effects. For COPCs that are assumed to have the potential to cause noncancer health effects, toxicological criteria are based on the dose predicted to be associated with no adverse effects. The resulting toxicological criteria for noncancer effects reflect the underlying assumption that a threshold for toxicity exists.

Toxicological criteria may differ depending on the length of human exposure. The U.S. Environmental Protection Agency (EPA) defines acute exposures as lasting less than 2 weeks (USEPA 1989). Subchronic exposures are defined as lasting for at least 2 weeks but less than 7 years, and chronic exposures are defined as lasting 7 years or more.

The majority of the exposure scenarios evaluated in the BHHRA are chronic. For these scenarios, chronic toxicological criteria are used. The exception is the construction worker, for whom exposures are assumed to last 1 year. Chronic toxicological criteria were used to evaluate this exposure scenario in the BHHRA. The implications of using chronic toxicological criteria to assess subchronic exposures are addressed in the "Uncertainty Evaluation" section of the BHHRA (Section 5.6 of Appendix M).

Toxicological criteria also may differ depending upon the route of exposure. For example, criteria for both cancer and noncancer effects may be specifically derived for the dermal, ingestion, or inhalation exposure routes. Potential exposures via all three of these routes have been quantified in this BHHRA, and relevant toxicological criteria were selected, when available. While dermal-specific toxicological criteria are available for some chemicals, there are no dermal-specific toxicological criteria available for the COPCs selected for this BHHRA. Thus, the oral criteria were used to evaluate toxicity for both the oral and dermal routes of exposure, with appropriate adjustments for absorption efficiency by the dermal route, as outlined in USEPA (1989, 2004) guidance.

A discussion of the hierarchy of sources that were consulted for the selection of toxicological criteria for the BHHRA and a general discussion of noncancer and cancer toxicological criteria

are provided below. The discussion of the specific noncancer and cancer toxicological criteria used for the BHHRA are provided after the respective general discussion.

SELECTION OF CHEMICAL-SPECIFIC TOXICOLOGICAL CRITERIA

EPA has established a hierarchy of sources to be considered when selecting toxicological criteria for use in site risk assessment. Following the EPA's hierarchy, the sources that were consulted for the selection of toxicity values, in order of preference, were as follows:

- Tier 1: EPA's Integrated Risk Information System (IRIS) (USEPA 2016)
- Tier 2: EPA's provisional peer-reviewed toxicity values (PPRTVs) (USEPA 2015a)
- Tier 3: Other sources that are publicly available and peer-reviewed, giving priority to those sources that are most current, including, but not limited to:
  - The California Environmental Protection Agency toxicity values (CalEPA 2015)
  - The Agency for Toxic Substances and Disease Registry minimal risk levels (MRLs) (ATSDR 2015)
  - EPA's Health Effects Assessment Summary Tables (HEAST) toxicity values (USEPA 1997).

As described above, chronic toxicological criteria were selected for use in the BHHRA to evaluate all exposure pathways, including the limited number of subchronic exposure scenarios. Similarly, in some cases the toxicological criteria were based on an isomer, parent compound, or derivative within the same family, if a chemical–specific value was not available from the source listed above. The implications of uncertainties associated with the toxicity criteria used in this risk assessment are addressed in the "Uncertainty Evaluation" section of the BHHRA (Section 5.6 of Appendix M).

NONCARCINOGENIC TOXICITY CRITERIA

To evaluate the potential for noncancer hazards from exposures to COPCs, the estimated average daily intake or dose (ADD), or exposure concentration for inhalation exposures, is compared with a reference dose (RfD) for ingestion or dermal contact, a reference concentration (RfC) for inhalation exposures, or other estimate of a safe daily dose. For long-term exposures, this is identified as a chronic RfD or RfC. USEPA (1989) defines the chronic RfD or RfC as a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime. Subchronic RfDs or RfCs represent average daily exposure levels at which no adverse health effects are expected to occur with subchronic exposures of less than 7 years. RfDs and RfCs reflect the underlying assumption

that systemic toxicity occurs as a result of processes that have a threshold (i.e., that a safe level of exposure exists and that toxic effects will not occur until this level has been exceeded).

The RfDs and RfCs for noncarcinogenic effects are generally derived on the basis of laboratory animal studies or epidemiological studies (i.e., studies of humans). The RfD or RfC is typically calculated by first identifying either the highest concentration or dose that does not cause observable adverse effects (the no-observed-adverse-effects level [NOAEL]), the lowest-observed-adverse-effects level (LOAEL), or a modeled effect level (e.g., benchmark dose level). This dose or concentration is then divided by uncertainty and/or modifying factors to calculate an RfD or RfC.

When deriving an RfD or RfC, uncertainty and modifying factors may be applied to account for limitations of, or uncertainties in, the underlying data. Uncertainty factors are intended to provide a margin of safety to ensure that exposures resulting in actual doses less than or equal to the toxicity value (i.e., the RfD or RfC) calculated based on the data will be unlikely to result in adverse health effects in exposed human populations, including sensitive subpopulations. Standard uncertainty factors include those that account for the following: uncertainties stemming from extrapolating doses and effects from animal studies to humans; variation in sensitivity among members of the human population; using a LOAEL instead of a NOAEL; using data from subchronic studies to derive chronic toxicological criteria; and using a limited or incomplete database (e.g., some effect endpoints are untested) for the chemical. Uncertainty factors are most commonly factors of 10. There are many times, however, when a full factor of 10 is not warranted. When this occurs, a factor of 3 or 3.2, which is the square root of 10, or 3 (expressed as one significant figure) is sometimes used. Modifying factors, which are variable in magnitude, account for uncertainties and variabilities that are not captured by the standard uncertainty factors described above.

Once the appropriate uncertainty and modifying factors are used to adjust the NOAEL or LOAEL from the toxicological study, the recommended toxicological criteria are presented in EPA's IRIS and other regulatory databases. These criteria are then directly compared with estimated exposures to estimate potential hazards.

Oral and Dermal Exposures

Noncarcinogenic toxicity criteria for oral and dermal exposures are summarized in risk assessment guidance for superfund (RAGS) D Table 5.1 (Exhibit 1). Noncarcinogenic health effects for the dermal and ingestion exposure pathways quantified in the BHHRA are evaluated using RfDs. Toxicity values for the COPCs evaluated in this BHHRA were not available for dermal exposures. Dermal RfDs were extrapolated from oral RfDs by expressing the oral toxicity value in terms of the dose absorbed through the gastrointestinal tract. As shown in Exhibit 1, the

majority of COPCs were assumed to be completely absorbed, and so the oral and dermal toxicity values are the same.

Noncancer hazards are evaluated using a ratio of exposure (e.g., ADD) to the corresponding noncancer toxicity reference value (e.g., RfD). This ratio is referred to as the hazard quotient (HQ). To assess the overall potential of noncarcinogenic effects posed by multiple chemicals acting on the body in a similar manner, the HQs for each exposure pathway can be summed to calculate a hazard index (HI). The HIs for each exposure pathway can then be summed to derive a total HI for a given exposure scenario that encompasses multiple routes of exposure. Exhibit 1 includes a list of target organs for each COPC. These are the organs that are adversely affected at lower doses than other organs, and upon which the RfD is based. Target organs can be used to group chemical-specific hazards and assess the total hazard to a target organ. For example, in cases where an HI exceeds 1, USEPA (1989) allows COPCs to be segregated by target organs to derive separate HIs for chemicals that affect the same target organ.

Inhalation Exposures

Noncarcinogenic toxicity criteria for inhalation exposures are summarized in RAGS D Table 5.2 (Exhibit 2). The inhalation pathway is associated with exposure to mercury released into ambient air through volatilization from surface water and sediment. No other chemicals are currently being evaluated under the inhalation exposure route.

CARCINOGENIC TOXICITY CRITERIA

EPA evaluates the potential for individual chemicals to cause cancer in humans. An initial step in this evaluation is the completion of a qualitative, weight-of-evidence (WOE) evaluation of the extent to which a chemical is believed to be a human carcinogen based on the results of human and/or animal studies. A chemical is assigned a WOE classification based on data obtained from both human and animal studies as follows:

- Chemicals for which EPA considers there to be adequate causal evidence of carcinogenicity in humans (generally based on human epidemiological data) are categorized as "known human carcinogens" (WOE Class A).

- Other chemicals with various levels of supporting data may be classified as "probable human carcinogens" (WOE Classes B1 or B2), or "possible human carcinogens" (WOE Class C).

- If EPA considers the available data to be inadequate for determining carcinogenicity, the chemical is identified as "not classifiable as to human carcinogenicity" (WOE Class D).

- When toxicological studies provide specific evidence of noncarcinogenicity, the chemical is assigned a WOE Class E.[1]

To assess the potential carcinogenic health effects from oral and dermal exposures, EPA typically develops cancer slope factors (CSFs). CSFs are upper-bound estimates of the carcinogenic potency of chemicals. They are used to estimate the incremental risk of developing cancer, corresponding to a lifetime of exposure at the levels estimated in the exposure assessment. In EPA's standard, default risk assessment procedures, estimates of carcinogenic potency reflect the conservative assumption that there is no threshold dose for carcinogenic effects; that is, there is no entirely "safe" dose, and exposure to any amount of the chemical will contribute to an individual's overall risk of developing cancer during a lifetime.

EPA's *Guidelines for Carcinogen Risk Assessment* (USEPA 2005a), however, recognizes that some carcinogens act in a manner within the body (i.e., a mode of action) that follows a nonlinear, threshold response. A nonlinear dose-response relationship is one in which a level of exposure exists at which there is no increased risk of cancer within the exposed population so that only exposure levels that exceed a threshold dose will result in an increased risk of cancer. EPA allows for estimates of carcinogenic potency to be based on a nonlinear model when sufficient evidence exists to support a nonlinear mode of action for the general population and any subpopulations of concern (USEPA 2005a).

Some carcinogenic chemicals operate through a mutagenic mode of action, causing irreversible DNA damage. For chemicals that are mutagenic, an age-dependent adjustment factor (ADAF) is applied in the dose portion of the risk calculation to address the potential increased risk associated with early life exposures to such chemicals, in accordance with EPA guidance (USEPA 2005b). In the case of vinyl chloride, the ADAF approach cannot be used. Rather, for vinyl chloride exposures that include an early-life component, the risks are calculated separately for the early-life and later-life components and then added to get the total risk for the assumed exposure. Consistent with USEPA (2015b) the vinyl chloride CSF for a continuous lifetime exposure during adulthood is used for both early-life and later-life, but the early-life component is treated as a lifetime exposure rather than pro-rated by the portion of a lifetime over which the early-life exposure occurs.

Oral and Dermal Exposures

Carcinogenic toxicity criteria for oral and dermal exposures are summarized in RAGS D Table 6.1 (Exhibit 3). Potential cancer risks from ingestion of, or dermal contact with,

[1] The WOE approach outlined in the final *Guidelines for Carcinogen Risk Assessment* (USEPA 2005a) differs from and may eventually supersede the categories currently used in EPA's IRIS. The outlined approach considers all scientific information in determining whether and under what conditions an agent may cause cancer in humans, and provides a narrative approach to characterize carcinogenicity rather than categories.

carcinogens are assessed using CSFs. Such toxicity values for the COPCs evaluated in this BHHRA were not available for dermal exposures. Similar to noncarcinogenic toxicity criteria, dermal CSFs were extrapolated from oral CSFs by expressing the oral toxicity value in terms of the dose absorbed through the gastrointestinal tract. As shown in Exhibit 3, the majority of COPCs were assumed to be completely absorbed, resulting in the same toxicity value for oral and dermal exposures.

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Draft
Exhibit 1: RAGS D Table 5.1 Noncancer Oral and Dermal Exposures

Toxicological Criteria

Berry's Creek Study Area Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

Table 5.1
Noncancer Toxicity Data - Oral
Berry's Creek Study Area

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal [1]	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfD: Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Metals										
Aluminum	Chronic	1.0E+00	mg/kg-day	1	1.0E+00	mg/kg-day	Nervous system	100	ORNL - PPRTV	10/21/2015
Antimony	Chronic	4.0E-04	mg/kg-day	0.15	6.0E-05	mg/kg-day	Hematological	1,000	IRIS	10/21/2015
Arsenic	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	Cardiovascular, Dermal	3	IRIS	10/21/2015
Cadmium	Chronic	1.0E-03	mg/kg-day	0.025	2.5E-05	mg/kg-day	Kidney	10	IRIS	10/21/2015
Chromium (VI)	Chronic	3.0E-03	mg/kg-day	0.025	7.5E-05	mg/kg-day	--[4]	900	IRIS	10/21/2015
Cobalt	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	Thyroid	3,000	ORNL - PPRTV	10/21/2015
Copper	Chronic	4.0E-02	mg/kg-day	1	4.0E-02	mg/kg-day	Gastrointestinal	-	ORNL - HEAST	10/21/2015
Iron	Chronic	7.0E-01	mg/kg-day	1	7.0E-01	mg/kg-day	Gastrointestinal	2	ORNL - PPRTV	10/21/2015
Manganese	Chronic	1.4E-01	mg/kg-day	1	1.4E-01	mg/kg-day	Nervous system	1	IRIS	10/21/2015
Mercury (Inorganic) [2]	Chronic	3.0E-04	mg/kg-day	0.07	2.1E-05	mg/kg-day	Immunological	1,000	IRIS	10/21/2015
Nickel	Chronic	2.0E-02	mg/kg-day	0.04	8.0E-04	mg/kg-day	Body[5]	300	IRIS	10/21/2015
Selenium	Chronic	5.0E-03	mg/kg-day	1	5.0E-03	mg/kg-day	Dermal[6]	3	IRIS	10/21/2015
Thallium	Chronic	1.0E-05	mg/kg-day	1	1.0E-05	mg/kg-day	Hair	3,000	ORNL - PPRTV	10/21/2015
Vanadium[3]	Chronic	5.0E-03	mg/kg-day	0.026	1.3E-04	mg/kg-day	Dermal	100	EPA, IRIS	10/21/2015
Zinc	Chronic	3.0E-01	mg/kg-day	1	3.0E-01	mg/kg-day	Hematological, Immunological	3	IRIS	10/21/2015
Organometals										
Methyl Mercury	Chronic	1.0E-04	mg/kg-day	1	1.0E-04	mg/kg-day	Nervous system, Developmental	10	IRIS	10/21/2015
PAHs										
Benz[a]anthracene	Chronic	-	mg/kg-day	1	-	mg/kg-day	-	-	-	-
Benzo[a]pyrene	Chronic	-	mg/kg-day	1	-	mg/kg-day	-	-	-	-
Benzo[b]fluoranthene	Chronic	-	mg/kg-day	1	-	mg/kg-day	-	-	-	-
Dibenz[a,h]anthracene	Chronic	-	mg/kg-day	1	-	mg/kg-day	-	-	-	-
Indeno[1,2,3-cd]pyrene	Chronic	-	mg/kg-day	1	-	mg/kg-day	-	-	-	-
Pesticides										
Aldrin	Chronic	3.0E-05	mg/kg-day	1	3.0E-05	mg/kg-day	Liver	1,000	IRIS	10/21/2015
Heptachlor	Chronic	5.0E-04	mg/kg-day	1	5.0E-04	mg/kg-day	Liver	300	IRIS	10/21/2015
Heptachlor epoxide	Chronic	1.3E-05	mg/kg-day	1	1.3E-05	mg/kg-day	Liver	1,000	IRIS	10/21/2015
PCBs										
PCBs (total Aroclors)[7]	Chronic	2.0E-05	mg/kg-day	1	2.0E-05	mg/kg-day	Dermal, Immunological, Ocular	300	IRIS	10/21/2015

Table 5.1
Noncancer Toxicity Data - Oral
Berry's Creek Study Area

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal [1]	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfD: Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Volatiles										
Trichloroethene	Chronic	5.0E-04	mg/kg-day	1	5.0E-04	mg/kg-day	Immunological	10-1,000[8]	IRIS	10/21/2015
Vinyl chloride	Chronic	3.0E-03	mg/kg-day	1	3.0E-03	mg/kg-day	Liver	30	IRIS	10/21/2015

Notes:
EPA = U.S. Environmental Protection Agency User's Guide (www2.epa.gov/risk/regional-screening-table-users-guide-june-2015)
HEAST = Health Effects Assessment Summary Tables, cited from EPA risk-based summary tables
IRIS = Integrated Risk Information System (www.epa.gov/iris/)
mg/kg-day = milligram per kilogram day
ORNL = Oak Ridge National Laboratory
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PPRTV = Provisional Peer Reviewed Toxicity Values, cited from EPA risk-based summary tables
RfD = oral reference dose
- = no value available

[1] Source is Risk Assessment Guidance for Superfund (RAGS) Part E, Section 4.2 and Exhibit 4-1. Follows recommendations for RfD adjustments. If RAGS E recommends no adjustment be made, the oral absorption efficiency is listed as 1 in this table.

[2] Values are based on mercuric chloride.

[3] Based on oral RfD for vanadium pentoxide multiplied by 56%.

[4] IRIS lists target organ as "None" as the RfD is based on a NOAEL with no identified LOAEL.

[5] Critical effect is decreased body and organ weights.

[6] Clinical signs observed included the characteristic "garlic odor" of excess selenium excretion in the breath and urine, thickened and brittle nails, hair and nail loss, lowered hemoglobin levels, mottled teeth, skin lesions and CNS abnormalities (peripheral anesthesia, acroparesthesia and pain in the extremities).

[7] Values are based on Aroclor 1254.

[8] The RfD for trichloroethene is based on three different endpoints with combined uncertainty and modifying factors of 10, 100 and 1,000.

Draft
Exhibit 2: RAGS D Table 5.2 Noncancer Inhalation Exposures

Toxicological Criteria

Berry's Creek Study Area Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

Table 5.2
Noncancer Toxicity Data - Inhalation
Berry's Creek Study Area

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfC: Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Metals									
Mercury (total) [1]	Chronic	3.0E-04	mg/m^3	NA	NA	Nervous system	30	IRIS	10/21/2015

Notes:
IRIS = Integrated Risk Information System (www.epa.gov/iris/)
mg/m^3 = milligram per cubic meter
NA = not applicable
RfC = inhalation reference concentration
RfD = oral reference dose

[1] Values are based on elemental mercury.

Draft
Exhibit 3: RAGS D Table 6.1 Cancer Oral and Dermal Exposures

Toxicological Criteria

Berry's Creek Study Area Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

Table 6.1
Cancer Toxicity Data - Oral/Dermal
Berry's Creek Study Area

Chemical of Potential Concern	Oral CSF		Oral Absorption Efficiency for Dermal [1]	Absorbed CSF for Dermal		Weight of Evidence/Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Metals								
Arsenic	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	10/21/2015
Chromium (VI)	5.0E-01	$(mg/kg\text{-}day)^{-1}$	0.025	2.0E+01	$(mg/kg\text{-}day)^{-1}$	D	NJDEP, IRIS	10/16/2009
PAHs								
Benzo[a]anthracene	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/21/2015
Benzo[a]pyrene	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/21/2015
Benzo[b]fluoranthene	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/21/2015
Dibenzo[a,h]anthracene	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/21/2015
Indeno[1,2,3-cd]pyrene	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/21/2015
Pesticides								
Aldrin	1.7E+01	$(mg/kg\text{-}day)^{-1}$	1	1.7E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/21/2015
Heptachlor	4.5E+00	$(mg/kg\text{-}day)^{-1}$	1	4.5E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/21/2015
Heptachlor epoxide	9.1E+00	$(mg/kg\text{-}day)^{-1}$	1	9.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/21/2015
PCBs								
PCBs (total Aroclors)	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/21/2015
Volatiles								
Trichloroethene	4.6E-02	$(mg/kg\text{-}day)^{-1}$	1	4.6E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	10/21/2015
Vinyl chloride	7.2E-01	$(mg/kg\text{-}day)^{-1}$	1	7.2E-01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	10/21/2015

Notes:
A = human carcinogen
B2 = probable human carcinogen
CSF = cancer slope factor
D = not classifiable as to human carcinogenicity for the oral route
IARC = International Agency for Research on Cancer
IRIS = Integrated Risk Information System (www.epa.gov/iris/)
mg/kg-day = milligram per kilogram day
NJDEP = New Jersey Department of Environmental Protection
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl

[1] Source is Risk Assessment Guidance for Superfund (RAGS) Part E, Section 4.2 and Exhibit 4-1. Follows recommendations for CSF adjustments. If RAGS E recommends no adjustment be made, the oral absorption efficiency is listed as 1 in this table.

Draft
Attachment M3: Physical-Chemical Parameters Used for Intake Calculations Baseline Human Health Risk Assessment

Berry's Creek Study Area Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

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INTRODUCTION

A baseline human health risk assessment (BHHRA) was conducted as part of the remedial investigation (RI) of the Berry's Creek Study Area (BCSA). The exposure pathways to be evaluated, the equations used for exposure calculations, and the pathway- and receptor-specific exposure factors were described in detail in an *Updated Memorandum of Exposure Scenarios and Assumptions* (MESA) submitted to the U.S. Environmental Protection Agency (EPA) in 2015 (BCSA Group 2015); however, chemical-specific parameter assumptions were not detailed at that time because the full list of chemicals of potential concern (COPCs) for the BHHRA had not yet been determined. COPCs have since been selected as part of the BHHRA (see Attachment M1), and this attachment details chemical-specific parameters to support COPC exposure and risk calculations.

These chemical-specific parameters describe the behavior of these COPCs in the ingestion and dermal exposure pathways for this BHHRA. The particular pathways for which chemical-specific parameters were used in the BCSA BHHRA are as follows:

- Fish/crab ingestion
- Sediment direct contact
  - Dermal contact
  - Sediment ingestion
- Surface water dermal contact.

The following discussion provides a description of the chemical-specific parameters used for the BHHRA and the source of the data. Table 1 provides the values for the physical-chemical parameters used in the BHHRA risk calculations.

FISH/CRAB INGESTION PATHWAY

The BCSA BHHRA evaluated potential exposure to COPCs in white perch fillet, blue crab muscle, and blue crab hepatopancreas. The perch fillet tissues were skin-on fillets with the belly flap included, as recommended by USEPA (2000) and consistent with the quality assurance project plan (QAPP) for the BCSA. Crab muscle tissue was all edible muscle tissue (i.e., all leg and claw meat, back shell meat, and body cavity meat) as specified in the QAPP. Mercury and other metals, methyl mercury, and polychlorinated biphenyls (PCBs) were the COPCs selected for evaluation in fish and crab tissue.

It is well recognized that tissue preparation and cooking methods used may reduce chemical concentrations in fish tissues, particularly for lipophilic compounds such as PCBs (USEPA 2000, 2002; Wilson et al. 1998). For the reasonable maximum exposure (RME) scenarios, the BHHRA assumed that chemical residues in fish and crab tissue are not changed due to preparation or cooking prior to consumption. Chemical loss due to preparation/cooking was evaluated for the central tendency exposure (CTE) scenarios in this BHHRA.

Of the selected COPCs, losses due to preparation and cooking are potentially most significant for PCBs, which are lipophilic compounds that are present in higher concentrations in fatty tissue and skin than in muscle tissue. PCBs can be lost from tissue by removal of fat and skin prior to consumption and by cooking that results in fat (and the PCBs it contains) being released from the tissue. In general, chemicals that are distributed throughout the muscle tissue, such as mercury, will not be substantively reduced through most cooking or preparation methods, and USEPA (2000) has taken the position that cooking/preparation loss is not relevant for metals. Therefore, in this assessment, COPC loss due to preparation and cooking was assumed to occur only for PCBs and only as part of the CTE scenario.

Fish Tissue—Cooking Loss

Reductions in tissue concentrations from preparing and cooking, commonly referred to as cooking loss, are dependent on a number of factors and can vary significantly depending on the species being consumed, the lipid content of the tissue, and the concentration of the chemical in the tissue. Information on the specific cooking techniques that remove the largest amount of PCBs is not known; however, it is thought that those that allow for the fat to be separated or drained from the tissue are likely to reduce exposure the most.

A meta-analysis published by AECOM (2012) reviewed the available data on cooking loss for lipophilic compounds. Studies completed in a variety of fish types and applying a range of preparation and cooking methods were reviewed, and those with sufficient data for quantitative analysis were used to determine the range and midpoint of cooking loss for PCBs. The analysis focused on studies that used a relevant and appropriate experimental method and presented changes in raw and cooked fish tissue COPC levels on a mass basis because a comparison of concentrations in raw and cooked fish alone neglects the change in tissue mass that occurs with cooking, which is often significant. The median losses were generally in the range of 20 to 50 percent for typical cooking methods, and consistent differences in mass loss between cooking methods were not apparent. Across all tissue types and cooking methods, the median losses were 32 percent for PCBs.

In the BHHRA, a cooking loss of 30 percent was applied to the CTE exposure estimates for PCBs in fish fillets.

Crab Tissue—Cooking Loss

Fewer data are available with which to evaluate cooking loss in crab. In a study of PCB concentrations in blue crab claw and body muscle tissue, Zabik et al. (1992) reported a greater than 20 percent reduction of PCBs in tissue after cooking, regardless of cooking technique (boiling or steaming) or preparation (with or without hepatopancreas). Removal of hepatopancreas prior to cooking resulted in slightly greater PCB loss in body muscle tissue (36.4 vs. 31 percent), but did not affect overall PCB loss in claw tissue (23.3 vs. 25.4 percent). Most of the PCBs lost (80 percent) were detected in the cooking water.

For the purposes of the BHHRA, a cooking loss of 20 percent was assumed for blue crab CTE exposure calculations.

SEDIMENT DIRECT CONTACT PATHWAYS

The BCSA BHHRA evaluated potential direct contact exposures to COPCs in sediments. Mercury and other metals, PCBs, polycyclic aromatic hydrocarbons (PAHs), and organochlorine pesticides were the COPCs selected for evaluation in sediments. Chemical-specific parameters were included in the exposure calculations to address dermal absorption of COPCs contacting skin and gastrointestinal absorption of COPCs present on ingested sediment.

Dermal Absorption Factor, ABS_d

For dermal exposures to sediments, the dermal absorption factor (ABS_d) is a unitless value that describes the amount of chemical in soil or sediment that is absorbed through the skin upon contact. Of the sediment COPCs, EPA has developed recommended ABS_d values for arsenic, cadmium, PAHs, and PCBs based on a review of the available studies. For the BCSA BHHRA, the ABS_d values used by EPA for calculation of regional screening levels (RSL) for chemical contaminants at Superfund sites (USEPA 2015a) were used to calculate dermal exposures. Dermal exposure to COPCs without an EPA recommended ABS_d (metals and pesticides) was not quantified, and is addressed in the "Uncertainty Evaluation" section of the BHHRA (Section 5.6 of Appendix M).

Relative Bioavailability, RBA

Bioavailability refers to the fraction of an ingested chemical that is absorbed from the gastrointestinal tract and becomes available for distribution to internal tissues and organs. Relative bioavailability (RBA) refers to the bioavailability of a chemical in a certain dosing vehicle (or exposure medium) compared to the bioavailability of the chemical in the dosing/exposure medium used in the toxicity study that is the basis for the toxicological criteria for the chemical. As outlined by USEPA (1989, 2007a,b, 2012), an RBA can be incorporated into dose calculations to account for the differences in bioavailability between these dosing/exposure mediums.

The toxicological criteria for arsenic that are housed EPA's Integrated Risk Information System (IRIS) database, and used in this BHHRA, were derived from human exposures to drinking water. Many recent bioassay studies of arsenic bioavailability from soil ingestion exposures have demonstrated a significant decrease in bioavailability from this medium. Thus, for evaluating ingestion of arsenic in sediment in this BHHRA, EPA's default RBA value for arsenic in soil of 0.6 (60 percent) was adopted. The basis of this default is USEPA's (2012) compilation of relevant arsenic bioavailability bioassays, which identifies a range of RBA values from 0.08 to 0.6 (i.e., 8–60 percent).

For all other COPCs, a default value of 1 was used.

DERMAL CONTACT WITH SURFACE WATER PATHWAY

The BCSA BHHRA evaluated potential exposures to COPCs in surface water that contacts the skin. Metals (arsenic and thallium), two PAH compounds, and one volatile compound (vinyl chloride) were selected as COPCs in surface water. Dermal contact with PAHs in surface water was not quantified in the risk assessment. EPA recommends against quantifying exposure and risk to PAHs (USEPA 2004). For lipophilic compounds, such as PAHs, predicting chemical-specific parameters needed for estimating dermal surface water exposures is highly uncertain. These chemicals are considered by EPA to be outside of the effective predictive domain. For the remainder of the surface water COPCs, a number of chemical-specific parameters are required to predict the amount of COPCs present in water that is absorbed into the bloodstream.

Fraction Absorbed Water

For highly lipophilic chemicals or other chemicals that exhibit a long lag time between exposure and absorption, some of the chemical dissolved into the skin may be lost due to desquamation (i.e., shedding of the outer layer of skin cells) before absorption into the bloodstream occurs. USEPA (2004) uses a fraction absorbed (FA) term in the calculation of a dermally absorbed dose from water to account for the loss of COPCs due to desquamation. For the BHHRA, FA values were taken from the EPA RSL table for residential water (USEPA 2015b).

A value of 1 is used for chemicals that are not lost via desquamation. A value of less than 1 is used for chemicals that can be lost via this mechanism. FA values less than 1 are used in the BHHRA for some PAHs, pesticides, and PCBs.

Skin Permeability Coefficient, K_p

As described in USEPA (2004), the permeability coefficient for skin contact with chemicals in water (K_p) is the rate of migration of the chemical through the skin, specifically the outermost layer of the skin or stratum corneum, in centimeters per hour. This value, K_p, is derived from either

experimentally derived or predicted values. For the BHHRA, K_p values were taken from the EPA RSL table of chemical-specific parameters (USEPA 2015a).

Permeability Ratio, B

Included in the dermal calculation for COPCs in water is a dimensionless chemical-specific ratio, B, that accounts for the differences in the permeability in different layers of the skin. Specifically, the value B represents the permeability through the stratum corneum at the top of the skin layer relative to the permeability across the viable epidermis below. For the BHHRA, values for B were taken from the most recent EPA RSL table of chemical-specific parameters (USEPA 2015a).

Event Lag Time, τ_{event}

The intake equation for dermal contact with organic chemicals in water assumes that the skin is composed of two compartments, the stratum corneum in direct contact with the water and the viable epidermis below. The event lag time, τ_{event}, is the time required for diffusion of a chemical across the stratum corneum. Accordingly, τ_{event} is a function of the length of the stratum corneum and the chemical-specific diffusion coefficient in this skin layer. Typically, chemicals that are lipophilic and have a high molecular weight have higher τ_{event} values whereas τ_{event} decreases for lower molecular weight and nonlipophilic chemicals. For the BHHRA, values for τ_{event} were taken from the most recent EPA RSL table of chemical-specific parameters (USEPA 2015a).

Time to Steady State, t*

For organic chemicals, the calculation of the dermal-absorbed dose for an exposure event differs based on whether the event was of sufficient duration for the chemical transport across the skin to reach steady state. The time to reach steady state (t*) in hours is a chemical-specific value that represents the time required for the absorption process to reach equilibrium between the stratum corneum and viable epidermis. The value of t* for an organic chemical is a function of two chemical-specific parameters discussed above: the permeability ratio, B, and the event lag time, τ_{event}. For the BHHRA, values for t* were taken from the most recent EPA RSL table of chemical-specific parameters (USEPA 2015a).

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TABLES

Table 1. Physical-Chemical Parameters, Berry's Creek Study Area

COPC	Sediment - Oral Pathway		Sediment - Dermal Pathway		Surface Water - Dermal Pathway									
	RBA[a]	Units	ABS_d[b]	Units	FA[c]	Units	B[b]	Units	K_p[b]	Units	t_{event}[b]	Units	t*[b]	Units
Metals														
Aluminum	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
Antimony	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
Arsenic	6.0E-01	unitless	3.0E-02	unitless	1.0E+00	unitless	3.3E-03	unitless	1.0E-03	cm/hr	2.8E-01	hr/event	6.6E-01	hr
Cadmium	1.0E+00	unitless	1.0E-03	unitless	--	--	--	--	--	--	--	--	--	--
Chromium (VI)	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
Cobalt	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
Copper	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
Iron	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
Manganese	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
Mercury	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
Nickel	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
Thallium	1.0E+00	unitless	NA	unitless	1.0E+00	unitless	5.5E-03	unitless	1.0E-03	cm/hr	1.5E+00	hr/event	3.5E+00	hr
Vanadium	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
Zinc	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
PAHs														
Benzo[a]anthracene	1.0E+00	unitless	1.3E-01	unitless	--	--	--	--	--	--	--	--	--	--
Benzo[a]pyrene	1.0E+00	unitless	1.3E-01	unitless	NA[d]									
Benzo[b]fluoranthene	1.0E+00	unitless	1.3E-01	unitless	--	--	--	--	--	--	--	--	--	--
Dibenzo[a,h]anthracene	1.0E+00	unitless	1.3E-01	unitless	NA[d]									
Indeno[1,2,3-cd]pyrene	1.0E+00	unitless	1.3E-01	unitless	--	--	--	--	--	--	--	--	--	--
Pesticides														
Aldrin	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
Heptachlor	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
Heptachlor epoxide	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
PCBs														
PCBs (total Aroclors)	1.0E+00	unitless	1.4E-01	unitless	--	--	--	--	--	--	--	--	--	--
Volatiles														
Trichloroethene	1.0E+00	unitless	NA	unitless	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	--	--	--	--	1.0E+00	unitless	2.5E-02	unitless	8.4E-03	cm/hr	2.4E-01	hr/event	5.7E-01	hr

Notes:

ABS_d = dermal absorption factor
B = permeability ratio
COPC = chemical of potential concern
EPA = U.S. Environmental Protection Agency
FA = fraction absorbed
K_p = skin permeability coefficient
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RBA = relative bioavailability
t* = time to reach steady state
t_{event} = event lag time
NA = not available
-- = not a COPC in this medium

[a] Source for RBA is EPA regional screening level calculator (USEPA 2015c) and USEPA (2012) guidance.

[b] Source is EPA regional screening level table for chemical and physical parameters (USEPA 2015a).

[c] Source is EPA regional screening level table for resident tap water (USEPA 2015b).

[d] EPA recommends against quantifying dermal exposure to PAHs in surface water. See text of Attachment M3 for explanation.

Draft
Attachment M4: Exposure and Risk Estimates

Baseline Human Health Risk Assessment

Berry's Creek Study Area
Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

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INTRODUCTION

A baseline human health risk assessment (BHHRA) is being conducted as part of the remedial investigation (RI) of the Berry's Creek Study Area (BCSA). This attachment presents a brief description of the site, exposed populations, and exposure pathways; the methods and assumptions used for deriving estimates of exposure; and the methods and resulting estimates of cancer risks and noncancer hazards. The exposed populations and exposure assumptions have been previously reviewed and agreed to by the U.S. Environmental Protection Agency (EPA) (BCSA Group 2015a,b). Interpretation of the risk estimates are presented in the main text of Appendix M.

Site Setting

The BCSA is located in Bergen County, New Jersey (Figure 1), within the New York City metropolitan area. Consistent with the statement of work, the RI and feasibility study are focused on the tidal portions of the BCSA and its tributaries and associated wetlands. The tidal portion of the BCSA consists of three primary features: open channel waterways (including mudflats and subtidal areas), wetlands, and uplands border.

To support the RI, the tidal portion of the BCSA has been divided into five study segments encompassing the major waterways and associated tributaries and wetlands (Figure 1). These are Upper Berry's Creek (UBC), Middle Berry's Creek (MBC), Berry's Creek Canal (BCC), Lower Berry's Creek (LBC), and Above Tide Gate Areas including Upper Peach Island Creek (UPIC). These study segments are segregated by infrastructure and/or confluence with other waterways and each has distinct hydrologic and geomorphic characteristics. In all of these study segments, the open waterways are surrounded by large expanses of wetlands, which are the predominant form of undeveloped land in the study area. Marsh areas within each of the four reaches are shown on Figure 2.

Three regional reference sites were selected with input from EPA to support the RI: 1) Bellman's Creek located along the Hackensack River approximately 2.7 miles north of the BCSA, 2) Mill Creek, also located along the Hackensack River 1.9 miles north of the BCSA, and 3) Woodbridge River located along the Arthur Kill tidal strait about 23 miles south of the BCSA.[1] The locations of the reference sites relative to the BCSA are shown on Figure 1.

Potentially Exposed Populations

Based on observations at the site, and considering the physical area, access constraints, and zoning (primarily commercial and industrial in the vicinity of the tidal area), the primary populations potentially exposed to the tidal portions of the BCSA under current and reasonably anticipated future use conditions are recreational users and worker populations. For assessment purposes,

[1] Refer to Section 3.1 of the RI Report for a description of the process used to identify reference sites.

recreational and worker populations have been divided into specific receptor populations that reflect the principal activities in which they might be engaged. These receptor populations are as follows:

- Anglers/Crabbers—Fishing and crabbing have been observed in the BCSA at waterway access points. This receptor group includes persons directly engaged in the activity and family members who consume the catch. Adults and older children (6 to <18 years of age) are assumed to engage in fishing/crabbing and consume their catch, while younger children (0 to <6 years of age) are assumed to consume the catch but not participate in the fishing/crabbing activity. It is assumed that potential exposures for angler/crabber activities from the shore are similar to activities from a boat. This receptor group is considered applicable to current and hypothetical future use conditions.

- Kayaker/Canoers—Boaters have been observed in the BCSA. Although observations indicate that motor boating is the most common, a range of boating activities could occur in the BCSA, including kayaking and canoeing. Kayakers and canoers have an equal or greater potential for exposure to surface water and sediments compared to power boaters and, therefore, were selected as the boater receptor group for the BHHRA. Adults and older children (6 to <18 years of age) are assumed to engage in this activity. This activity is assumed to occur under both current and future use conditions.

- Construction Workers – Construction workers may engage in intrusive but short-term activities throughout the BCSA where they may be exposed to sediment. Other workers potentially exposed in the BCSA include local workers who may engage in infrequent, nonintrusive activities. Exposures for local workers will be similar to, or less than, those assumed for construction workers and recreational populations, and, therefore, exposures for this receptor group were not quantified, but instead evaluated qualitatively. Construction and local workers could be present under both current and future use conditions.

  In 2014, EPA additionally identified the presence of divers completing work around the pilings of the Route 3 Bridge. EPA's exposure and risk evaluation for this diver scenario is presented as Exhibit 1.

- Future Recreators—Though future human use of the area is projected to remain consistent with the activities of present day, it is possible that increased promotion of eco-tourism in the region and/or improvement to the regional water quality could create some additional types of exposure, more so in the lower sections of the study area (BCC and LBC), which are closer to access points. Based on discussions with EPA, two additional future use receptors were identified for qualitative evaluation in the BHHRA. Consistent with EPA Region 2 goals to achieve swimmable and fishable waters, recreational swimmers were identified for qualitative

review. Hikers may be present if boardwalks or paths are constructed as part of future recreational improvements to the area. Swimmers and marsh hikers are assumed to be adults and older children (6 to <18 years of age).

Beyond recreational activities, no surface water use occurs, or is likely to occur in the future. Local drinking water is provided by public community water systems that obtain surface water exclusively from other water management areas in the region. Further, given the brackish water quality and increasing salinity, surface water in the BCSA will not be a source of drinking water in the future. Groundwater is not used as a source of domestic water in the study area. Further, shallow groundwater is unlikely to be used for water supply in the future given its brackish nature or close proximity to brackish water. In fact, much of the shallow groundwater throughout the Meadowlands region is brackish and considered unsuitable for municipal and most industrial uses (Carswell 1976).

Exposure Pathways

The potential exposure media for the human receptors identified above are sediments, biota, surface water, and air. Sediment and surface water may be directly contacted by recreational users and workers. With the exception of construction workers, however, direct contact with impacted media is likely low and spatially focused, given that these populations tend to access the creek from overpasses or banks near roadways and parking lots, rather than by wading in the waterways or hiking through the marshes. Fish and crab are the primary potential exposure media for anglers/crabbers. Finally, recreational users and construction workers could be exposed to chemicals that partition to ambient air from surface water; therefore, air is also identified as a potential exposure medium. Exposure to fugitive dust is not a complete pathway since the sediments of the waterway are continuously wet from diurnal tidal fluctuations and sediments in the marshes are covered by dense stands of *Phragmites*. Both of these conditions prevent significant emissions of particulates into ambient air.

The complete exposure pathways selected for evaluation in the BHHRA are summarized in Table 1. Potentially complete and significant exposure pathways are evaluated quantitatively. Some exposure pathways that represent exposures equal to or less than those in other receptor groups (i.e., local worker recreational exposures relative to recreators including angler/crabbers and kayaker/canoers) or that are considered very unlikely (i.e., future swimmers) or likely to result in negligible exposures (i.e., future hikers on a marsh boardwalk) are evaluated qualitatively.

By receptor, the following are significant exposure pathways that are evaluated quantitatively in the BHHRA:

- Angler/Crabber (current/future)

  - Ingestion of fish or crab
  - Incidental ingestion and dermal contact with surface sediment; dermal contact with surface water
  - Inhalation of volatiles in ambient air

- Kayaker/Canoer (current/future)
  - Incidental ingestion and dermal contact with surface sediment
  - Incidental ingestion and dermal contact with surface water
  - Inhalation of volatiles in ambient air

- Construction Worker (current/future)
  - Incidental ingestion and dermal contact with sediment (surface and deep)
  - Inhalation of volatiles in ambient air.

EXPOSURE ASSESSMENT

Exposure assessment combines the chemical concentration contacted by a receptor for a given pathway with parameters that describe the frequency, duration, and degree of exposure to estimate the intake of chemicals being evaluated in the risk assessment. This section provides details on the exposure units, exposure point concentrations (EPCs), exposure parameters, and dose equations used for the BHHRA.

Exposure Units

Exposure units are the spatial constructs over which potential risks to receptors are estimated. Exposure units are the area throughout which a particular receptor may move and can encounter an environmental medium for the duration of their exposure (USEPA 2002a). The exposure units for the BCSA were defined, in part, based on known or anticipated exposure points and, in part, to reflect differences in the spatial distribution of COPCs and/or other spatial boundaries. Though a receptor could theoretically roam across, or catch and consume fish or crab from, more than one exposure unit or the entire tidal area throughout the course of a lifetime, estimating exposure across such a large area provides little information of value for identifying areas of the site that might require remediation. As a consequence, smaller exposure units were used.

In the waterways, exposures were evaluated by study area reach—UBC, MBC, BCC, and LBC—which span the site moving from north to south. In the marshes, exposures were evaluated for each of the 11 individual named marshes within the BCSA tidal zone.

Exposure Point Concentrations

EPCs represent the chemical concentration that a receptor could contact over the exposure period. EPCs are required for each COPC in each medium that is contacted via the exposure pathways quantified in the risk assessment. For the BHHRA, the exposure pathways are presumed to result in contact with sediment, surface water, fish, crab, and ambient air. COPCs were selected for each medium using risk-based screening levels as described in Attachment M1. The resulting COPCs by media are presented in Table 2. A brief description of the data used, and the methodology and resulting EPCs is presented below.

Data

An extensive database of environmental sampling from the BCSA was used in the BHHRA. Field sampling events were conducted from in 2006, 2007 and annually from 2009 to 2015 and include the collection of surface water, sediment, and biota tissue samples.[2] The data treatment used to develop the environmental data set used in the BHHRA is described in Appendix K. Data for groundwater, porewater, and toxicity testing were not included as they are not relevant to the exposure pathways identified for the BHHRA. Data for each media identified for receptor exposures were included in the BHHRA with the following exceptions:

- Simultaneously extracted metals
- Voltammetry
- Physical chemistry
- Radionuclides[3].

Methodology for Exposure Point Concentration Selection

The first step in deriving the EPC was to calculate the 95th percent upper confidence limit on the mean (95UCL). The relevant sampling data for a given receptor group, exposure pathway, and exposure unit were grouped together to calculate the EPC using R version 3.2.3 with functions developed to be consistent with EPA's ProUCL (Version 5.0.00) program. EPCs were calculated

[2] Refer to Appendix C.
[3] Radioisotopes were measured to provide an understanding of COPC distributions and an evaluation of the stability of sediments (Refer to Appendix C).

for censored and non-censored data sets. Censored data sets include data that were not detected above laboratory reporting limits. These data were qualified with U flags and substituted with the method detection limit (MDL) as per EPA guidance for nondetects. Though substitution of the MDL was used for censored data, the 95UCLs for censored data sets were based on regression order statistics or Kaplan Meier methods as recommended in ProUCL Version 5.0.00 Technical Guide (Singh and Singh 2013). Estimated values qualified with J flags, which indicated that the sample was detected but the value was estimated at a concentration above the MDL but below the lowest quantitation limit, were included in EPC calculations as detects. The 95UCL value was used as the EPC except in cases where the 95UCL exceeded the maximum detected concentration, consistent with EPA guidance. In those cases, the maximum concentration was selected as the EPC. Details and verification of the program used to calculate 95UCLs and select EPCs are provided in Exhibit 2 along with various supporting documentation for the EPC selection (e.g., goodness of fit plots).

Information on the 95UCL calculation and EPC selection for each medium and exposure unit combination quantitatively evaluated in the BHHRA is provided in Exhibit 3 in a RAGS D Table 3 format.

Site Sediment Exposure Point Concentrations

Sediment EPCs were calculated by reach to evaluate ingestion and dermal contact exposures for angler/crabbers, kayaker/canoers, and construction workers. Each of these receptor groups conducts unique activities within BCSA that result in assumed exposures to different portions of the sediment. Accordingly, EPCs for each receptor group were calculated by grouping the data using the unique exposure characteristics as follows:

- **Angler/Crabbers:** This receptor population could contact sediments directly around waterway access points. Locations of waterway access points were identified based on observations of fishing activity by field personnel during RI sampling or by proximity to fish advisory signs[4], and EPCs were calculated using accessible surface sediment (0–15 cm) data along the same bank and ~1,000 ft upstream/downstream of these locations. Figures 3 through 6 show the surface sediment data used in calculating the angler/crabber sediment EPCs by reach. Summary statistics and angler/crabber sediment EPCs are provided in Table 3.

- **Kayakers/Canoers:** This receptor population could contact sediments directly around waterway access points as well as mudflat sediments along the length of the waterway. EPCs

[4] Additional fish advisory signs were added in the BCSA in August 2016, following the establishment of sediment EPCs for anglers/crabbers. In light of these additions, sediment sample locations selected for the EPCs were reviewed, and additional samples for the potential inclusion in EPCs were identified. A review of the data for these samples indicated that the inclusion of the single additional sample identified as relevant to the EPC calculations would not significantly impact the EPCs derived for anglers/kayakers.

for kayakers/canoers were calculated using surface sediment (0–15 cm) data from sampling locations around waterway access points (described above for angler/crabbers) and from the mudflats along the length of the waterway. Figures 7 through 10 show the surface sediment data used in calculating the kayaker/canoer sediment EPCs by reach. Summary statistics and kayaker/canoer sediment EPCs are provided by reach in Table 4.

- **Construction Workers:** This receptor population could contact waterway and marsh sediments throughout the BCSA. EPCs for this group were derived for two distinct spatial groupings—waterway sediments by reach, and marsh sediments by defined marsh. The focus of RI sediment data collection was on the surface sediment depth interval. For this reason, a significant proportion of sediment data is from locations where only the surface sediment interval was collected. Since concentrations of COPCs in sediment vary with depth, it was important to consider the potential bias that may be introduced by including sediment locations for which only surface sediment data are available. To minimize this potential bias, data from the high- and low-resolution coring studies, which include both surface sediment and deeper intervals at a given sample location, were used preferentially. Sediment data from these studies were available for the majority of COPCs and exposure units; however, there were some instances where COPCs were not measured at high/low-resolution coring locations. For exposure units where no COPCs were available in deeper sediment intervals, data from the surface sediment (0–15 cm) were used to estimate EPCs. Using the selected data, a depth-weighted average concentration was calculated for each sediment location which were then used in the calculation of the EPC for each exposure unit (i.e., reach or marsh). Figure 11 shows the sediment sample locations used in calculating the EPCs by reach and marsh for this receptor group. Summary statistics and construction worker sediment EPCs are provided in Tables 5 and 6.

Site Biota Exposure Point Concentrations

White perch and blue crab EPCs were calculated separately as the basis for calculating angler and crabber ingestion exposures, respectively. Reach-specific EPCs were calculated for each species by grouping samples caught within a given reach.

- White perch EPCs were calculated using data for the fillet from target-sized fish (i.e., 150–190 mm). Table 7 provides summary statistics and EPCs for white perch fillet. An evaluation of concentrations in whole body fish is included as part of the uncertainty evaluation in Section 5.6 of Appendix M.

- Blue crab EPCs were calculated in two ways for muscle only, and for muscle plus hepatopancreas. A weighted average was used in calculating the blue crab muscle plus hepatopancreas EPC in which muscle was assumed to represent 81 percent of the mass and hepatopancreas comprised the remaining 19 percent. In the absence of site-specific

information on mass, these assumptions are based on the average masses of hepatopancreas and muscle for blue claw crab from the Newark Bay Complex reported by Weidou (1981, as cited by NJDEP 2002). Because data for hepatopancreas were not available for all COPCs, the approach to calculating a weighted-average EPC that represents both muscle and hepatopancreas could not be taken for all COPCs. For COPCs with no available data in hepatopancreas (i.e., antimony, copper, iron, manganese, selenium), the EPC for crab muscle only was applied in the calculation of exposure for crabbers exposed to muscle and hepatopancreas. Summary statistics and EPCs for muscle only and muscle plus hepatopancreas are presented in Tables 8 and 9, respectively.

Site Surface Water Exposure Point Concentrations

Surface water EPCs were calculated by reach using total surface water concentrations. Table 10 provides summary statistics and EPCs for surface water.

Site Ambient Air Exposure Point Concentrations

Ambient air EPCs were calculated by reach. The ambient air data used in the BHHRA were for samples collected above the waterway within each reach. No data were collected from within the marsh areas. The resulting EPCs were used to evaluate inhalation exposures at or on the waterways. As a result, inhalation exposures were calculated for anglers/crabbers, kayakers/canoers, and construction workers for UBC, MBC, BCC, and LBC. Construction worker exposures to ambient air in marshes were not evaluated quantitatively (the absence of this pathway is addressed in the uncertainty evaluation in Section 5.6 of Appendix M). Figure 12 shows the locations of ambient air samples used in the EPC calculations. Table 11 provides summary statistics and EPCs for mercury (the single COPC for ambient air).

Reference Site Exposure Point Concentrations

EPCs were calculated for sediment and biota using data collected from all reference sites combined[5]. Surface sediment data (0–15 cm) from marsh and waterway samples collected at the three reference sites was combined and used to calculate EPCs that were used for evaluating recreational exposure to sediment. The sample locations for reference area sediment samples used in the EPC calculation are shown in Figure 13, and Table 4 lists the reference site EPCs for sediment.

[5] EPCs for reference sites were used to estimate reference site exposures and risks. These exposures and risks were estimated using methods and exposure factors identical to what was used for estimating exposures and risks at the BCSA.

EPCs for reference sites were also calculated for reference white perch fillet, crab muscle, and crab muscle and hepatopancreas. Tables 7 through 9 provide the reference site EPCs.

Dose Equations

This section presents the general equations that are used to estimate exposures. In general, oral and dermal exposures are expressed in terms of intake (i.e., mg/kg-day), whereas inhalation exposures are expressed in terms of an exposure concentration in air (i.e., mg/m^3). The specific dose equations that were used in the BHHRA for the various exposure pathways evaluated are presented in Exhibit 4 in a RAGS D Table 4 format.

The following is a general form of the equation used to estimate intake for oral and dermal exposures (USEPA 1989, 2004):

$$Intake\ (mg/kg \cdot day) = \frac{C \times CR \times CF \times EF \times ED}{BW \times AT}$$

Where:

C = chemical-specific exposure concentration (mg/kg)

CR = contact rate (mg/day)

CF = conversion factor (10^{-6} kg/mg)

EF = exposure frequency (days/year)

ED = exposure duration (years)

BW = body weight (kg)

AT[6] = averaging time (days).

The contact rate depends on the particular route for which exposure is being quantified. For example, when calculating intake via ingestion of sediment, the contact rate is expressed as the product of the sediment ingestion rate and a chemical-specific relative bioavailability (RBA) factor. When calculating dermal exposure to sediment, intake is expressed as a dermally absorbed dose, and the contact rate is the product of several parameters, including the exposed skin surface area of an individual, the amount of sediment that will adhere to the skin, and a chemical-specific dermal absorption factor (ABS_d).

The following is a general form of the equation used to estimate an exposure concentration for inhalation exposures to chemicals in ambient air (adapted from USEPA 2009a):

[6] The averaging time is the period over which the exposure is averaged. When evaluating cancer risks the exposure is averaged over a lifetime (i.e., 70 years). When evaluating noncancer hazards, the exposure is averaged over the total exposure duration.

$$EC_{air}\ (mg/m^3) = \frac{C_{air} \times ET \times EF \times ED}{AT}$$

Where:

C_{air} = chemical-specific concentration in air (mg/m^3)

ET = exposure time (hours/day)

EF = exposure frequency (days/year)

ED = exposure duration (years)

AT[7] = averaging time (hours).

The exposure concentration for air is a function of a chemical's concentration in air measured at the exposure point as well as scenario-specific parameters, such as exposure duration and exposure frequency.

Mutagenic Considerations

Several COPCs identified for evaluation in the BHHRA have been classified by EPA as mutagens, as discussed in Attachment M2. USEPA (2005) assumes that early-life exposures to chemicals that act with a mutagenic mode of action may result in higher carcinogenic risks than exposures that occur later in life. When no chemical-specific data are available to evaluate cancer susceptibility from early-life exposure to a mutagenic carcinogen, USEPA (2005) recommends applying age-dependent adjustment factors (ADAFs) to develop risk estimates. ADAFs were applied in evaluating early life exposures (i.e., to child recreators [both anglers/crabbers and kayakers/canoers]) to mutagenic COPCs including benzo[a]pyrene, and benzo[a,h]anthracene. Table 12 presents the ADAFs used.

For vinyl chloride, sufficient chemical-specific data are available to evaluate early-life exposures. For this chemical, EPA addresses early-life susceptibility by calculating the total risk as if the child intake occurs over a lifetime and the adult exposure occurs only for the assumed exposure duration (USEPA 2000). This methodology was employed for the BHHRA.[8]

[7] The averaging time is the period over which the exposure is averaged. When evaluating cancer risks the exposure is averaged over a lifetime (i.e., 70 years). When evaluating noncancer hazards, the exposure is averaged over the total exposure duration.

[8] Trichloroethene is also a mutagenic chemical and was identified as a COPC in sediment of all depths. Exposure for adult construction workers only were evaluated for COPCs in sediment of all depths. Thus no mutagenic adjustment factors were needed for the evaluation of trichloroethene.

Exposure Parameters

Exposure parameters are used to quantify the frequency, duration, and magnitude of contact with impacted media for a given receptor exposure scenario. All exposure parameter values presented reflect the previous agreements reached with EPA during meetings and in follow-up written communications responding to the comments on the draft and final *Updated Memorandum on Human Exposure Scenarios and Assumptions* and draft and final *Updated Pathway Analysis Report* (BCSA Group 2015a,b).

Table 4 of RAGS Part D was completed for each exposure scenario to be quantified in the risk assessment. A separate RAGS Part D Table 4 is provided for each unique combination of exposure medium and time frame. Following USEPA (1989) guidance, exposure parameters are identified to estimate both reasonable maximum exposures (RMEs) and an average (central tendency exposure [CTE]) scenario. Therefore, there are two tables for each unique combination of exposure medium and time frame: one subtitled RME and the other subtitled central tendency. Tables 4.1 through 4.22, in Exhibit 4, present the exposure parameter values.

Values for exposure parameters shown in Tables 4.1 through 4.22 are either default values published by USEPA (1989, 1991, 1997, 2002a,b, 2004, 2011a, 2014b) or site-specific values based on the current understanding of the site. The bases for these values are discussed in the following sections.

Exposure Duration

Given the limited accessibility of Berry's Creek, individuals who recreate in the BCSA most likely live or work in nearby areas. Therefore, exposure durations for recreational users (i.e., anglers/crabbers and kayakers/canoers) were conservatively based on standard default assumptions for residents. For the RME angler/crabber receptor group, following USEPA (2014b) guidance, an RME exposure duration of 26 years was used, including 6 years for the younger child (0 to <6 years of age), 12 years for the older child (6 to <18 years of age), and 8 years for the adult. For the RME kayaker/canoer, for whom no exposure for a young child is assumed, the exposure duration for the older child is assumed to be 12 years. As directed by EPA the exposure duration for the adult was assumed to be 8 years.

A CTE duration of 12 years was used to reflect the mean residential occupancy value recommended by USEPA (2011a). Additionally, for the CTE case, exposure duration is assumed to be exclusively as an adult instead of distributed across the various age-segments. This approach of an adult-only CTE was adopted to provide a CTE risk estimate that is representative of site-specific observations of primarily adult activity throughout the duration of the field effort since 2008. Therefore, the adult-only scenario is consistent with the guidance that the CTE should be

representative of the average, or typical, individual in the affected population.[9] The assumption that the entire CTE duration is as an adult was applied to both the angler/crabber and kayaker/canoer scenarios.

Construction activity is anticipated to include repair or replacement of tide gates, repair of water main breaks, construction of stormwater outfalls, and construction of rail lines. Construction activities within the BCSA, including the replacement of the West Riser tide gate, have lasted 6 months or less and involved intermittent activity over the duration. Consistent with USEPA (2002a), the exposure duration for a construction activity was assumed to be 1 year (RME and CTE cases), though the period of actual direct contact with impacted media is a shorter duration than this based on past construction activities within the BCSA.

Exposure Frequency for Direct Contact Pathways

Based on the site-specific conditions (e.g., limited access, dense vegetation, and unfavorable conditions for recreation) and corroborated by the camera survey and other observations, exposure frequency in the BCSA is predicted to be low.[10]

The annual exposure frequency of recreational anglers/crabbers is estimated based upon data collected in a survey of New York anglers conducted by Connolly et al. (1992) and summarized in USEPA (1997). In that survey, Connolly et al. reported that the average number of fishing days per year across all New York anglers surveyed was 27 days, with a median of 15 days. As discussed with EPA (and indicated in the agency's written comments on this topic), these central tendency frequencies can be used to represent the RME and CTE cases for the BCSA, given that the study area may not be as attractive a water body as many of the other New York sport fisheries included in the Connelly et al. (1992) study. Accordingly, 27 days per year was used as the RME frequency for fishing and crabbing activity in the BCSA and 15 days per year was used as the CTE frequency.

No regional or site-specific information was available to support the selection of the annual exposure frequency for kayakers/canoers; therefore, these assumptions were based on best professional judgment in consultation with EPA. The selected RME of 18 days per year assumes that an individual visits the site 2 times per month on average, from early spring through fall. The selected CTE of 9 days per year assumes that an individual visits the site an average of 1 time per month over these same months. In the future, if eco-tourism is promoted and/or regional water quality is improved and use of the area as a recreational setting is promoted, it is possible that kayakers/canoers may visit the site more often. For future kayaker/canoers, the BHHRA used the RME and CTE durations recommended by EPA of 39 days per year (i.e., an average of 1 visit per

[9] https://www.epa.gov/risk/conducting-human-health-risk-assessment
[10] Refer to Appendix N.

week from early spring through fall) and 19 days per year (i.e., an average of 1 visit every other week from early spring through fall), respectively (USEPA 2009b).

Exposure frequency for construction workers will depend upon the activity. A variety of construction activities have been documented in the BCSA. These activities have involved rail line construction, tide gate replacement and repair, stormwater outfall construction, and water main break repairs. Some of these activities were focused in the surface sediments (e.g., replacement of flap valves on tide gates), whereas others involved excavation into the subsurface to set concrete footings. Based on a review of the documentation and other information available for these projects, the maximum amount of time that a worker was potentially in direct contact with impacted media is estimated to be between 5 days and 8 weeks, though the projects themselves had a longer duration. As agreed in consultation with EPA, the maximum duration of construction activity observed at the site (8 weeks) was selected as the RME exposure frequency for evaluation in the BHHRA so as to bound all such intrusive construction activities at the BCSA. A CTE exposure frequency of 10 days was selected to reflect the average time spent in recent construction activities at the BCSA. It is likely, however, that actual direct contact with contaminated media was much less than these estimates, given that BCSA construction workers are very likely to use some personal protective equipment (e.g., gloves) during these activities. Nevertheless, for the BHHRA, construction workers are assumed to have some direct contact with contaminated media.

Body Weight

EPA recommends that mean age-specific body weights be assumed for estimating exposures to human receptors (USEPA 2011a). Mean body weights for adult and young child (ages 0 to <6) receptors of 80 and 15 kg, respectively, were adopted from EPA's directive on standard default exposure factors (USEPA 2014b). For older children (ages 6 to <18), age-weighted mean values for body weight from EPA's *Exposure Factors Handbook* (USEPA 2011a) were calculated as 48.8 kg using data for males and females combined.

Sediment Ingestion Rate

For recreational users (i.e., anglers/crabbers, kayakers/canoers) sediment ingestion rates were based on recommendations from EPA for characterizing exposure via incidental ingestion of soil. EPA's default ingestion rate of 100 mg per day for adults (USEPA 2014b) was adopted as the RME sediment ingestion rate for adult and older child recreators. The EPA-recommended central tendency soil ingestion rate of 20 mg per day for adults (USEPA 2011a) was adopted for the CTE value.

Based on the assumption that workers may be involved in contact-intensive activities, EPA suggests a higher soil ingestion rate for workers (USEPA 2002a). For construction workers, EPA's

default ingestion rate of 330 mg per day was adopted for the RME. EPA's recommended ingestion rate for outdoor workers of 100 mg per day (USEPA 2014b) was adopted for the CTE.

Skin Surface Area for Dermal Contact with Sediment

Recreational anglers were assumed to fish from banks, overpasses, or possibly boats. Kayakers/canoers may launch from the bank. These recreational users were assumed to not wade in the creek, given the physical hazards of the soft sediments. The value for skin surface area available for direct contact with surface sediment was based upon the assumption that the forearms, hands, and lower legs would be uncovered. This is a conservative assumption because recreators would likely wear long pants and shirts during the cooler spring and fall months. Surface areas were estimated using mean surface area data for males and females published in USEPA (2011a). Exposed surface areas of 4,760 and 3,108 cm^2, respectively, were calculated for the adult and older child recreational receptors. This set of assumptions was adopted for both the RME and CTE in the case of adult recreators and for the RME values for older child recreators.

Construction workers were assumed to have direct contact with sediment while working at the BCSA. EPA's default (USEPA 2014b) skin surface area for workers of 3,470 cm^2 was adopted for both the RME and CTE cases. This value assumes that the head, hands, and forearms of adult males and females could be exposed to direct contact with the sediments.

Sediment Adherence Factor

For dermal contact with sediment, the EPA default adherence factor for children of 0.2 mg/cm^2-event (USEPA 2014b) was used as the RME value for all older child recreators. This value reflects the geometric mean for children, 8 to 12 years old, playing in mud (USEPA 2004). For adult recreators, an adherence factor of 0.3 mg/cm^2-event was selected for the RME and CTE, as requested by EPA (USEPA 2013), which reflects the geometric mean for adult reed gatherers (USEPA 2004).

EPA's default construction worker adherence factor of 0.3 mg/cm^2-event (USEPA 2002a) was adopted as both the RME and CTE value for construction workers at BCSA. This value represents the 95th percentile adherence factor for construction workers (USEPA 2004).

Skin Surface Area Available for Dermal Contact with Surface Water

For anglers/crabbers, the value for skin surface area available for direct contact with surface water assumes that only the hands, forearms, and lower legs could come into contact with surface water during angling/crabbing activities. RME values for exposed surface areas of 4,760 and 3,108 cm^2 for adults and older children, respectively, were estimated based on data available from EPA for males and females (USEPA 2011a). The adult value of 4,760 cm^2 was adopted for both the RME and CTE cases.

In the case that kayakers/canoers fall overboard, their entire body may be in contact with surface water for some short period of time. For adult kayakers/canoers, the updated EPA default water surface area of 20,900 cm^2 for adults (USEPA 2014b) was used for the RME and CTE cases. This value represents the age-weighted average of mean values for adult males and females ≥21 years of age. A value of 14,180 cm^2 was adopted for older child kayakers/canoers, based on a calculated age-weighted average using the EPA mean total body surface area for males and females combined, between the ages of 6 and 17 (USEPA 2011a).

Event Frequency for Dermal Contact with Surface Water and Sediment

The parameter of event frequency refers to the number of times per day an event occurs on any given exposure day. For dermal contact with both sediment and surface water, the event frequency is assumed to be once per day. This value was adopted for all relevant exposures for both the RME and CTE cases.

Exposure Time/Event Duration

For inhalation, dermal contact, and incidental ingestion of surface water exposure pathways, there are parameters that describe the amount of time that an individual is in contact with the exposure media. For anglers/crabbers, based on data provided by EPA, an RME of 9.5 hours per day and a CTE of 3.5 hours per day for time spent angling were selected (USEPA 1997, Tables 15–110). These values were developed from the Tsang and Kleppis (1996) *National Human Activity Pattern Study*, which is described as the largest and most current such study available (USEPA 2011a). The RME and CTE values represent the 95th percentile and mean values, respectively, for the time spent outdoors at a pool, river, or lake, by the study population. These exposure times were used directly for estimating inhalation exposures. However, direct contact with surface water while angling from the shoreline would likely only occur during infrequent intervals. Based on best professional judgment, and in agreement with EPA, for the RME case it is assumed that 25 percent of the 9.5 hours spent fishing would involve direct contact with surface water. This assumption results in an RME time of 2.4 hours for contact with surface water during each angler/crabber event. The value of 2.4 hours per event was adopted as the RME value for both adult and older child exposures. For the CTE, it is assumed that 10 percent of the 3.5 hours spent fishing would involve direct contact with surface water, based on best professional judgment. The resulting value of 0.4 hour per event (i.e., 24 minutes) was adopted as the CTE surface water contact duration for adult anglers/crabbers.

For current and future kayakers/canoers, RME and CTE times of 4 and 2 hours per day, respectively, were selected based on best professional judgment. These exposure times were used for estimating inhalation exposures. Direct contact with surface water for this recreator was assumed to occur when the kayaker/canoer goes overboard. Such exposures would likely only occur for a fraction of the time a kayaker/canoer spends on the water. Based on best professional

judgment, it was assumed that a kayaker/canoer would contact surface water for 0.25 hour per event (i.e., 15 minutes) and 0.08 hour per event (i.e., 5 minutes) for the RME and CTE cases, respectively.

For construction workers, EPA's default exposure time for outdoor workers of 8 hours per day (USEPA 2014b) was selected for the RME and CTE.

Incidental Ingestion Rate for Surface Water

During the time kayakers/canoers spend overboard they may incidentally ingest surface water. An incidental surface water ingestion rate of 0.05 L per hour is assumed for the RME and CTE cases. This value, provided for water ingestion during swimming (USEPA 1989), was adopted for the RMEs and CTEs.

Fish and Crab Consumption Rate and Frequency

No site-specific consumption surveys have been conducted for the BCSA, but as already summarized, a considerable amount of information has been compiled that provides insight on fishing and crabbing activity in the BCSA.

As agreed in previous discussions with EPA on this matter, these collective factors support the development of a site-specific consumption rate for the BCSA that is lower than that traditionally assumed by EPA for more accessible and attractive water bodies in the region. Fish and crab consumption rates derived from nationwide databases provided the starting point for the exposure assumptions in the BHHRA.

USEPA (2014a) uses data from 30-day fish consumption frequency questionnaires and 2-day dietary recall surveys to estimate usual (i.e., long-term average) consumption rates for episodically consumed foods by multiplying the probability of consumption on a given day by the average amount consumed on a day when some fish is consumed (i.e., a "consumption day") (USEPA 2014a). The 90th and 50th percentiles of consumption rates of uncooked finfish and shellfish for adult consumers of freshwater and estuarine organisms are 22.0 and 5.0 g/day, respectively (USEPA 2014a). These values were selected as the RME and CTE values for fish and crab consumption rates for adult anglers and crabbers in the BCSA BHHRA. Because these consumption rates combine finfish and shellfish consumption, a recreational user of the BCSA is assumed to consume only finfish or only crab at these rates.

The preponderance of site-specific information gathered indicates that it is highly unlikely that anglers or crabbers would regularly consume fish or crab solely from the BCSA each day over the course of multiple years. Under a 365 days per year consumption frequency, the RME consumption rate of 22.0 g/day, for example, equates to 8,030 g/year or nearly 18 lb of fish or crab from the BCSA each year per person. This amount of fish or crab consumption is unrealistic given

the evidence to date that indicates very infrequent fishing/crabbing activity in the BCSA, combined with the fact that the primary sport fish of the water body (white perch) are well below "eating size," as defined by NJDFW (2005), and not even large enough to produce fillets that when cooked are similar in size to commercially purchased "fish sticks" (NJDFW 2005).

For these reasons, and based on discussions with EPA during July 2011, the frequency of consumption of fish and crab caught in the BCSA was assumed to be 27 days/year (RME) and 15 days/year (CTE). These rates are the same as those assumed for direct contact pathways.

Applying the RME exposure frequencies for the adult finfish/shellfish to the RME consumption rate of 22.0 g/day yields a daily consumption rate of 1.6 g/day on an annualized basis, or a total of 1.3 lb of fish or crab per year. This RME rate is equivalent to an average of 5.2 fish meals (4 oz each) or 2.6 fish meals (8 oz each) each year for 26 years. Given that BCSA white perch are typically not large enough to be considered "eating size," these consumption rates still may overestimate consumption of BCSA white perch.

At the request of EPA, rates for older child and younger child consumers were derived for the purposes of the BHHRA by scaling the adult rates. This approach has been adopted in other risk assessments in the region (TAMS and Gradient 2000; Louis Berger Group 2014; HDR et al. 2011). The consumption rate for an older child was scaled to two-thirds of the adult RME rate to derive an RME finfish/shellfish consumption rate of 14.7 g/day (22*2/3), which equates to 397 g/year based on a 27 day/year frequency, or approximately 0.88 lb. This is equivalent 14 oz, or 1.75 meals (8 oz each) per year. The consumption rate for a younger child was scaled to one-third of the adult RME rate to derive an RME finfish/shellfish consumption rate of 7.3 g/day (22*1/3) or about 7 oz/year.

Chemical-Specific Exposure Factors

Chemical-specific exposure factors, including ABS_d, RBA, and cooking loss, were included in relevant intake calculations (see Exhibit 4). The factors were applied for both the RME and CTE exposures, with the exception of cooking loss, which was only used for the CTE evaluation. The chemical-specific values used in the intake equations are detailed in Attachment M3.

RISK ESTIMATES

Risk characterization combines estimates of intake or dose with toxicity criteria to provide an assessment of the potential cancer risk and noncancer hazards for the scenarios quantified in the risk assessment. The general methods for calculating each are described below.

Cancer Risk

Cancer risk estimates are derived using standard risk assessment methods that estimate the incremental probability that an individual described by an exposure scenario might develop cancer during his or her lifetime as a result of exposure to COPCs in the area under study. The term "incremental" reflects the fact that the calculated risk associated with any exposures in the area under study is in addition to the background risk of cancer experienced by all individuals in the course of daily life.

Excess incremental lifetime cancer risks are calculated as the product of the estimated dose and the expression of the carcinogenic potency of chemicals (e.g., cancer slope factor [CSF]). Excess incremental lifetime cancer risk from oral and dermal exposures is calculated using the following equation:

$$Cancer\ Risk(unitless) = LADD \times CSF$$

Where:

LADD = lifetime average daily dose of the chemical (mg/kg-day)

CSF = cancer slope factor (kg-day/mg).

Incremental cancer risks are summed for all COPCs and across all relevant exposure pathways to estimate cumulative incremental cancer risk.

Excess incremental lifetime cancer risk from inhalation exposures was not estimated for the BHHRA as the only COPC evaluated in air (i.e., mercury) is not a carcinogen.

Both federal and state regulatory agencies define what they consider to be an acceptable level of incremental cancer risk associated with exposure to chemicals in environmental media. EPA considers 10^{-6} to 10^{-4} the target range for excess cancer risk (USEPA 1990).

Noncancer Hazard

Noncancer health risks are termed hazards. To evaluate noncancer hazards, the ratio of the exposure term (i.e., average daily dose [ADD]) to the corresponding noncancer toxicity reference value (i.e., reference dose [RfD]) is calculated. The hazard quotient (HQ) is calculated for oral and dermal exposures using the following equation:

$$HQ(unitless) = \frac{ADD}{RfD}$$

Where:

ADD = average daily dose of the chemical (mg/kg-day)

RfD = reference dose (mg/kg-day).

The HQ is calculated for inhalation exposures using the following equation:

$$HQ(unitless) = \frac{EC_{Air}}{RfC}$$

Where:

EC_{Air} = exposure concentration in air (mg/m^3)

RfC = reference concentration (mg/m^3).

To evaluate cumulative noncancer effects, HQs are summed for all COPCs and across all relevant exposure pathways to determine a noncancer hazard index (HI) using the following formula:

$$HI(unitless) = HQ_1 + HQ_2 + ... + HQ_i$$

Where:

HI = hazard index

HQ = hazard quotient for a specified exposure route (unitless).

HIs that are calculated for multiple chemicals are likely to overstate risk if the RfDs for the chemicals are based on adverse effects to different target organs. This is because the noncancer health hazards associated with chemicals that affect different target organs or have different health effects are not likely to be additive. Following USEPA (1989) guidance, in the case that the total HI for a receptor exceeded 1 for all COPCs combined and across all exposure pathways, separate HIs for groups of COPCs that affect the same target organ or endpoint were estimated. These effect-specific HIs provide a more accurate indication of whether there is potential for a specific adverse health effect to occur for the specific scenario being evaluated.

If the resulting multi-chemical or effect-specific HI is 1 or less for a given scenario, then no adverse health effects are expected to occur (USEPA 1989). If the HI is greater than 1, then further risk evaluation may be appropriate. However, HIs greater than 1 do not necessarily mean that any actual adverse health effects would be observed in a receptor population under the assumed exposure. A substantial margin of safety has been incorporated into the RfDs developed for the COPCs. For these chemicals, adverse health effects may not occur even if the HI is much larger than 1. The HI is not a measure of probability that adverse health effects will occur. That is, the level of concern for health effects to occur does not necessarily increase linearly as the RfD is approached or exceeded (USEPA 1989).

Exhibit 5 presents the cancer risks and noncancer hazards for each receptor group, age group, and exposure unit in the form of RAGS D Table 7. Exhibit 6 presents a summary of receptor risks and hazards in the form of RAGS D Table 9. Tables for both RME (i.e., Tables 7.1 through 7.81 of Exhibit 5, Tables 9.1 through 9.81 of Exhibit 6) and CTE (Tables 7.82 through 7.122 of Exhibit 5, Tables 9.82 through 9.122 of Exhibit 6) are presented.

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TABLES

Table 1. Receptors and Exposure Pathways
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 1

Scenario Timeframe	Medium [a]	Exposure Medium [b]	Exposure Point [c]	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future	Sediment	Sediment	Surface sediment (0–15 cm) Marsh and mudflat at access points, all reaches	Angler/ Crabber	Adult Older child (6 to <18)	Ingestion	Quantitative	Recreational users may incidentally ingest particles of bank or nearshore sediment while fishing or crabbing. Contact with bank/nearshore sediment less likely in BCC (which has less exposed shoreline) and in UBC, where recreational use is less likely due to shallow waters, compared to other study segments. Contact with marsh sediment may occur while they are walking to waterway access point.
						Dermal contact	Quantitative	Recreational users may come into contact with bank or nearshore sediment while fishing or crabbing. Contact with marsh sediment may occur while they are walking to waterway access point.
			Surface sediment (0–15 cm) Marsh at access points & all mudflats, all reaches	Kayaker/ Canoer	Adult Older child (6 to <18)	Ingestion	Quantitative	Kayakers and canoers may incidentally ingest particles of nearshore sediment while recreating in the area. Contact with nearshore sediment less likely in BCC and UBC for reasons noted above. Contact with marsh sediment may occur while they are walking to waterway access point.
						Dermal contact	Quantitative	Kayakers and canoers may come into contact with nearshore sediment while recreating. Contact with mudflat sediment less likely in BCC and UBC for reasons noted above. Contact with marsh sediment may occur while they are walking to waterway access point.
			Surface sediment (0–15 cm) Marsh and mudflat at access points, all reaches	Local worker	Adult	Ingestion	Qualitative	Local workers may incidentally ingest particles of bank or nearshore sediment while fishing or crabbing. Contact with marsh sediment may occur while they are walking to waterway access point. Adult angler/crabber sediment ingestion will serve as a surrogate for this receptor group.
						Dermal contact	Qualitative	Local workers may come into contact with bank or nearshore sediment while fishing or crabbing. Contact with marsh sediment may occur while they are walking to waterway access point. Adult angler/crabber sediment dermal contact will serve as a surrogate for this receptor group.
			Waterway and marsh sediment, all depths, all reaches	Construction worker	Adult	Ingestion	Quantitative	Workers may be involved in construction or maintenance activities that result in direct contact with waterway and marsh sediment.
						Dermal contact	Quantitative	Workers may be involved in construction or maintenance activities that result in direct contact with waterway and marsh sediment.

Table 1. Receptors and Exposure Pathways
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 1

Scenario Timeframe	Medium [a]	Exposure Medium [b]	Exposure Point [c]	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future	Surface water	Surface water	Surface water, waterways, all reaches	Angler/ Crabber	Adult Older child (6 to <18)	Dermal contact	Quantitative	Recreational users may contact surface water while fishing or crabbing.
				Kayaker/ Canoer	Adult Older child (6 to <18)	Dermal contact	Quantitative	Overboard kayakers/canoers will be exposed via dermal contact with surface water.
						Ingestion	Quantitative	Overboard kayakers/canoers may ingest limited surface water incidentally. Potential ingestion will likely be minimal because the exposure will be infrequent and of short duration.
				Local worker	Adult	Dermal contact	Qualitative	Local workers may come into contact with surface water while fishing or crabbing. Adult angler/crabber surface water dermal contact will serve as a surrogate for this receptor group.
				Construction worker	Adult	Dermal contact	Qualitative	Construction workers may come into contact with surface water. Potential contact will likely be minimal because the exposure will be infrequent and of short duration.
		Ambient air	Ambient air - Mercury vapor, waterways, all reaches	Angler/ Crabber	Adult Older child (6 to <18)	Inhalation	Quantitative	Receptors could inhale volatiles released to ambient air from surface water.
				Kayaker/ Canoer	Adult Older child (6 to <18)	Inhalation	Quantitative	Kayakers and canoers could inhale volatiles released to ambient air from surface water.
				Local and construction worker	Adult	Inhalation	Quantitative	Workers could inhale volatiles released to ambient air from surface water.
	Surface water & sediment	Fish	Finfish - Fillets, Shellfish - Blue crab, waterways, all reaches	Angler/ Crabber	Adult Older child (6 to <18) Younger child (0 to <6)	Ingestion	Quantitative	Recreational anglers may consume some portion of catch. This exposure could occur in all study segments; however, the species caught and consumed could vary given the variable salinity conditions throughout BCSA which could affect species presence and abundance. Adult anglers are assumed to bring home catch for a younger child to consume.
	Surface water & sediment	Shellfish	Finfish - Fillets, Shellfish - Blue crab, waterways, all reaches	Local worker	Adult	Ingestion	Qualitative	Local workers who fish are expected to consume some portion of catch. This exposure could occur in all study segments; however, the species caught and consumed could vary given the variable salinity conditions throughout BCSA which could affect species presence and abundance. Adult recreational fish ingestion exposure will serve as surrogate for this receptor group.

Table 1. Receptors and Exposure Pathways
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 1

Scenario Timeframe	Medium [a]	Exposure Medium [b]	Exposure Point [c]	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future Only	Surface water	Surface water	Surface water, waterways, all reaches	Swimmer	Adult Older child (6 to <18)	Dermal contact Ingestion	Qualitative	Swimming not a current recreational activity in BCSA waterways. Future exposures will be evaluated qualitatively based on the current use Kayaker/Canoer exposure.
		Ambient air	Ambient air - Mercury vapor, waterways, all reaches	Swimmer	Adult Older child (6 to <18)	Inhalation	Qualitative	Swimming not a current recreational activity in BCSA waterways. Future exposures will be evaluated qualitatively based on the current use Kayaker/Canoer exposure.
				Hiker in marsh	Adult Older child (6 to <18)	Inhalation	Qualitative	Future recreational improvements to BCSA could allow receptors to enter portions of the marsh beyond the existing waterway access areas evaluated for recreational receptor groups under the current land use scenarios. Future exposures will be evaluated qualitatively based on the current use evaluation.
	Sediment	Sediment	Surface sediment (0–15 cm) Mudflat at waterway access points, all reaches	Swimmer	Adult Older child (6 to <18)	Dermal contact Ingestion	Qualitative	Swimming not a current recreational activity in BCSA waterways. Future exposures will be evaluated qualitatively based on the current use Kayaker/Canoer exposure.
			Surface sediment (0–15 cm) Marsh at waterway access points, all reaches	Swimmer	Adult Older child (6 to <18)	Dermal contact Ingestion	Qualitative	Swimming not a current recreational activity in BCSA waterways. Future exposures will be evaluated qualitatively based on the current use Kayaker/Canoer exposure.
			Surface sediment (0–15 cm) Marsh at future recreational area	Hiker in marsh	Adult Older child (6 to <18)	Dermal contact Ingestion	Qualitative	Future recreational improvements to BCSA could allow receptors to contact marsh sediment beyond the existing waterway access areas evaluated for recreational receptor groups under the current land use scenarios. Future exposures will be evaluated qualitatively based on the current use evaluation.

Notes:

BCC = Berry's Creek Canal
BCSA = Berry's Creek Study Area
EPA = U.S. Environmental Protection Agency
RAGS = Risk Assessment Guidance for Superfund
UBC = Upper Berry's Creek

[a] Defined by EPA as the substance that is a potential source of contaminants in the exposure medium (the medium will sometimes equal the exposure medium) (USEPA 2001). Herein equal to the source medium.
[b] Defined by EPA as the contaminated environmental medium to which an individual may be exposed. This includes the transfer of contaminants from one medium to another (USEPA 2001).
[c] Defined by EPA as an exact location of potential contact between a person and a chemical within an exposure medium (USEPA 2001).

Source:

USEPA (2001)

Table 2. Chemicals of Potential Concern by Media

Chemical	Construction Worker	Recreator		
	Sediment (All Depths)	Surface Sediment	Surface Water	Tissue
Metals				
Aluminum	X	--	--	--
Antimony	X	X	--	X
Arsenic	X	X	X	--
Cadmium	X	X	--	--
Chromium (VI)	X	X	--	--
Cobalt	X	X	--	--
Copper	X	X	--	X
Iron	X	X	--	X
Manganese	X	X	--	X
Mercury [a]	X	X	--	X
Nickel	X	X	--	--
Selenium	--	--	--	X
Thallium	X	X	X	--
Vanadium	X	--	--	--
Zinc	X	X	--	--
Organometals				
Methyl mercury	--	--	--	X
PAHs				
Benz[a]anthracene	--	X	--	--
Benzo[a]pyrene	X	X	X	--
Benzo[b]fluoranthene	--	X	--	--
Dibenz[a,h]anthracene	X	X	X	--
Indeno[1,2,3-cd]pyrene	--	X	--	--
Pesticides				
Aldrin	X	X	--	--
Heptachlor	X	--	--	--
Heptachlor epoxide	X	X	--	--
PCBs				
PCBs (total Aroclors)	X	X	--	X
Volatiles				
Trichloroethene	X	--	--	--
Vinyl chloride	--	--	X	--
Total	***21***	***20***	***5***	***8***

Notes:

PAH = polycylic aromatic hydrocarbon

PCB = polychlorinated biphenyl

-- = not selected as COPC for this media and receptor

[a] Also selected as COPC in air.

Table 3. Intertidal Waterway Surface Sediments (0 to 15 cm) at Access Points – Summary Statistics and Exposure Point Concentrations for Angler/Crabber Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	Metals	Mercury	59	59	100	0.53 J	1,400 J	130	0.019–30	Nonparametric	95% Chebyshev (Mean, SD) UCL	280	280	(1)
	PCBs	PCBs (total Aroclors)	55	55	100	0.030 J	24 J	3.1	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	6.2	6.2	(1)
	Metals	Antimony	40	11	28	0.71 J	5.7 J	2.0	0.53–3.0	Normal	95% KM (t) UCL	1.3	1.3	(1)
		Arsenic	40	40	100	4.9	130 J	29	0.40–3.0	Nonparametric	95% Chebyshev (Mean, SD) UCL	50	50	(1)
		Cadmium	40	40	100	0.78 J	120 J	16	0.049–0.76	Nonparametric	95% Chebyshev (Mean, SD) UCL	34	34	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	40	40	100	5.1 J	33 J	14	0.22–7.6	Approximate normal	95% Modified Student's-t UCL	15	15	(1)
		Copper	40	40	100	36 J	710 J	240	1.0–5.2	Lognormal	95% Chebyshev (Mean, SD) UCL	350	350	(1)
		Iron	41	41	100	12,000	38,000 J	28,000	6.6–34	Normal	95% Student's-t UCL	29,000	29,000	(1)
		Manganese	41	41	100	130	13,000 J	1,100	0.10–2.3	Nonparametric	95% Chebyshev (Mean, SD) UCL	2,600	2,600	(1)
		Nickel	40	40	100	16	180 J	62	0.36–6.1	Lognormal	95% Chebyshev (Mean, SD) UCL	88	88	(1)
		Thallium	40	14	35	0.94 J	15 J	4.8	0.74–12	Normal	95% KM (t) UCL	3.1	3.1	(1)
		Zinc	40	40	100	150 J	10,000 J	1,600	1.3–29	Nonparametric	95% Chebyshev (Mean, SD) UCL	3,100	3,100	(1)
	PAHs	Benz[a]anthracene	21	21	100	0.11 J	3.3 J	0.86	0.0033–0.042	Normal	95% Student's-t UCL	1.2	1.2	(1)
		Benzo[a]pyrene	21	21	100	0.14 J	3.2 J	0.98	0.0026–0.055	Lognormal	95% Chebyshev (Mean, SD) UCL	1.8	1.8	(1)
		Benzo[b]fluoranthene	21	21	100	0.17 J	3.6 J	1.3	0.0042–0.048	Lognormal	95% Chebyshev (Mean, SD) UCL	2.3	2.3	(1)
		Dibenz[a,h]anthracene	21	21	100	0.030 J	1.3 J	0.33	0.0029–0.044	Lognormal	95% Chebyshev (Mean, SD) UCL	0.68	0.68	(1)
		Indeno[1,2,3-cd]pyrene	21	21	100	0.13 J	2.4 J	0.75	0.0018–0.045	Lognormal	95% Chebyshev (Mean, SD) UCL	1.3	1.3	(1)
	Pesticides	Aldrin	18	8	44	0.0062 J	0.088 J	0.036	0.00012–0.0080	Normal	95% KM (t) UCL	0.027	0.027	(1)
		Heptachlor epoxide	19	16	84	0.0035 J	0.19 J	0.052	0.00011–0.0087	Lognormal	97.5% KM (Chebyshev) UCL	0.12	0.12	(1)
MBC	Metals	Mercury	46	46	100	0.68	82 J	18	0.015–3.6	Gamma	95% Adjusted Gamma UCL	24	24	(1)
	PCBs	PCBs (total Aroclors)	44	44	100	0.032 J	4.6 J	1.1	NA	Gamma	95% Adjusted Gamma UCL	1.6	1.6	(1)
	Metals	Antimony	33	7	21	0.78 J	2.6 J	1.6	0.46–6.3	Normal	95% KM (t) UCL	1.2	1.2	(1)
		Arsenic	33	33	100	3.6	48 J	16	0.35–6.3	Approximate normal	95% Modified Student's-t UCL	19	19	(1)
		Cadmium	33	32	97	0.24 J	9.7 J	3.0	0.043–1.6	Normal	95% KM (t) UCL	3.5	3.5	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	33	31	94	4.6 J	95 J	15	0.19–16	Approximate normal	95% KM (t) UCL	19	19	(1)
		Copper	33	33	100	33	210 J	120	0.88–7.8	Normal	95% Student's-t UCL	130	130	(1)
		Iron	35	35	100	10,000	84,000 J	31,000	5.8–34	Approximate normal	95% Modified Student's-t UCL	35,000	35,000	(1)
		Manganese	35	35	100	150	31,000 J	3,400	0.088–4.7	Nonparametric	95% Chebyshev (Mean, SD) UCL	8,800	8,800	(1)
		Nickel	33	33	100	16	210 J	45	0.32–13	Approximate normal	95% Modified Student's-t UCL	55	55	(1)
		Thallium	33	8	24	1.1 J	100 J	15	0.65–10.6	Lognormal	95% KM (BCA) UCL	10	10	(1)
		Zinc	33	33	100	130	1,500 J	450	1.2–11	Approximate normal	95% Modified Student's-t UCL	520	520	(1)
	PAHs	Benz[a]anthracene	15	15	100	0.086 J	2.5 J	0.76	0.0017–0.029	Normal	95% Student's-t UCL	1.1	1.1	(1)
		Benzo[a]pyrene	15	15	100	0.11 J	2.6 J	0.83	0.0014–0.034	Normal	95% Student's-t UCL	1.1	1.1	(1)
		Benzo[b]fluoranthene	15	15	100	0.13 J	3.7 J	1.1	0.0022–0.030	Normal	95% Student's-t UCL	1.5	1.5	(1)
		Dibenz[a,h]anthracene	15	15	100	0.056 J	0.60 J	0.19	0.0015–0.030	Lognormal	95% Chebyshev (Mean, SD) UCL	0.37	0.37	(1)
		Indeno[1,2,3-cd]pyrene	15	15	100	0.11 J	2.0 J	0.59	0.0014–0.031	Normal	95% Student's-t UCL	0.82	0.82	(1)
	Pesticides	Aldrin	12	3	25	0.027 J	0.046 J	0.034	0.000077–0.0027	None	Maximum concentration	0.046	0.046	(4)
		Heptachlor epoxide	12	7	58	0.0070 J	0.034 J	0.019	0.000053–0.003	Normal	95% KM (t) UCL	0.016	0.016	(1)

Table 3. Intertidal Waterway Surface Sediments (0 to 15 cm) at Access Points – Summary Statistics and Exposure Point Concentrations for Angler/Crabber Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
BCC	Metals	Mercury	11	11	100	0.19 J	18 J	6.3	0.0162–0.49	Gamma	95% Adjusted Gamma UCL	13	13	(1)
	PCBs	PCBs (total Aroclors)	8	8	100	0.025 J	0.91 J	0.39	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	0.82	0.82	(1)
	Metals	Antimony	6	1	17	1.8 J	1.8 J	1.8	0.81–3.5	None	Maximum concentration	1.8	1.8	(4)
		Arsenic	6	6	100	9.3 J	13 J	11	0.63–2.7	Normal	95% Student's-t UCL	12	12	(1)
		Cadmium	6	6	100	0.55 J	2.3 J	1.6	0.075–0.32	Normal	95% Student's-t UCL	2.1	2.1	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	6	6	100	7.1 J	12 J	9.9	0.33–1.4	Normal	95% Student's-t UCL	11	11	(1)
		Copper	6	6	100	66 J	130 J	100	1.5–6.6	Normal	95% Student's-t UCL	120	120	(1)
		Iron	6	6	100	16,000 J	32,000 J	26,000	10–44	Normal	95% Student's-t UCL	31,000	31,000	(1)
		Manganese	6	6	100	310 J	400 J	350	0.15–0.66	Normal	95% Student's-t UCL	380	380	(1)
		Nickel	6	6	100	22 J	41 J	34	0.56–2.4	Normal	95% Student's-t UCL	39	39	(1)
		Thallium	6	1	17	3.4 J	3.4 J	3.4	1.1–4.9	None	Maximum concentration	3.4	3.4	(4)
		Zinc	6	6	100	160 J	350 J	260	2.1–8.9	Normal	95% Student's-t UCL	330	330	(1)
	PAHs	Benz[a]anthracene	5	5	100	0.14 J	1.7 J	0.8	0.0048–0.017	Normal	95% Student's-t UCL	1.4	1.4	(1)
		Benzo[a]pyrene	5	5	100	0.15 J	1.7 J	0.88	0.0039–0.031	Normal	95% Student's-t UCL	1.4	1.4	(1)
		Benzo[b]fluoranthene	5	5	100	0.32 J	2.3 J	1.2	0.0061–0.022	Normal	95% Student's-t UCL	2.0	2.0	(1)
		Dibenz[a,h]anthracene	5	5	100	0.019 J	0.55 J	0.20	0.0043–0.024	Lognormal	95% Chebyshev (Mean, SD) UCL	0.60	0.55	(3)
		Indeno[1,2,3-cd]pyrene	5	5	100	0.13 J	1.2 J	0.56	0.0040–0.0071	Normal	95% Student's-t UCL	0.95	0.95	(1)
	Pesticides	Aldrin	5	3	60	0.0060 J	0.010 J	0.0079	0.00018–0.00049	None	Maximum concentration	0.01	0.01	(4)
		Heptachlor epoxide	4	4	100	0.0032 J	0.0073 J	0.0048	0.00019–0.00053	Normal	95% Student's-t UCL	0.0071	0.0071	(1)
LBC	Metals	Mercury	25	25	100	1.6	8.3 J	4.0	0.028–0.32	Normal	95% Student's-t UCL	4.6	4.6	(1)
	PCBs	PCBs (total Aroclors)	23	23	100	0.023 J	0.90 J	0.33	NA	Normal	95% Student's-t UCL	0.42	0.42	(1)
	Metals	Antimony	16	1	6	1.8 J	1.8 J	1.8	0.73–1.9	None	Maximum concentration	1.8	1.8	(4)
		Arsenic	16	16	100	10 J	23 J	13	0.56–1.4	Approximate normal	95% Modified Student's-t UCL	15	15	(1)
		Cadmium	16	16	100	0.80 J	2.9 J	1.6	0.068–0.17	Normal	95% Student's-t UCL	1.8	1.8	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	16	16	100	10 J	16 J	13	0.30–0.76	Normal	95% Student's-t UCL	13	13	(1)
		Copper	16	16	100	54	130 J	100	1.4–3.5	Approximate normal	95% Modified Student's-t UCL	110	110	(1)
		Iron	16	16	100	27,000 J	42,000 J	33,000	9.2–23.3	Normal	95% Student's-t UCL	36,000	36,000	(1)
		Manganese	16	16	100	330 J	830 J	450	0.14–0.35	Approximate normal	95% Modified Student's-t UCL	510	510	(1)
		Nickel	16	16	100	30 J	79 J	39	0.51–1.3	Approximate normal	95% Modified Student's-t UCL	45	45	(1)
		Thallium	16	6	38	1.7 J	2.8 J	2.2	1.0–2.6	Normal	95% KM (t) UCL	1.7	1.7	(1)
		Zinc	16	16	100	150 J	380 J	260	1.9–4.7	Normal	95% Student's-t UCL	290	290	(1)
	PAHs	Benz[a]anthracene	13	13	100	0.15 J	0.93 J	0.49	0.0052–0.016	Normal	95% Student's-t UCL	0.60	0.60	(1)
		Benzo[a]pyrene	13	13	100	0.12 J	0.99 J	0.57	0.0042–0.029	Normal	95% Student's-t UCL	0.70	0.70	(1)
		Benzo[b]fluoranthene	13	13	100	0.13 J	1.3 J	0.73	0.0065–0.021	Normal	95% Student's-t UCL	0.90	0.90	(1)
		Dibenz[a,h]anthracene	13	11	85	0.029 J	0.26 J	0.14	0.0046–0.023	Normal	95% KM (t) UCL	0.17	0.17	(1)
		Indeno[1,2,3-cd]pyrene	13	13	100	0.075 J	0.78 J	0.41	0.0034–0.0057	Normal	95% Student's-t UCL	0.52	0.52	(1)
	Pesticides	Aldrin	13	9	69	0.0024 J	0.0069 J	0.0045	0.00014–0.00046	Normal	95% KM (t) UCL	0.0040	0.0040	(1)
		Heptachlor epoxide	10	4	40	0.0022 J	0.0037 J	0.0029	0.00015–0.00050	Normal	95% KM (t) UCL	0.0016	0.0016	(1)

Table 3. Intertidal Waterway Surface Sediments (0 to 15 cm) at Access Points – Summary Statistics and Exposure Point Concentrations for Angler/Crabber Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Reference Sites	Metals	Mercury	76	72	95	0.030 J	14 J	2.9	0.00548–0.68	Gamma	95% KM (Approximate Gamma) UCL	3.3	3.3	(1)
	PCBs	PCBs (total Aroclors)	59	52	88	0.011 J	7.0 J	0.50	NA	Lognormal	95% KM (Chebyshev) UCL	1.1	1.1	(1)
	Metals	Antimony	59	15	25	0.50 J	88 J	8.5	0.41–7.0	Nonparametric	95% KM (BCA) UCL	5.7	5.7	(1)
		Arsenic	59	59	100	2.6 J	150 J	20	0.32–7.0	Lognormal	95% Chebyshev (Mean, SD) UCL	34	34	(1)
		Cadmium	59	42	71	0.065 J	17 J	2.0	0.038–1.8	Lognormal	95% KM (Chebyshev) UCL	3.0	3.0	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	59	54	92	2.7 J	98 J	15	0.17–18	Lognormal	95% KM (Chebyshev) UCL	24	24	(1)
		Copper	59	59	100	16	1,100 J	190	0.79–8.8	Lognormal	95% Chebyshev (Mean, SD) UCL	330	330	(1)
		Iron	59	59	100	7,500 J	72,000 J	26,000	5.2–43.1	Normal	95% Student's-t UCL	29,000	29,000	(1)
		Manganese	59	59	100	71 J	7,400 J	820	0.079–5.3	Nonparametric	95% Chebyshev (Mean, SD) UCL	1700	1700	(1)
		Nickel	59	59	100	6.1 J	420 J	63	0.29–14	Lognormal	95% Chebyshev (Mean, SD) UCL	110	110	(1)
		Thallium	59	18	31	1.5	8.9 J	3.7	0.59–4.8	Lognormal	95% KM (t) UCL	1.9	1.9	(1)
		Zinc	58	58	100	51 J	1,100 J	320	1.1–8.8	Lognormal	95% Chebyshev (Mean, SD) UCL	450	450	(1)
	PAHs	Benz[a]anthracene	47	45	96	0.044 J	4.0	0.74	0.0022–0.033	Lognormal	95% KM (Chebyshev) UCL	1.3	1.3	(1)
		Benzo[a]pyrene	47	45	96	0.049 J	3.5 J	0.72	0.0017–0.038	Lognormal	95% KM (Chebyshev) UCL	1.2	1.2	(1)
		Benzo[b]fluoranthene	47	45	96	0.037 J	4.1	0.96	0.0027–0.034	Lognormal	95% KM (Chebyshev) UCL	1.6	1.6	(1)
		Dibenz[a,h]anthracene	47	39	83	0.018 J	0.81 J	0.20	0.0019–0.035	Lognormal	95% KM (Chebyshev) UCL	0.29	0.29	(1)
		Indeno[1,2,3-cd]pyrene	47	44	94	0.049 J	2.0 J	0.49	0.0018–0.035	Lognormal	95% KM (Chebyshev) UCL	0.76	0.76	(1)
	Pesticides	Aldrin	40	11	28	0.00079 J	0.041 J	0.0068	0.000049–0.0012	Lognormal	95% KM (BCA) UCL	0.0042	0.0042	(1)
		Heptachlor epoxide	39	13	33	0.00053 J	0.096 J	0.018	0.000053–0.0013	Nonparametric	97.5% KM (Chebyshev) UCL	0.026	0.026	(1)

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = not detected/no data

(1) The 95 UCL is selected as the EPC.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the EPC.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.
(6) No available data.

Table 4. Intertidal Waterway Surface Sediments (0 to 15 cm) at Access Points and Mudflats – Summary Statistics and Exposure Point Concentrations for Kayaker/Canoer Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	Metals	Mercury	76	76	100	0.53 J	1,400 J	130	0.014–30	Nonparametric	95% Chebyshev (Mean, SD) UCL	260	260	(1)
	PCBs	PCBs (total Aroclors)	71	71	100	0.03 J	24 J	3.1	NA	Nonparametric	95% Chebyshev (Mean, SD) UCL	5.7	5.7	(1)
	Metals	Antimony	52	12	23	0.71 J	5.7 J	1.9	0.53–3.0	Normal	95% KM (t) UCL	1.2	1.2	(1)
		Arsenic	52	52	100	4.9	130 J	28	0.40–3.0	Nonparametric	95% Chebyshev (Mean, SD) UCL	45	45	(1)
		Cadmium	52	52	100	0.78 J	120 J	16	0.049–0.76	Nonparametric	95% Chebyshev (Mean, SD) UCL	30	30	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	52	52	100	5.1 J	33 J	13	0.22–7.6	Approximate normal	95% Modified Student's-t UCL	15	15	(1)
		Copper	52	52	100	36 J	710 J	230	1.0–5.2	Lognormal	95% Chebyshev (Mean, SD) UCL	330	330	(1)
		Iron	53	53	100	12,000	39,000 J	28,000	6.6–34	Normal	95% Student's-t UCL	29,000	29,000	(1)
		Manganese	53	53	100	130	13,000 J	980	0.10–2.3	Nonparametric	95% Chebyshev (Mean, SD) UCL	2,100	2,100	(1)
		Nickel	52	52	100	16	180 J	59	0.36–6.1	Lognormal	95% Chebyshev (Mean, SD) UCL	81	81	(1)
		Thallium	52	18	35	0.94 J	15 J	4.2	0.74–12	Lognormal	95% KM (t) UCL	2.7	2.7	(1)
		Zinc	52	52	100	150 J	10,000 J	1,600	1.3–29	Nonparametric	95% Chebyshev (Mean, SD) UCL	2,700	2,700	(1)
	PAHs	Benz[a]anthracene	32	32	100	0.11 J	3.3 J	0.82	0.0033–0.042	Normal	95% Student's-t UCL	1.0	1.0	(1)
		Benzo[a]pyrene	32	32	100	0.14 J	3.2 J	0.92	0.0026–0.055	Lognormal	95% Chebyshev (Mean, SD) UCL	1.5	1.5	(1)
		Benzo[b]fluoranthene	32	32	100	0.17 J	3.6 J	1.2	0.0042–0.048	Normal	95% Student's-t UCL	1.5	1.5	(1)
		Dibenz[a,h]anthracene	32	31	97	0.030 J	1.3 J	0.30	0.0029–0.044	Lognormal	95% KM (Chebyshev) UCL	0.53	0.53	(1)
		Indeno[1,2,3-cd]pyrene	32	32	100	0.13 J	2.4 J	0.73	0.0018–0.045	Lognormal	95% Chebyshev (Mean, SD) UCL	1.1	1.1	(1)
	Pesticides	Aldrin	25	10	40	0.0062 J	0.23 J	0.054	0.00012–0.0080	Lognormal	95% KM (BCA) UCL	0.041	0.041	(1)
		Heptachlor epoxide	27	23	85	0.0035 J	0.19 J	0.052	0.00011–0.0087	Lognormal	95% KM (Chebyshev) UCL	0.087	0.087	(1)
MBC	Metals	Mercury	61	61	100	0.68	82 J	17	0.014–3.6	Gamma	95% Approximate Gamma UCL	21	21	(1)
	PCBs	PCBs (total Aroclors)	58	58	100	0.032 J	4.6 J	1.1	NA	Gamma	95% Approximate Gamma UCL	1.4	1.4	(1)
	Metals	Antimony	45	7	16	0.78 J	2.6 J	1.6	0.46–6.3	Normal	95% KM (t) UCL	1.1	1.1	(1)
		Arsenic	45	45	100	3.6	48 J	16	0.35–6.3	Approximate normal	95% Modified Student's-t UCL	18	18	(1)
		Cadmium	45	44	98	0.24 J	9.7 J	3.1	0.043–1.6	Normal	95% KM (t) UCL	3.5	3.5	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	45	41	91	4.6 J	95 J	14	0.19–16	Approximate normal	95% KM (t) UCL	16	16	(1)
		Copper	45	45	100	33	210 J	120	0.88–7.8	Normal	95% Student's-t UCL	130	130	(1)
		Iron	48	48	100	10,000	84,000 J	31,000	5.8–34	Approximate normal	95% Modified Student's-t UCL	34,000	34,000	(1)
		Manganese	48	48	100	150	31,000 J	2,600	0.088–4.7	Nonparametric	95% Chebyshev (Mean, SD) UCL	6,600	6,600	(1)
		Nickel	45	45	100	16	210 J	43	0.32–13	Approximate normal	95% Modified Student's-t UCL	50	50	(1)
		Thallium	45	8	18	1.1 J	100 J	15	0.65–10.6	Lognormal	95% KM (BCA) UCL	7.6	7.6	(1)
		Zinc	45	45	100	130	1,500 J	450	1.2–11	Approximate normal	95% Modified Student's-t UCL	500	500	(1)
	PAHs	Benz[a]anthracene	19	19	100	0.086 J	2.5 J	0.71	0.0017–0.029	Normal	95% Student's-t UCL	0.94	0.94	(1)
		Benzo[a]pyrene	19	19	100	0.11 J	2.6 J	0.79	0.0014–0.034	Lognormal	95% Chebyshev (Mean, SD) UCL	1.4	1.4	(1)
		Benzo[b]fluoranthene	19	19	100	0.13 J	3.7 J	1.1	0.0022–0.030	Normal	95% Student's-t UCL	1.4	1.4	(1)
		Dibenz[a,h]anthracene	19	19	100	0.056 J	0.67 J	0.21	0.0015–0.030	Lognormal	95% Chebyshev (Mean, SD) UCL	0.39	0.39	(1)
		Indeno[1,2,3-cd]pyrene	19	19	100	0.11 J	2.0 J	0.59	0.0014–0.031	Normal	95% Student's-t UCL	0.78	0.78	(1)
	Pesticides	Aldrin	15	5	33	0.016 J	0.046 J	0.029	0.000077–0.0027	Normal	95% KM (t) UCL	0.014	0.014	(1)
		Heptachlor epoxide	14	8	57	0.0070 J	0.034 J	0.018	0.000053–0.0030	Normal	95% KM (t) UCL	0.014	0.014	(1)

Table 4. Intertidal Waterway Surface Sediments (0 to 15 cm) at Access Points and Mudflats – Summary Statistics and Exposure Point Concentrations for Kayaker/Canoer Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
BCC	Metals	Mercury	23	23	100	0.19 J	18 J	5.6	0.0162–0.49	Gamma	95% Adjusted Gamma UCL	8.4	8.4	(1)
	PCBs	PCBs (total Aroclors)	20	19	95	0.025 J	1.4 J	0.48	NA	Normal	95% KM (t) UCL	0.59	0.59	(1)
	Metals	Antimony	16	2	12	1.8 J	4.3 J	3.1	0.76–3.5	None	Maximum concentration	4.3	4.3	(4)
		Arsenic	16	16	100	9.3 J	38 J	13	0.59–2.7	Approximate normal	95% Modified Student's-t UCL	17	17	(1)
		Cadmium	16	16	100	0.42 J	3.3 J	1.6	0.070–0.32	Normal	95% Student's-t UCL	1.9	1.9	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	16	15	94	3.2 J	12 J	9.2	0.31–1.4	Approximate normal	95% KM (t) UCL	9.9	9.9	(1)
		Copper	16	16	100	21 J	130 J	90	1.4–6.6	Normal	95% Student's-t UCL	110	110	(1)
		Iron	16	16	100	9,600 J	32,000 J	25,000	9.6–44	Normal	95% Student's-t UCL	27,000	27,000	(1)
		Manganese	16	16	100	160 J	460 J	340	0.14–0.66	Normal	95% Student's-t UCL	380	380	(1)
		Nickel	16	16	100	18 J	60 J	32	0.53–2.4	Normal	95% Student's-t UCL	37	37	(1)
		Thallium	16	3	19	1.6 J	3.4 J	2.3	1.1–4.9	None	Maximum concentration	3.4	3.4	(4)
		Zinc	16	16	100	86 J	430 J	270	2.0–8.9	Normal	95% Student's-t UCL	310	310	(1)
	PAHs	Benz[a]anthracene	15	15	100	0.016 J	1.7 J	0.54	0.0045–0.028	Gamma	95% Adjusted Gamma UCL	1.0	1.0	(1)
		Benzo[a]pyrene	15	14	93	0.061 J	1.7 J	0.66	0.0036–0.049	Normal	95% KM (t) UCL	0.81	0.81	(1)
		Benzo[b]fluoranthene	15	14	93	0.11 J	2.3 J	0.91	0.0056–0.036	Normal	95% KM (t) UCL	1.1	1.1	(1)
		Dibenz[a,h]anthracene	15	12	80	0.019 J	0.55 J	0.15	0.0040–0.039	Lognormal	95% KM (Chebyshev) UCL	0.27	0.27	(1)
		Indeno[1,2,3-cd]pyrene	15	14	93	0.044 J	1.2 J	0.42	0.0016–0.0096	Normal	95% KM (t) UCL	0.52	0.52	(1)
	Pesticides	Aldrin	15	7	47	0.0054 J	0.020 J	0.0095	0.00010–0.0020	Approximate normal	95% KM (t) UCL	0.0063	0.0063	(1)
		Heptachlor epoxide	13	9	69	0.0021 J	0.011 J	0.0053	0.00011–0.0022	Normal	95% KM (t) UCL	0.0051	0.0051	(1)
LBC	Metals	Mercury	37	36	97	0.67 J	23 J	4.3	0.028–0.49	Nonparametric	95% KM (Chebyshev) UCL	6.7	6.7	(1)
	PCBs	PCBs (total Aroclors)	35	35	100	0.023 J	1.3 J	0.43	NA	Normal	95% Student's-t UCL	0.52	0.52	(1)
	Metals	Antimony	27	2	7	1.8 J	2.5 J	2.1	0.73–1.9	None	Maximum concentration	2.5	2.5	(4)
		Arsenic	27	27	100	10 J	23 J	14	0.56–1.4	Approximate normal	95% Modified Student's-t UCL	15	15	(1)
		Cadmium	27	27	100	0.80 J	2.9 J	1.6	0.068–0.17	Normal	95% Student's-t UCL	1.8	1.8	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	27	27	100	8.8 J	18 J	12	0.30–0.76	Normal	95% Student's-t UCL	13	13	(1)
		Copper	27	27	100	54	150 J	110	1.4–3.5	Approximate normal	95% Modified Student's-t UCL	110	110	(1)
		Iron	27	27	100	25,000 J	52,000 J	34,000	9.2–23.3	Normal	95% Student's-t UCL	36,000	36,000	(1)
		Manganese	27	27	100	320 J	830 J	450	0.14–0.35	Approximate normal	95% Modified Student's-t UCL	490	490	(1)
		Nickel	27	27	100	25 J	79 J	39	0.51–1.3	Approximate normal	95% Modified Student's-t UCL	42	42	(1)
		Thallium	27	9	33	1.7 J	2.8 J	2.1	1.0–2.6	Normal	95% KM (t) UCL	1.6	1.6	(1)
		Zinc	27	27	100	150 J	380 J	270	1.9–4.7	Approximate normal	95% Modified Student's-t UCL	290	290	(1)
	PAHs	Benz[a]anthracene	24	24	100	0.15 J	1.2 J	0.52	0.0052–0.017	Normal	95% Student's-t UCL	0.61	0.61	(1)
		Benzo[a]pyrene	24	24	100	0.12 J	1.1 J	0.58	0.0042–0.030	Normal	95% Student's-t UCL	0.66	0.66	(1)
		Benzo[b]fluoranthene	24	24	100	0.13 J	1.4 J	0.75	0.0065–0.022	Normal	95% Student's-t UCL	0.86	0.86	(1)
		Dibenz[a,h]anthracene	24	19	79	0.029 J	0.30 J	0.15	0.0046–0.024	Normal	95% KM (t) UCL	0.15	0.15	(1)
		Indeno[1,2,3-cd]pyrene	24	24	100	0.075 J	0.86 J	0.42	0.0034–0.0060	Normal	95% Student's-t UCL	0.49	0.49	(1)
	Pesticides	Aldrin	24	18	75	0.0018 J	0.0079 J	0.0042	0.00014–0.00046	Normal	95% KM (t) UCL	0.0038	0.0038	(1)
		Heptachlor epoxide	17	4	24	0.0022 J	0.0037 J	0.0029	0.00015–0.00050	Normal	95% KM (t) UCL	0.0010	0.0010	(1)

Table 4. Intertidal Waterway Surface Sediments (0 to 15 cm) at Access Points and Mudflats – Summary Statistics and Exposure Point Concentrations for Kayaker/Canoer Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Reference Sites	Metals	Mercury	76	72	95	0.030 J	14 J	2.9	0.00548–0.68	Gamma	95% KM (Approximate Gamma) UCL	3.3	3.3	(1)
	PCBs	PCBs (total Aroclors)	59	52	88	0.011 J	7.0 J	0.50	NA	Lognormal	95% KM (Chebyshev) UCL	1.1	1.1	(1)
	Metals	Antimony	59	15	25	0.50 J	88 J	8.5	0.41–7.0	Nonparametric	95% KM (BCA) UCL	5.6	5.6	(1)
		Arsenic	59	59	100	2.6 J	150 J	20	0.32–7.0	Lognormal	95% Chebyshev (Mean, SD) UCL	34	34	(1)
		Cadmium	59	42	71	0.065 J	17 J	2.0	0.038–1.8	Lognormal	95% KM (Chebyshev) UCL	3.0	3.0	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	59	54	92	2.7 J	98 J	15	0.17–18	Lognormal	95% KM (Chebyshev) UCL	24	24	(1)
		Copper	59	59	100	16	1,100 J	190	0.79–8.8	Lognormal	95% Chebyshev (Mean, SD) UCL	330	330	(1)
		Iron	59	59	100	7,500 J	72,000 J	26,000	5.2–43.1	Normal	95% Student's-t UCL	29,000	29,000	(1)
		Manganese	59	59	100	71 J	7,400 J	820	0.079–5.3	Nonparametric	95% Chebyshev (Mean, SD) UCL	1,700	1,700	(1)
		Nickel	59	59	100	6.1 J	420 J	63	0.29–14	Lognormal	95% Chebyshev (Mean, SD) UCL	110	110	(1)
		Thallium	59	18	31	1.5	8.9 J	3.7	0.59–4.8	Lognormal	95% KM (t) UCL	1.9	1.9	(1)
		Zinc	58	58	100	51 J	1,100 J	320	1.1–8.8	Lognormal	95% Chebyshev (Mean, SD) UCL	450	450	(1)
	PAHs	Benz[a]anthracene	47	45	96	0.044 J	4.0	0.74	0.0022–0.033	Lognormal	95% KM (Chebyshev) UCL	1.3	1.3	(1)
		Benzo[a]pyrene	47	45	96	0.049 J	3.5 J	0.72	0.0017–0.038	Lognormal	95% KM (Chebyshev) UCL	1.2	1.2	(1)
		Benzo[b]fluoranthene	47	45	96	0.037 J	4.1	0.96	0.0027–0.034	Lognormal	95% KM (Chebyshev) UCL	1.6	1.6	(1)
		Dibenz[a,h]anthracene	47	39	83	0.018 J	0.81 J	0.20	0.0019–0.035	Lognormal	95% KM (Chebyshev) UCL	0.29	0.29	(1)
		Indeno[1,2,3-cd]pyrene	47	44	94	0.049 J	2.0 J	0.49	0.0018–0.035	Lognormal	95% KM (Chebyshev) UCL	0.76	0.76	(1)
	Pesticides	Aldrin	40	11	28	0.00079 J	0.041 J	0.0068	0.000049–0.0012	Lognormal	95% KM (BCA) UCL	0.0041	0.0041	(1)
		Heptachlor epoxide	39	13	33	0.00053 J	0.096 J	0.018	0.000053–0.0013	Nonparametric	97.5% KM (Chebyshev) UCL	0.026	0.026	(1)

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = not detected/no data

(1) The 95 UCL is selected as the EPC.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.
(6) No available data.

Table 5. Marsh Sediments (All Depths) – Summary Statistics and Exposure Point Concentrations for Construction Worker Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Upper Peach Island Creek Marsh	Metals	Mercury	9	9	100	43 J	430	230	0.017–29	Normal	95% Student's-t UCL	320	320	(1)
	PCBs	PCBs (total Aroclors)	7	7	100	0.034 J	1.7 J	0.71	NA	Nonparametric	97.5% Chebyshev (Mean, SD) UCL	2.3	1.7	(3)
	Metals	Aluminum	7	7	100	5,000 J	18,000 J	13,000	21–170	Normal	95% Student's-t UCL	16,000	16,000	(1)
		Antimony	6	2	33	5.4 J	17 J	11	0.64–2.0	None	Maximum concentration	17	17	(4)
		Arsenic	7	7	100	52 J	260 J	130	0.49–1.5	Normal	95% Student's-t UCL	190	190	(1)
		Cadmium	7	7	100	2.9 J	37 J	11	0.059–0.18	Lognormal	95% Chebyshev (Mean, SD) UCL	30	30	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	7	7	100	5.2 J	150 J	33	0.26–0.80	Lognormal	95% Chebyshev (Mean, SD) UCL	120	120	(1)
		Copper	7	7	100	160 J	5,200 J	1,100	1.2–3.7	Lognormal	95% Chebyshev (Mean, SD) UCL	4,100	4,100	(1)
		Iron	4	4	100	20,000 J	30,000 J	27,000	5.0–21	Normal	95% Student's-t UCL	32,000	30,000	(3)
		Manganese	4	4	100	230 J	3,700 J	1,500	0.13–5.1	Lognormal	95% Chebyshev (Mean, SD) UCL	4,800	3,700	(3)
		Nickel	7	7	100	29 J	1,100 J	220	0.44–1.4	Lognormal	95% Chebyshev (Mean, SD) UCL	860	860	(1)
		Thallium	7	3	43	2.7 J	6.6 J	4.3	1.2–11	None	Maximum concentration	6.6	6.6	(4)
		Vanadium	7	7	100	34 J	200 J	120	0.20–0.60	Normal	95% Student's-t UCL	160	160	(1)
		Zinc	7	7	100	220 J	590 J	400	1.6–5.0	Normal	95% Student's-t UCL	510	510	(1)
	PAHs	Benzo[a]pyrene	4	4	100	0.20 J	0.55 J	0.37	0.0021–0.018	Normal	95% Student's-t UCL	0.55	0.55	(1)
		Dibenz[a,h]anthracene	4	4	100	0.014 J	0.11 J	0.063	0.0023–0.020	Normal	95% Student's-t UCL	0.12	0.11	(3)
	Pesticides	Aldrin	4	2	50	0.0065 J	0.045 J	0.026	0.000098–0.0012	None	Maximum concentration	0.045	0.045	(4)
		Heptachlor	4	2	50	0.0085 J	0.021 J	0.015	0.00012–0.0014	None	Maximum concentration	0.021	0.021	(4)
		Heptachlor epoxide	3	2	67	0.00050 J	0.0091 J	0.0048	0.00011–0.00023	None	Maximum concentration	0.0091	0.0091	(4)
	Volatiles	Trichloroethene	4	0	0	--	--	--	0.0018–0.0052	None	Not detected	--	--	(2)
Nevertouch Marsh	Metals	Mercury	13	13	100	46 J	370 J	130	0.072–10	Normal	95% Student's-t UCL	180	180	(1)
	PCBs	PCBs (total Aroclors)	7	7	100	0.059 J	11 J	4.0	NA	Lognormal	99% Chebyshev (Mean, SD) UCL	20	11	(3)
	Metals	Aluminum	4	4	100	10,000 J	18,000 J	13,000	35.1–71	Normal	95% Student's-t UCL	17,000	17,000	(1)
		Antimony	4	4	100	2.5 J	4.2 J	3.3	1.4–2.9	Normal	95% Student's-t UCL	4.1	4.1	(1)
		Arsenic	4	4	100	42 J	67 J	54	1.1–2.2	Normal	95% Student's-t UCL	68	67	(3)
		Cadmium	4	4	100	8.8 J	32 J	18	0.13–0.27	Normal	95% Student's-t UCL	31	31	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	4	4	100	9.9 J	31 J	18	0.59–1.2	Normal	95% Student's-t UCL	29	29	(1)
		Copper	4	4	100	160 J	560 J	350	2.7–5.5	Normal	95% Student's-t UCL	550	550	(1)
		Iron	6	6	100	18,000 J	32,000 J	24,000	11–36.2	Normal	95% Student's-t UCL	28,000	28,000	(1)
		Manganese	6	6	100	400 J	4,000 J	2,000	0.27–1.7	Normal	95% Student's-t UCL	3,300	3,300	(1)
		Nickel	4	4	100	54 J	230 J	110	0.99–2.0	Normal	95% Student's-t UCL	200	200	(1)
		Thallium	4	3	75	3.3 J	4.0 J	3.6	2.0–4.1	None	Maximum concentration	4.0	4.0	(4)
		Vanadium	4	4	100	53 J	95 J	72	0.44–0.89	Normal	95% Student's-t UCL	93	93	(1)
		Zinc	4	4	100	570 J	17,000 J	5,500	3.7–73.2	Lognormal	95% Chebyshev (Mean, SD) UCL	22,000	17,000	(3)
	PAHs	Benzo[a]pyrene	2	2	100	0.11 J	0.14 J	0.13	0.0030–0.024	None	Maximum concentration	0.14	0.14	(4)
		Dibenz[a,h]anthracene	2	2	100	0.012 J	0.022 J	0.017	0.0033–0.027	None	Maximum concentration	0.022	0.022	(4)
	Pesticides	Aldrin	2	1	50	0.26 J	0.26 J	0.26	0.00034–0.0055	None	Maximum concentration	0.26	0.26	(4)
		Heptachlor	2	1	50	0.21 J	0.21 J	0.21	0.00042–0.0068	None	Maximum concentration	0.21	0.21	(4)
		Heptachlor epoxide	2	2	100	0.0090 J	0.29 J	0.15	0.00037–0.0059	None	Maximum concentration	0.29	0.29	(4)
	Volatiles	Trichloroethene	2	0	0	--	--	--	0.0023–0.011	None	Not detected	--	--	(2)

Table 5. Marsh Sediments (All Depths) – Summary Statistics and Exposure Point Concentrations for Construction Worker Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Eight Day Swamp	Metals	Mercury	11	11	100	28 J	67 J	49	0.0307–11	Normal	95% Student's-t UCL	57	57	(1)
	PCBs	PCBs (total Aroclors)	4	4	100	1.2 J	5.1 J	2.2	NA	Nonparametric	95% Chebyshev (Mean, SD) UCL	6.4	5.1	(3)
	Metals	Aluminum	2	2	100	9,600 J	13,000 J	11,000	44.3–63	None	Maximum concentration	13,000	13,000	(4)
		Antimony	2	2	100	2.5 J	2.7 J	2.6	1.8–2.6	None	Maximum concentration	2.7	2.7	(4)
		Arsenic	2	2	100	34 J	41 J	38	1.4–2.0	None	Maximum concentration	41	41	(4)
		Cadmium	2	2	100	11 J	16 J	13	0.17–0.24	None	Maximum concentration	16	16	(4)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	2	2	100	17 J	24 J	20	0.74–1.1	None	Maximum concentration	24	24	(4)
		Copper	2	2	100	300 J	580 J	440	3.4–4.9	None	Maximum concentration	580	580	(4)
		Iron	4	4	100	17,000 J	21,000 J	20,000	11–32.2	Normal	95% Student's-t UCL	22,000	21,000	(3)
		Manganese	4	4	100	1,600 J	2,700 J	2,100	0.30–3.7	Normal	95% Student's-t UCL	2,800	2,700	(3)
		Nickel	2	2	100	130 J	180 J	160	1.2–1.8	None	Maximum concentration	180	180	(4)
		Thallium	2	2	100	3.6 J	5.9 J	4.8	2.5–3.6	None	Maximum concentration	5.9	5.9	(4)
		Vanadium	2	2	100	74 J	75 J	75	0.55–0.79	None	Maximum concentration	75	75	(4)
		Zinc	2	2	100	1,200 J	1,400 J	1,300	4.6–6.6	None	Maximum concentration	1,400	1,400	(4)
	PAHs	Benzo[a]pyrene	2	2	100	0.13 J	0.18 J	0.16	0.0031–0.0043	None	Maximum concentration	0.18	0.18	(4)
		Dibenz[a,h]anthracene	2	2	100	0.012 J	0.030 J	0.021	0.0034–0.0048	None	Maximum concentration	0.030	0.030	(4)
	Pesticides	Aldrin	2	2	100	0.013 J	0.020 J	0.017	0.00037–0.00098	None	Maximum concentration	0.020	0.020	(4)
		Heptachlor	2	1	50	0.012 J	0.012 J	0.012	0.00046–0.0012	None	Maximum concentration	0.012	0.012	(4)
		Heptachlor epoxide	1	1	100	0.016 J	0.016 J	0.016	0.00041–0.0011	None	Maximum concentration	0.016	0.016	(4)
	Volatiles	Trichloroethene	2	0	0	--	--	--	0.0030–0.0041	None	Not detected	--	--	(2)
Paterson Plank Marsh	Metals	Mercury	4	4	100	25 J	47 J	32	0.049–8.4	Normal	95% Student's-t UCL	44	44	(1)
	PCBs	PCBs (total Aroclors)	2	2	100	1.3 J	3.3 J	2.3	NA	None	Maximum concentration	3.3	3.3	(4)
	Metals	Aluminum	1	1	100	11,000 J	11,000 J	11,000	49.6–61.2	None	Maximum concentration	11,000	11,000	(4)
		Antimony	1	1	100	3.2 J	3.2 J	3.2	2.0–2.5	None	Maximum concentration	3.2	3.2	(4)
		Arsenic	1	1	100	40 J	40 J	40	1.6–1.9	None	Maximum concentration	40	40	(4)
		Cadmium	1	1	100	8.8 J	8.8 J	8.8	0.19–0.23	None	Maximum concentration	8.8	8.8	(4)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	1	1	100	39 J	39 J	39	0.83–1.0	None	Maximum concentration	39	39	(4)
		Copper	1	1	100	230 J	230 J	230	3.8–4.7	None	Maximum concentration	230	230	(4)
		Iron	2	2	100	22,000 J	25,000 J	23,000	9.7–31.2	None	Maximum concentration	25,000	25,000	(4)
		Manganese	2	2	100	1,100 J	6,900 J	4,000	0.25–1.9	None	Maximum concentration	6,900	6,900	(4)
		Nickel	1	1	100	200 J	200 J	200	1.4–1.7	None	Maximum concentration	200	200	(4)
		Thallium	1	1	100	5.9 J	5.9 J	5.9	2.8–14.3	None	Maximum concentration	5.9	5.9	(4)
		Vanadium	1	1	100	91 J	91 J	91	0.62–0.77	None	Maximum concentration	91	91	(4)
		Zinc	1	1	100	1,300 J	1,300 J	1,300	5.2–6.4	None	Maximum concentration	1,300	1,300	(4)
	PAHs	Benzo[a]pyrene	1	1	100	0.42 J	0.42 J	0.42	0.0068–0.0068	None	Maximum concentration	0.42	0.42	(4)
		Dibenz[a,h]anthracene	1	1	100	0.085 J	0.085 J	0.085	0.0075–0.0075	None	Maximum concentration	0.085	0.085	(4)
	Pesticides	Aldrin	1	1	100	0.0050 J	0.0050 J	0.0050	0.00038–0.00038	None	Maximum concentration	0.0050	0.0050	(4)
		Heptachlor	1	0	0	--	--	--	0.00047–0.00047	None	Not detected	--	--	(2)
		Heptachlor epoxide	--	--	--	--	--	--	NA	--	--	--	--	(6)
	Volatiles	Trichloroethene	1	0	0	--	--	--	0.0036–0.0036	None	Not detected	--	--	(2)

Table 5. Marsh Sediments (All Depths) – Summary Statistics and Exposure Point Concentrations for Construction Worker Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Walden Swamp	Metals	Mercury	14	14	100	14 J	130 J	41	0.055–9.5	Lognormal	95% Chebyshev (Mean, SD) UCL	74	74	(1)
	PCBs	PCBs (total Aroclors)	8	8	100	0.35 J	6.3 J	1.5	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	4.5	4.5	(1)
	Metals	Aluminum	3	3	100	6,900 J	8,500 J	7,900	51.1–87.3	None	Maximum concentration	8,500	8,500	(4)
		Antimony	3	3	100	3.8 J	5.5 J	4.6	2.1–3.5	None	Maximum concentration	5.5	5.5	(4)
		Arsenic	3	3	100	24 J	47 J	37	1.6–2.7	None	Maximum concentration	47	47	(4)
		Cadmium	3	3	100	4.4 J	11 J	6.7	0.19–0.33	None	Maximum concentration	11	11	(4)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	3	3	100	13 J	38 J	24	0.85–1.5	None	Maximum concentration	38	38	(4)
		Copper	3	3	100	110 J	190 J	140	3.9–6.7	None	Maximum concentration	190	190	(4)
		Iron	6	6	100	12,000 J	27,000 J	19,000	7.1–44.5	Normal	95% Student's-t UCL	24,000	24,000	(1)
		Manganese	6	6	100	340 J	14,000 J	3,000	0.19–2.8	Lognormal	95% Chebyshev (Mean, SD) UCL	13,000	13,000	(1)
		Nickel	3	3	100	100 J	310 J	180	1.4–2.5	None	Maximum concentration	310	310	(4)
		Thallium	3	2	67	5.5 J	5.7 J	5.6	2.9–5.0	None	Maximum concentration	5.7	5.7	(4)
		Vanadium	3	3	100	73 J	130 J	93	0.64–1.1	None	Maximum concentration	130	130	(4)
		Zinc	3	3	100	520 J	2,100 J	1,100	5.3–9.1	None	Maximum concentration	2,100	2,100	(4)
	PAHs	Benzo[a]pyrene	1	1	100	0.14 J	0.14 J	0.14	0.0061–0.021	None	Maximum concentration	0.14	0.14	(4)
		Dibenz[a,h]anthracene	1	1	100	0.031 J	0.031 J	0.031	0.0067–0.024	None	Maximum concentration	0.031	0.031	(4)
	Pesticides	Aldrin	1	1	100	0.018 J	0.018 J	0.018	0.00067–0.00096	None	Maximum concentration	0.018	0.018	(4)
		Heptachlor	1	1	100	0.0058 J	0.0058 J	0.0058	0.00084–0.0012	None	Maximum concentration	0.0058	0.0058	(4)
		Heptachlor epoxide	1	1	100	0.0033 J	0.0033 J	0.0033	0.00073–0.0010	None	Maximum concentration	0.0033	0.0033	(4)
	Volatiles	Trichloroethene	1	0	0	--	--	--	0.0039–0.0066	None	Not detected	--	--	(2)
Ackerman's East Marsh	Metals	Mercury	11	11	100	2.5	100 J	27	0.040–20	Lognormal	95% Chebyshev (Mean, SD) UCL	61	61	(1)
	PCBs	PCBs (total Aroclors)	8	8	100	0.18	0.87	0.42	NA	Normal	95% Student's-t UCL	0.58	0.58	(1)
	Metals	Aluminum	6	6	100	3,600 J	20,000 J	13,000	16–190	Normal	95% Student's-t UCL	18,000	18,000	(1)
		Antimony	6	2	33	2.1	4.8	3.4	2.0–19	None	Maximum concentration	4.8	4.8	(4)
		Arsenic	6	6	100	13	26	18	1.6–19	Normal	95% Student's-t UCL	23	23	(1)
		Cadmium	6	6	100	1.4	5.6	3.5	0.40–4.8	Normal	95% Student's-t UCL	5.0	5.0	(1)
		Chromium (VI)	1	1	100	17	17	17	3.4–7.6	None	Maximum concentration	17	17	(4)
		Cobalt	6	5	83	11	32	19	4.0–48	Normal	95% KM (t) UCL	27	27	(1)
		Copper	6	6	100	30	97 J	68	2.0–24	Normal	95% Student's-t UCL	90	90	(1)
		Iron	7	7	100	6,300 J	31,000 J	21,000	8.2–95	Normal	95% Student's-t UCL	28,000	28,000	(1)
		Manganese	7	7	100	400	3,600	1,900	0.21–32	Normal	95% Student's-t UCL	2,700	2,700	(1)
		Nickel	6	6	100	34	88	53	3.2–38	Normal	95% Student's-t UCL	68	68	(1)
		Thallium	6	0	0	--	--	--	0.98–22	None	Not detected	--	--	(2)
		Vanadium	6	6	100	39	62	50	4.0–48	Normal	95% Student's-t UCL	57	57	(1)
		Zinc	6	6	100	130	450 J	320	2.0–19	Normal	95% Student's-t UCL	420	420	(1)
	PAHs	Benzo[a]pyrene	6	3	50	0.038	0.060	0.046	0.0011–0.087	None	Maximum concentration	0.060	0.060	(4)
		Dibenz[a,h]anthracene	6	2	33	0.012	0.015 J	0.014	0.00099–0.097	None	Maximum concentration	0.015	0.015	(4)
	Pesticides	Aldrin	2	2	100	0.00074 J	0.0044 J	0.0026	0.00015–0.00021	None	Maximum concentration	0.0044	0.0044	(4)
		Heptachlor	2	0	0	--	--	--	0.00019–0.00026	None	Not detected	--	--	(2)
		Heptachlor epoxide	2	0	0	--	--	--	0.00018–0.00023	None	Not detected	--	--	(2)
	Volatiles	Trichloroethene	6	1	17	0.033 J	0.033 J	0.033	0.00058–0.0097	None	Maximum concentration	0.033	0.033	(4)

Table 5. Marsh Sediments (All Depths) – Summary Statistics and Exposure Point Concentrations for Construction Worker Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Rutherford Marsh	Metals	Mercury	7	7	100	10 J	16 J	12	0.0372–0.76	Normal	95% Student's-t UCL	14	14	(1)
	PCBs	PCBs (total Aroclors)	1	1	100	0.50 J	0.50 J	0.50	NA	None	Maximum concentration	0.50	0.50	(4)
	Metals	Aluminum	5	5	100	6,700 J	15,000 J	9,900	14–63.1	Normal	95% Student's-t UCL	13,000	13,000	(1)
		Antimony	5	1	20	1.2 J	1.2 J	1.2	0.56–2.6	None	Maximum concentration	1.2	1.2	(4)
		Arsenic	5	5	100	2.9	16 J	11	0.43–2.0	Normal	95% Student's-t UCL	16	16	(1)
		Cadmium	5	3	60	0.21 J	1.6 J	0.90	0.052–0.24	None	Maximum concentration	1.6	1.6	(4)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	5	5	100	5.5 J	14 J	10	0.23–1.1	Normal	95% Student's-t UCL	14	14	(1)
		Copper	5	5	100	29	160 J	100	1.1–4.9	Normal	95% Student's-t UCL	140	140	(1)
		Iron	1	1	100	22,000 J	22,000 J	22,000	10–16	None	Maximum concentration	22,000	22,000	(4)
		Manganese	1	1	100	4,600 J	4,600 J	4,600	0.26–1.6	None	Maximum concentration	4,600	4,600	(4)
		Nickel	5	5	100	13	79 J	46	0.39–1.8	Normal	95% Student's-t UCL	71	71	(1)
		Thallium	5	4	80	1.8 J	6.7 J	4.3	0.79–3.6	Normal	95% KM (t) UCL	5.6	5.6	(1)
		Vanadium	5	5	100	32	58 J	44	0.17–0.79	Normal	95% Student's-t UCL	55	55	(1)
		Zinc	5	5	100	53	360 J	230	1.4–6.6	Normal	95% Student's-t UCL	360	360	(1)
	PAHs	Benzo[a]pyrene	4	4	100	0.071	0.32 J	0.24	0.0014–0.019	Normal	95% Student's-t UCL	0.37	0.32	(3)
		Dibenz[a,h]anthracene	4	2	50	0.016 J	0.059	0.038	0.0015–0.021	None	Maximum concentration	0.059	0.059	(4)
	Pesticides	Aldrin	4	2	50	0.005 J	0.0056 J	0.0053	0.000060–0.00039	None	Maximum concentration	0.0056	0.0056	(4)
		Heptachlor	3	0	0	--	--	--	0.000074–0.00011	None	Not detected	--	--	(2)
		Heptachlor epoxide	3	2	67	0.0024 J	0.0027 J	0.0026	0.000065–0.00042	None	Maximum concentration	0.0027	0.0027	(4)
	Volatiles	Trichloroethene	4	0	0	--	--	--	0.0014–0.0065	None	Not detected	--	--	(2)
Tollgate Marsh	Metals	Mercury	6	6	100	3.8 J	15 J	9.0	0.021–1.4	Normal	95% Student's-t UCL	13	13	(1)
	PCBs	PCBs (total Aroclors)	2	2	100	0.27 J	0.44 J	0.35	NA	None	Maximum concentration	0.44	0.44	(4)
	Metals	Aluminum	1	1	100	11,000 J	11,000 J	11,000	13.2–41	None	Maximum concentration	11,000	11,000	(4)
		Antimony	1	0	0	--	--	--	0.54–1.7	None	Not detected	--	--	(2)
		Arsenic	1	1	100	9.2 J	9.2 J	9.2	0.41–1.3	None	Maximum concentration	9.2	9.2	(4)
		Cadmium	1	1	100	0.56 J	0.56 J	0.56	0.050–0.15	None	Maximum concentration	0.56	0.56	(4)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	1	1	100	11 J	11 J	11	0.22–0.68	None	Maximum concentration	11	11	(4)
		Copper	1	1	100	66 J	66 J	66	1.0–3.2	None	Maximum concentration	66	66	(4)
		Iron	2	2	100	21,000 J	28,000 J	25,000	3.8–20.9	None	Maximum concentration	28,000	28,000	(4)
		Manganese	2	2	100	490 J	1,100 J	790	0.099–0.91	None	Maximum concentration	1,100	1,100	(4)
		Nickel	1	1	100	38 J	38 J	38	0.37–1.2	None	Maximum concentration	38	38	(4)
		Thallium	1	1	100	2.4 J	2.4 J	2.4	0.76–2.3	None	Maximum concentration	2.4	2.4	(4)
		Vanadium	1	1	100	29 J	29 J	29	0.17–0.51	None	Maximum concentration	29	29	(4)
		Zinc	1	1	100	170 J	170 J	170	1.4–4.3	None	Maximum concentration	170	170	(4)
	PAHs	Benzo[a]pyrene	3	3	100	0.071 J	0.27 J	0.16	0.0057–0.017	None	Maximum concentration	0.27	0.27	(4)
		Dibenz[a,h]anthracene	3	3	100	0.019 J	0.062 J	0.039	0.0063–0.014	None	Maximum concentration	0.062	0.062	(4)
	Pesticides	Aldrin	3	2	67	0.0030 J	0.0078 J	0.0054	0.00031–0.00039	None	Maximum concentration	0.0078	0.0078	(4)
		Heptachlor	2	0	0	--	--	--	0.00039–0.00043	None	Not detected	--	--	(2)
		Heptachlor epoxide	2	0	0	--	--	--	0.00034–0.00038	None	Not detected	--	--	(2)
	Volatiles	Trichloroethene	3	0	0	--	--	--	0.0035–0.0037	None	Not detected	--	--	(2)

Table 5. Marsh Sediments (All Depths) – Summary Statistics and Exposure Point Concentrations for Construction Worker Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Oritani Marsh	Metals	Mercury	6	6	100	0.34 J	2.9 J	1.8	0.00439–0.13	Normal	95% Student's-t UCL	2.5	2.5	(1)
	PCBs	PCBs (total Aroclors)	2	1	50	0.016 J	0.016 J	0.016	NA	None	Maximum concentration	0.016	0.016	(4)
	Metals	Aluminum	2	2	100	8,300 J	14,000 J	11,000	16.7–85.3	None	Maximum concentration	14,000	14,000	(4)
		Antimony	2	2	100	2.8 J	3.2 J	3.0	0.68–3.5	None	Maximum concentration	3.2	3.2	(4)
		Arsenic	2	2	100	12 J	23 J	17	0.52–2.7	None	Maximum concentration	23	23	(4)
		Cadmium	2	1	50	0.34 J	0.34 J	0.34	0.063–0.32	None	Maximum concentration	0.34	0.34	(4)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	2	2	100	4.8 J	16 J	10	0.28–1.4	None	Maximum concentration	16	16	(4)
		Copper	2	2	100	41 J	67 J	54	1.3–6.6	None	Maximum concentration	67	67	(4)
		Iron	2	2	100	13,000 J	34,000 J	23,000	8.5–43.5	None	Maximum concentration	34,000	34,000	(4)
		Manganese	2	2	100	90 J	530 J	310	0.13–0.66	None	Maximum concentration	530	530	(4)
		Nickel	2	2	100	30 J	40 J	35	0.47–2.4	None	Maximum concentration	40	40	(4)
		Thallium	2	0	0	--	--	--	0.96–4.9	None	Not detected	--	--	(2)
		Vanadium	2	2	100	47 J	63 J	55	0.21–1.1	None	Maximum concentration	63	63	(4)
		Zinc	2	2	100	140 J	160 J	150	1.7–8.9	None	Maximum concentration	160	160	(4)
	PAHs	Benzo[a]pyrene	1	1	100	0.20 J	0.20 J	0.20	0.0059–0.0059	None	Maximum concentration	0.20	0.20	(4)
		Dibenz[a,h]anthracene	1	0	0	--	--	--	0.0066–0.0066	None	Not detected	--	--	(2)
	Pesticides	Aldrin	1	0	0	--	--	--	0.00066–0.00066	None	Not detected	--	--	(2)
		Heptachlor	1	1	100	0.0012 J	0.0012 J	0.0012	0.00082–0.00082	None	Maximum concentration	0.0012	0.0012	(4)
		Heptachlor epoxide	1	1	100	0.0023 J	0.0023 J	0.0023	0.00072–0.00072	None	Maximum concentration	0.0023	0.0023	(4)
	Volatiles	Trichloroethene	1	0	0	--	--	--	0.0065–0.0065	None	Not detected	--	--	(2)
Berry's Creek Marsh	Metals	Mercury	5	5	100	2.2 J	6.3 J	4.6	0.0173–0.28	Normal	95% Student's-t UCL	6.1	6.1	(1)
	PCBs	PCBs (total Aroclors)	2	2	100	0.060 J	0.14 J	0.098	NA	None	Maximum concentration	0.14	0.14	(4)
	Metals	Aluminum	1	1	100	14,000 J	14,000 J	14,000	26.8–45.6	None	Maximum concentration	14,000	14,000	(4)
		Antimony	1	1	100	2.2 J	2.2 J	2.2	1.1–1.9	None	Maximum concentration	2.2	2.2	(4)
		Arsenic	1	1	100	27 J	27 J	27	0.84–1.4	None	Maximum concentration	27	27	(4)
		Cadmium	1	1	100	1.2 J	1.2 J	1.2	0.10–0.17	None	Maximum concentration	1.2	1.2	(4)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	1	1	100	18 J	18 J	18	0.45–0.76	None	Maximum concentration	18	18	(4)
		Copper	1	1	100	130 J	130 J	130	2.1–3.5	None	Maximum concentration	130	130	(4)
		Iron	2	2	100	21,000 J	30,000 J	25,000	13–26	None	Maximum concentration	30,000	30,000	(4)
		Manganese	2	2	100	530 J	800 J	660	0.21–0.67	None	Maximum concentration	800	800	(4)
		Nickel	1	1	100	94 J	94 J	94	0.75–1.3	None	Maximum concentration	94	94	(4)
		Thallium	1	1	100	2.6 J	2.6 J	2.6	1.5–2.6	None	Maximum concentration	2.6	2.6	(4)
		Vanadium	1	1	100	66 J	66 J	66	0.33–0.57	None	Maximum concentration	66	66	(4)
		Zinc	1	1	100	390 J	390 J	390	2.8–4.7	None	Maximum concentration	390	390	(4)
	PAHs	Benzo[a]pyrene	3	3	100	0.11 J	0.30 J	0.18	0.0036–0.021	None	Maximum concentration	0.30	0.30	(4)
		Dibenz[a,h]anthracene	3	3	100	0.020 J	0.077 J	0.053	0.0040–0.016	None	Maximum concentration	0.077	0.077	(4)
	Pesticides	Aldrin	3	0	0	--	--	--	0.00021–0.00081	None	Not detected	--	--	(2)
		Heptachlor	3	0	0	--	--	--	0.00026–0.0010	None	Not detected	--	--	(2)
		Heptachlor epoxide	3	1	33	0.0015 J	0.0015 J	0.0015	0.00022–0.00088	None	Maximum concentration	0.0015	0.0015	(4)
	Volatiles	Trichloroethene	3	0	0	--	--	--	0.0036–0.0046	None	Not detected	--	--	(2)

Table 5. Marsh Sediments (All Depths) – Summary Statistics and Exposure Point Concentrations for Construction Worker Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Former ENCAP Restoration Area	Metals	Mercury	1	1	100	3.7 J	3.7 J	3.7	0.061–0.085	None	Maximum concentration	3.7	3.7	(4)
	PCBs	PCBs (total Aroclors)	4	4	100	0.097 J	0.21 J	0.14	NA	Normal	95% Student's-t UCL	0.20	0.20	(1)
	Metals	Aluminum	1	1	100	8,600 J	8,600 J	8,600	45.2–57.4	None	Maximum concentration	8,600	8,600	(4)
		Antimony	1	0	0	--	--	--	1.8–2.3	None	Not detected	--	--	(2)
		Arsenic	1	1	100	15 J	15 J	15	1.4–1.8	None	Maximum concentration	15	15	(4)
		Cadmium	1	0	0	--	--	--	0.17–0.22	None	Not detected	--	--	(2)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	1	1	100	6.8 J	6.8 J	6.8	0.75–0.96	None	Maximum concentration	6.8	6.8	(4)
		Copper	1	1	100	110 J	110 J	110	3.5–4.4	None	Maximum concentration	110	110	(4)
		Iron	1	1	100	14,000 J	14,000 J	14,000	23–29.3	None	Maximum concentration	14,000	14,000	(4)
		Manganese	1	1	100	160 J	160 J	160	0.35–0.44	None	Maximum concentration	160	160	(4)
		Nickel	1	1	100	42 J	42 J	42	1.3–1.6	None	Maximum concentration	42	42	(4)
		Thallium	1	0	0	--	--	--	2.6–3.3	None	Not detected	--	--	(2)
		Vanadium	1	1	100	78 J	78 J	78	0.56–0.72	None	Maximum concentration	78	78	(4)
		Zinc	1	1	100	140 J	140 J	140	4.7–6.0	None	Maximum concentration	140	140	(4)
	PAHs	Benzo[a]pyrene	1	1	100	0.35 J	0.35 J	0.35	0.016–0.016	None	Maximum concentration	0.35	0.35	(4)
		Dibenz[a,h]anthracene	1	0	0	--	--	--	0.017–0.017	None	Not detected	--	--	(2)
	Pesticides	Aldrin	1	1	100	0.0016 J	0.0016 J	0.0016	0.00035–0.00035	None	Maximum concentration	0.0016	0.0016	(4)
		Heptachlor	1	0	0	--	--	--	0.00044–0.00044	None	Not detected	--	--	(2)
		Heptachlor epoxide	1	1	100	0.0020 J	0.0020 J	0.0020	0.00038–0.00038	None	Maximum concentration	0.0020	0.0020	(4)
	Volatiles	Trichloroethene	1	0	0	--	--	--	0.0035–0.0035	None	Not detected	--	--	(2)

Notes:

EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
KM = Kaplan Meier
n = sample size
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SD = standard deviation
UCL = upper confidence limit
-- = not detected/no data

Upper Peach Island Creek is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

(1) The 95 UCL is selected as the EPC.
(2) Not detected.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the EPC.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.
(6) No available data.

Table 6. Waterway Sediments (All Depths) – Summary Statistics and Exposure Point Concentrations for Construction Worker Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Upper Peach Island Creek	Metals	Mercury	12	12	100	9.7 J	350 J	140	0.017-11	Lognormal	95% Chebyshev (Mean, SD) UCL	280	280	(1)
	PCBs	PCBs (total Aroclors)	12	12	100	1.5 J	17 J	8.2	NA	Normal	95% Student's-t UCL	11	11	(1)
	Metals	Aluminum	11	11	100	8,100	20,000 J	14,000	16-50	Normal	95% Student's-t UCL	16,000	16,000	(1)
		Antimony	11	9	82	0.77 J	4.1 J	1.9	0.66-2.0	Approximate normal	95% KM (t) UCL	2.2	2.2	(1)
		Arsenic	11	11	100	9.5	120 J	43	0.51-1.6	Normal	95% Student's-t UCL	61	61	(1)
		Cadmium	11	11	100	7.7 J	190 J	60	0.061-0.19	Lognormal	95% Chebyshev (Mean, SD) UCL	130	130	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	11	10	91	8.4 J	31 J	17	0.14-0.83	Normal	95% KM (t) UCL	19	19	(1)
		Copper	11	11	100	240 J	3,500 J	1,300	0.68-3.8	Lognormal	95% Chebyshev (Mean, SD) UCL	2,700	2,700	(1)
		Iron	11	11	100	18,000 J	48,000 J	29,000	8.3-25	Normal	95% Student's-t UCL	34,000	34,000	(1)
		Manganese	11	11	100	220 J	920 J	540	0.13-0.38	Normal	95% Student's-t UCL	680	680	(1)
		Nickel	11	11	100	45 J	870 J	300	0.24-1.4	Normal	95% Student's-t UCL	430	430	(1)
		Thallium	11	6	55	1.1 J	7.6 J	4.2	0.38-2.9	Normal	95% KM (t) UCL	3.8	3.8	(1)
		Vanadium	11	11	100	33 J	74 J	53	0.20-0.62	Normal	95% Student's-t UCL	61	61	(1)
		Zinc	11	11	100	700 J	6,600 J	2,500	1.7-19	Normal	95% Student's-t UCL	3,500	3,500	(1)
	PAHs	Benzo[a]pyrene	6	6	100	0.28 J	1.3 J	0.81	0.0057-0.046	Normal	95% Student's-t UCL	1.2	1.2	(1)
		Dibenz[a,h]anthracene	6	6	100	0.049 J	0.38 J	0.24	0.0064-0.036	Normal	95% Student's-t UCL	0.36	0.36	(1)
	Pesticides	Aldrin	6	2	33	0.021 J	0.050 J	0.036	0.00016-0.0014	None	Maximum concentration	0.050	0.050	(4)
		Heptachlor	4	1	25	0.029 J	0.029 J	0.029	0.00025-0.0015	None	Maximum concentration	0.029	0.029	(4)
		Heptachlor epoxide	6	3	50	0.0054 J	0.11	0.051	0.00017-0.0015	None	Maximum concentration	0.11	0.11	(4)
	Volatiles	Trichloroethene	6	1	17	27	27	27	0.0011-0.18	None	Maximum concentration	27	27	(4)
UBC	Metals	Mercury	46	46	100	0.77	680 J	110	0.014-40.4	Lognormal	95% Chebyshev (Mean, SD) UCL	200	200	(1)
	PCBs	PCBs (total Aroclors)	46	46	100	0.013 J	16 J	2.4	NA	Gamma	95% Adjusted Gamma UCL	3.6	3.6	(1)
	Metals	Aluminum	32	32	100	3,400 J	16,000 J	10,000	8.0-57.2	Normal	95% Student's-t UCL	11,000	11,000	(1)
		Antimony	32	18	56	0.56 J	14 J	2.5	0.32-2.3	Lognormal	95% KM (t) UCL	2.5	2.5	(1)
		Arsenic	32	32	100	2.9	88 J	23	0.25-1.8	Lognormal	95% Chebyshev (Mean, SD) UCL	37	37	(1)
		Cadmium	32	32	100	0.14 J	42 J	12	0.030-0.21	Lognormal	95% Chebyshev (Mean, SD) UCL	21	21	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	32	32	100	3.5 J	26 J	11	0.13-0.95	Normal	95% Student's-t UCL	12	12	(1)
		Copper	32	32	100	17 J	1,200 J	210	0.61-4.4	Lognormal	95% Chebyshev (Mean, SD) UCL	390	390	(1)
		Iron	32	32	100	6,900 J	38,000 J	23,000	4.1-29.2	Normal	95% Student's-t UCL	26,000	26,000	(1)
		Manganese	32	32	100	91	1,600 J	510	0.061-0.44	Lognormal	95% Chebyshev (Mean, SD) UCL	780	780	(1)
		Nickel	32	32	100	8.6	170 J	46	0.22-1.6	Lognormal	95% Chebyshev (Mean, SD) UCL	72	72	(1)
		Thallium	32	20	62	0.71 J	6.5 J	2.4	0.46-3.3	Lognormal	95% KM (BCA) UCL	2.4	2.4	(1)
		Vanadium	32	32	100	12	80 J	36	0.099-0.72	Normal	95% Student's-t UCL	41	41	(1)
		Zinc	32	32	100	66 J	4,000 J	1,200	0.83-53.8	Lognormal	95% Chebyshev (Mean, SD) UCL	2,100	2,100	(1)
	PAHs	Benzo[a]pyrene	15	15	100	0.098 J	1.8 J	0.84	0.00086-0.058	Normal	95% Student's-t UCL	1.0	1.0	(1)
		Dibenz[a,h]anthracene	15	15	100	0.055 J	0.32 J	0.17	0.00096-0.064	Normal	95% Student's-t UCL	0.21	0.21	(1)
	Pesticides	Aldrin	15	11	73	0.0013 J	0.11 J	0.024	0.000048-0.0080	Lognormal	97.5% KM (Chebyshev) UCL	0.063	0.063	(1)
		Heptachlor	14	5	36	0.00062 J	0.029 J	0.0097	0.000060-0.012	Lognormal	97.5% KM (Chebyshev) UCL	0.018	0.018	(1)
		Heptachlor epoxide	15	13	87	0.00070 J	0.13 J	0.027	0.000052-0.011	Lognormal	97.5% KM (Chebyshev) UCL	0.077	0.077	(1)
	Volatiles	Trichloroethene	15	1	7	0.0015 J	0.0015 J	0.0015	0.00082-0.0067	None	Maximum concentration	0.0015	0.0015	(4)

Table 6. Waterway Sediments (All Depths) – Summary Statistics and Exposure Point Concentrations for Construction Worker Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
MBC	Metals	Mercury	43	43	100	0.12 J	240 J	44	0.016-52	Gamma	95% Adjusted Gamma UCL	70	70	(1)
	PCBs	PCBs (total Aroclors)	43	43	100	0.025 J	29	4.4	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	8.6	8.6	(1)
	Metals	Aluminum	29	29	100	8,400 J	21,000	14,000	11.3-97	Normal	95% Student's-t UCL	15,000	15,000	(1)
		Antimony	29	9	31	0.64 J	6.5	2.1	0.46-9.7	Normal	95% KM (t) UCL	1.6	1.6	(1)
		Arsenic	29	29	100	5.9 J	43	17	0.35-9.7	Normal	95% Student's-t UCL	20	20	(1)
		Cadmium	29	24	83	1.0 J	12 J	4.7	0.042-2.4	Lognormal	95% KM (Chebyshev) UCL	6.6	6.6	(1)
		Chromium (VI)	5	4	80	1.1	4.4	2.7	0.94-3.5	Normal	95% KM (t) UCL	3.8	3.8	(1)
		Cobalt	29	29	100	8.4	19	13	0.19-24	Normal	95% Student's-t UCL	14	14	(1)
		Copper	29	29	100	14 J	260 J	100	0.87-12	Lognormal	95% Chebyshev (Mean, SD) UCL	160	160	(1)
		Iron	29	29	100	16,000	100,000 J	32,000	5.8-100	Approximate normal	95% Modified Student's-t UCL	37,000	37,000	(1)
		Manganese	29	29	100	240 J	2,600 J	760	0.087-7.2	Lognormal	95% Chebyshev (Mean, SD) UCL	1,200	1,200	(1)
		Nickel	29	29	100	19	71 J	38	0.32-19	Normal	95% Student's-t UCL	43	43	(1)
		Thallium	29	8	28	0.86 J	3.2 J	1.6	0.65-10	Normal	95% KM (t) UCL	1.4	1.4	(1)
		Vanadium	29	29	100	17 J	56	36	0.14-24	Normal	95% Student's-t UCL	39	39	(1)
		Zinc	29	29	100	72	2,000 J	480	1.2-11	Lognormal	95% Chebyshev (Mean, SD) UCL	840	840	(1)
	PAHs	Benzo[a]pyrene	15	14	93	0.045	4.3 J	0.50	0.00060-0.058	Lognormal	97.5% KM (Chebyshev) UCL	2.2	2.2	(1)
		Dibenz[a,h]anthracene	15	14	93	0.011	0.63 J	0.10	0.00051-0.025	Lognormal	97.5% KM (Chebyshev) UCL	0.35	0.35	(1)
	Pesticides	Aldrin	6	4	67	0.0055 J	0.047 J	0.018	0.000087-0.00086	Lognormal	97.5% KM (Chebyshev) UCL	0.056	0.047	(3)
		Heptachlor	6	1	17	0.0047 J	0.0047 J	0.0047	0.00011-0.0011	None	Maximum concentration	0.0047	0.0047	(4)
		Heptachlor epoxide	6	5	83	0.0061 J	0.014 J	0.0092	0.000095-0.00094	Normal	95% KM (t) UCL	0.011	0.011	(1)
	Volatiles	Trichloroethene	15	1	7	0.0012 J	0.0012 J	0.0012	0.00039-0.0069	None	Maximum concentration	0.0012	0.0012	(4)
BCC	Metals	Mercury	14	14	100	0.87 J	31 J	14	0.019-2.0	Gamma	95% Adjusted Gamma UCL	27	27	(1)
	PCBs	PCBs (total Aroclors)	14	14	100	0.09 J	3.0 J	1.3	NA	Gamma	95% Adjusted Gamma UCL	2.5	2.5	(1)
	Metals	Aluminum	8	8	100	2,300 J	17,000 J	11,000	12.4-85	Normal	95% Student's-t UCL	14,000	14,000	(1)
		Antimony	8	4	50	1.5 J	3.0 J	2.3	0.50-3.5	Normal	95% KM (t) UCL	1.9	1.9	(1)
		Arsenic	8	8	100	4.6 J	38 J	16	0.39-2.7	Normal	95% Student's-t UCL	23	23	(1)
		Cadmium	8	8	100	0.57 J	11 J	5.1	0.046-0.32	Lognormal	95% Chebyshev (Mean, SD) UCL	11	11	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	8	8	100	2.8 J	15 J	11	0.21-1.4	Normal	95% Student's-t UCL	13	13	(1)
		Copper	8	8	100	21 J	300 J	150	0.95-6.6	Normal	95% Student's-t UCL	210	210	(1)
		Iron	8	8	100	7,100 J	54,000 J	29,000	6.3-44	Normal	95% Student's-t UCL	38,000	38,000	(1)
		Manganese	8	8	100	330 J	650 J	490	0.095-0.66	Normal	95% Student's-t UCL	560	560	(1)
		Nickel	8	8	100	7.9 J	78 J	43	0.35-2.4	Normal	95% Student's-t UCL	58	58	(1)
		Thallium	8	6	75	1.1 J	4.2 J	2.2	0.71-4.9	Normal	95% KM (t) UCL	2.8	2.8	(1)
		Vanadium	8	8	100	6.3 J	75 J	35	0.15-1.1	Normal	95% Student's-t UCL	48	48	(1)
		Zinc	8	8	100	84 J	1,200 J	470	1.3-8.9	Normal	95% Student's-t UCL	710	710	(1)
	PAHs	Benzo[a]pyrene	7	7	100	0.10 J	1.6 J	0.89	0.0062-0.14	Normal	95% Student's-t UCL	1.2	1.2	(1)
		Dibenz[a,h]anthracene	7	7	100	0.032 J	0.25 J	0.15	0.0049-0.11	Normal	95% Student's-t UCL	0.21	0.21	(1)
	Pesticides	Aldrin	7	7	100	0.0018	0.035 J	0.018	0.000096-0.0013	Normal	95% Student's-t UCL	0.027	0.027	(1)
		Heptachlor	7	0	0	--	--	--	0.00012-0.0016	None	Not detected	--	--	(2)
		Heptachlor epoxide	7	6	86	0.00037 J	0.020 J	0.0079	0.00010-0.0014	Lognormal	99% KM (Chebyshev) UCL	0.039	0.020	(3)
	Volatiles	Trichloroethene	7	0	0	--	--	--	0.00070-0.0039	None	Not detected	--	--	(2)

Table 6. Waterway Sediments (All Depths) – Summary Statistics and Exposure Point Concentrations for Construction Worker Exposures via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
LBC	Metals	Mercury	12	12	100	0.11	17 J	5.3	0.018-0.84	Lognormal	95% Chebyshev (Mean, SD) UCL	12	12	(1)
	PCBs	PCBs (total Aroclors)	12	12	100	0.13 J	1.1 J	0.46	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	0.89	0.89	(1)
	Metals	Aluminum	7	7	100	12,000 J	15,000 J	13,000	15-29.1	Normal	95% Student's-t UCL	14,000	14,000	(1)
		Antimony	7	5	71	1.0 J	1.3 J	1.1	0.61-1.2	Normal	95% KM (t) UCL	1.1	1.1	(1)
		Arsenic	7	7	100	8.3 J	29 J	19	0.47-0.91	Normal	95% Student's-t UCL	24	24	(1)
		Cadmium	7	7	100	0.14 J	7.1 J	2.5	0.056-0.11	Lognormal	95% Chebyshev (Mean, SD) UCL	6.6	6.6	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	7	7	100	13 J	17 J	14	0.25-0.48	Normal	95% Student's-t UCL	16	16	(1)
		Copper	7	7	100	19 J	200 J	110	1.2-2.2	Normal	95% Student's-t UCL	150	150	(1)
		Iron	7	7	100	33,000 J	51,000 J	41,000	7.7-14.8	Normal	95% Student's-t UCL	45,000	45,000	(1)
		Manganese	7	7	100	250 J	750 J	520	0.12-0.22	Normal	95% Student's-t UCL	640	640	(1)
		Nickel	7	7	100	24 J	71 J	45	0.42-0.82	Normal	95% Student's-t UCL	56	56	(1)
		Thallium	7	5	71	1.4 J	2.8 J	2.1	0.86-1.7	Normal	95% KM (t) UCL	2.3	2.3	(1)
		Vanadium	7	7	100	32 J	52 J	42	0.19-0.36	Normal	95% Student's-t UCL	47	47	(1)
		Zinc	7	7	100	69 J	510 J	300	1.6-3.0	Normal	95% Student's-t UCL	410	410	(1)
	PAHs	Benzo[a]pyrene	5	5	100	0.040	1.4 J	0.52	0.015-0.23	Lognormal	95% Chebyshev (Mean, SD) UCL	1.6	1.4	(3)
		Dibenz[a,h]anthracene	5	5	100	0.021 J	0.21 J	0.089	0.011-0.18	Normal	95% Student's-t UCL	0.16	0.16	(1)
	Pesticides	Aldrin	5	5	100	0.0032	0.010 J	0.0064	0.00012-0.00090	Normal	95% Student's-t UCL	0.0089	0.0089	(1)
		Heptachlor	5	4	80	0.00039 J	0.0014	0.00074	0.00014-0.0011	Normal	95% KM (t) UCL	0.0011	0.0011	(1)
		Heptachlor epoxide	5	5	100	0.00059 J	0.0018 J	0.0010	0.00013-0.00098	Normal	95% Student's-t UCL	0.0015	0.0015	(1)
	Volatiles	Trichloroethene	5	0	0	--	--	--	0.0011-0.0022	None	Not detected	--	--	(2)

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
UPIC = Upper Peach Island Creek
-- = not detected/no data

UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

(1) The 95 UCL is selected as the EPC.
(2) Not detected.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the EPC.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.
(6) No available data.

Table 7. White Perch Filet – Summary Statistics and Exposure Point Concentrations for Angler Exposure via Ingestion

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	Metals	Mercury (inorganic)	42	26	62	0.010	0.51 J	0.11	NA	Lognormal	95% KM (BCA) UCL	0.10	0.10	(1)
	Organometals	Methyl mercury	52	52	100	0.038	1.2 J	0.40	0.00055-0.020	Gamma	95% Approximate Gamma UCL	0.48	0.48	(1)
	PCBs	PCBs (total Aroclors)	52	52	100	0.13	3.4	0.98	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	1.5	1.5	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39-0.39	None	Not detected	--	--	(2)
		Copper	3	2	67	1.4 J	1.8 J	1.6	0.74-0.74	None	Maximum concentration	1.8	1.8	(4)
		Iron	3	3	100	5.0 J	16	10	4.9-4.9	None	Maximum concentration	16	16	(4)
		Manganese	3	3	100	0.23 J	0.50 J	0.35	0.074-0.074	None	Maximum concentration	0.50	0.50	(4)
		Selenium	17	15	88	0.56 J	1.1	0.75	0.38-0.45	Normal	95% KM (t) UCL	0.79	0.79	(1)
MBC	Metals	Mercury (inorganic)	49	36	73	0.020 J	1.1	0.21	NA	Gamma	95% KM (Adjusted Gamma) UCL	0.21	0.21	(1)
	Organometals	Methyl mercury	59	59	100	0.040	0.99 J	0.37	0.00055-0.0064	Normal	95% Student's-t UCL	0.41	0.41	(1)
	PCBs	PCBs (total Aroclors)	59	59	100	0.11	3.2 J	0.80	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	1.2	1.2	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39-0.39	None	Not detected	--	--	(2)
		Copper	3	3	100	1.0 J	1.3 J	1.1	0.74-0.74	None	Maximum concentration	1.3	1.3	(4)
		Iron	3	3	100	7.4 J	11	9.1	4.9-4.9	None	Maximum concentration	11	11	(4)
		Manganese	3	3	100	0.33 J	0.53 J	0.41	0.074-0.074	None	Maximum concentration	0.53	0.53	(4)
		Selenium	23	22	96	0.51 J	1.2	0.78	0.35-0.45	Normal	95% KM (t) UCL	0.84	0.84	(1)
BCC	Metals	Mercury (inorganic)	49	26	53	0.010	0.36	0.17	NA	Gamma	95% KM (Adjusted Gamma) UCL	0.12	0.12	(1)
	Organometals	Methyl mercury	59	59	100	0.013	0.76	0.30	0.00055-0.015	Nonparametric	95% Chebyshev (Mean, SD) UCL	0.39	0.39	(1)
	PCBs	PCBs (total Aroclors)	59	59	100	0.056 J	2.9	0.81	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	1.2	1.2	(1)
	Metals	Antimony	3	2	67	0.43 J	0.47 J	0.45	0.39-0.39	None	Maximum concentration	0.47	0.47	(4)
		Copper	3	3	100	0.91 J	1.2 J	1.0	0.74-0.74	None	Maximum concentration	1.2	1.2	(4)
		Iron	3	3	100	7.3 J	13	10	4.9-4.9	None	Maximum concentration	13	13	(4)
		Manganese	3	3	100	0.18 J	0.69 J	0.42	0.074-0.074	None	Maximum concentration	0.69	0.69	(4)
		Selenium	23	21	91	0.49 J	1.4	0.90	0.36-0.45	Normal	95% KM (t) UCL	0.95	0.95	(1)
LBC	Metals	Mercury (inorganic)	47	25	53	0.010	0.44 J	0.14	NA	Lognormal	95% KM (Chebyshev) UCL	0.14	0.14	(1)
	Organometals	Methyl mercury	57	57	100	0.056	0.69	0.31	0.00055-0.014	Normal	95% Student's-t UCL	0.34	0.34	(1)
	PCBs	PCBs (total Aroclors)	57	57	100	0.036	1.7 J	0.43	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	0.64	0.64	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39-0.39	None	Not detected	--	--	(2)
		Copper	3	3	100	0.93 J	1.1 J	1.0	0.74-0.74	None	Maximum concentration	1.1	1.1	(4)
		Iron	3	3	100	5.3 J	9.0 J	6.8	4.9-4.9	None	Maximum concentration	9.0	9.0	(4)
		Manganese	3	3	100	0.18 J	0.59 J	0.33	0.074-0.074	None	Maximum concentration	0.59	0.59	(4)
		Selenium	21	16	76	0.53 J	1.1	0.75	0.32-0.45	Normal	95% KM (t) UCL	0.75	0.75	(1)

Table 7. White Perch Filet – Summary Statistics and Exposure Point Concentrations for Angler Exposure via Ingestion

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Reference Sites	Metals	Mercury (inorganic)	103	58	56	0.010	0.28 J	0.065	NA	Lognormal	95% KM (t) UCL	0.045	0.045	(1)
	Organometals	Methyl mercury	125	125	100	0.017	0.48	0.25	0.00055-0.024	Normal	95% Student's-t UCL	0.26	0.26	(1)
	PCBs	PCBs (total Aroclors)	125	125	100	0.027 J	2.1	0.51	NA	Nonparametric	95% Chebyshev (Mean, SD) UCL	0.66	0.66	(1)
	Metals	Antimony	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Copper	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Iron	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Manganese	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Selenium	38	38	100	0.41 J	1.1	0.77	0.26-0.45	Normal	95% Student's-t UCL	0.82	0.82	(1)

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = not detected/no data

(1) The 95 UCL is selected as the EPC.
(2) Not detected.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.
(6) No available data.

Table 8. Blue Crab Muscle Only – Summary Statistics and Exposure Point Concentrations for Crabber Exposure via Ingestion

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	Metals	Mercury (inorganic)	9	1	11	0.010	0.010	0.010	NA	None	Maximum concentration	0.010	0.010	(4)
	Organometals	Methyl mercury	9	9	100	0.18	0.29 J	0.24	0.00055-0.00072	Normal	95% Student's-t UCL	0.26	0.26	(1)
	PCBs	PCBs (total Aroclors)	13	10	77	0.0024 J	0.025	0.010	NA	Lognormal	95% KM (BCA) UCL	0.013	0.013	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39-0.39	None	Not detected	--	--	(2)
		Copper	3	3	100	9.7	14	12	0.74-0.74	None	Maximum concentration	14	14	(4)
		Iron	3	1	33	11 J	11 J	11	4.9-4.9	None	Maximum concentration	11	11	(4)
		Manganese	3	3	100	6.0 J	35 J	19	0.074-0.074	None	Maximum concentration	35	35	(4)
		Selenium	3	3	100	0.72	1.0	0.85	0.45-0.45	None	Maximum concentration	1.0	1.0	(4)
MBC	Metals	Mercury (inorganic)	9	1	11	0.14 J	0.14 J	0.14	NA	None	Maximum concentration	0.14	0.14	(4)
	Organometals	Methyl mercury	9	9	100	0.13	0.34	0.23	0.00033-0.0014	Normal	95% Student's-t UCL	0.28	0.28	(1)
	PCBs	PCBs (total Aroclors)	14	11	79	0.0019 J	0.047	0.017	NA	Lognormal	97.5% KM (Chebyshev) UCL	0.040	0.040	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39-0.39	None	Not detected	--	--	(2)
		Copper	3	3	100	9.2	16	12	0.74-0.74	None	Maximum concentration	16	16	(4)
		Iron	3	3	100	10 J	34 J	20	4.9-4.9	None	Maximum concentration	34	34	(4)
		Manganese	3	3	100	6.1 J	62 J	26	0.074-0.074	None	Maximum concentration	62	62	(4)
		Selenium	3	3	100	0.68	1.5	1.1	0.45-0.45	None	Maximum concentration	1.5	1.5	(4)
BCC	Metals	Mercury (inorganic)	9	5	56	0.010	0.098	0.052	NA	Normal	95% KM (t) UCL	0.052	0.052	(1)
	Organometals	Methyl mercury	9	9	100	0.022	0.30	0.20	0.00055-0.0014	Normal	95% Student's-t UCL	0.26	0.26	(1)
	PCBs	PCBs (total Aroclors)	14	11	79	0.0016 J	0.021	0.010	NA	Normal	95% KM (t) UCL	0.011	0.011	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39-0.39	None	Not detected	--	--	(2)
		Copper	3	3	100	9.6	14	11	0.74-0.74	None	Maximum concentration	14	14	(4)
		Iron	3	2	67	10 J	18 J	14	4.9-4.9	None	Maximum concentration	18	18	(4)
		Manganese	3	3	100	5.7 J	13 J	10	0.074-0.074	None	Maximum concentration	13	13	(4)
		Selenium	3	3	100	0.74	0.91	0.82	0.45-0.45	None	Maximum concentration	0.91	0.91	(4)
LBC	Metals	Mercury (inorganic)	9	2	22	0.020 J	0.079	0.049	NA	None	Maximum concentration	0.079	0.079	(4)
	Organometals	Methyl mercury	9	9	100	0.091	0.33	0.20	0.00033-0.0014	Normal	95% Student's-t UCL	0.24	0.24	(1)
	PCBs	PCBs (total Aroclors)	13	11	85	0.002 J	0.038	0.0082	NA	Lognormal	95% KM (Chebyshev) UCL	0.019	0.019	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39-0.39	None	Not detected	--	--	(2)
		Copper	3	3	100	14 J	20	16	0.74-0.74	None	Maximum concentration	20	20	(4)
		Iron	3	2	67	10 J	260 J	130	4.9-4.9	None	Maximum concentration	260	260	(4)
		Manganese	3	3	100	5.0 J	6.0 J	5.3	0.074-0.074	None	Maximum concentration	6.0	6.0	(4)
		Selenium	3	3	100	0.95	1.5	1.2	0.45-0.45	None	Maximum concentration	1.5	1.5	(4)

Table 8. Blue Crab Muscle Only – Summary Statistics and Exposure Point Concentrations for Crabber Exposure via Ingestion

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Reference Sites	Metals	Mercury (inorganic)	23	11	48	0.0030 J	0.055 J	0.029	NA	normal	95% KM (t) UCL	0.020	0.020	(1)
	Organometals	Methyl mercury	23	23	100	0.040 J	0.29 J	0.13	0.00055-0.00055	Lognormal	95% Chebyshev (Mean, SD) UCL	0.21	0.21	(1)
	PCBs	PCBs (total Aroclors)	39	27	69	0.0016 J	0.017 J	0.0064	NA	Normal	95% KM (t) UCL	0.0059	0.0059	(1)
	Metals	Antimony	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Copper	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Iron	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Manganese	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Selenium	--	--	--	--	--	--	NA	--	--	--	--	(6)

Notes:
BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = not detected/no data

(1) The 95 UCL is selected as the EPC.
(2) Not detected.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.
(6) No available data.

Table 9. Blue Crab Muscle plus Hepatopancreas – Summary Statistics and Exposure Point Concentrations for Crabber Exposure via Ingestion

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	Metals	Mercury (inorganic)	4	4	100	0.0093 J	0.014 J	0.011	NA	Normal	95% Student's-t UCL	0.013	0.013	(1)
	Organometals	Methyl mercury	4	4	100	0.19 J	0.25 J	0.22	0.00055-0.0010	Normal	95% Student's-t UCL	0.25	0.25	(3)
	PCBs	PCBs (total Aroclors)	9	9	100	0.099	0.25 J	0.15	NA	Normal	95% Student's-t UCL	0.18	0.18	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39-0.39	None	Not detected	--	--	(2)
		Copper	3	3	100	9.7	14	12	0.74-0.74	None	Maximum concentration	14	14	(4)
		Iron	3	1	33	11 J	11 J	11	4.9-4.9	None	Maximum concentration	11	11	(4)
		Manganese	3	3	100	6.0 J	35 J	19	0.074-0.074	None	Maximum concentration	35	35	(4)
		Selenium	3	3	100	0.72	1.0	0.85	0.45-0.45	None	Maximum concentration	1.0	1.0	(4)
MBC	Metals	Mercury (inorganic)	4	3	75	0.013 J	0.12 J	0.050	NA	None	Maximum concentration	0.12	0.12	(4)
	Organometals	Methyl mercury	4	4	100	0.14 J	0.19 J	0.17	0.00055-0.0022	Normal	95% Student's-t UCL	0.20	0.19	(3)
	PCBs	PCBs (total Aroclors)	9	9	100	0.0064 J	0.17	0.097	NA	Normal	95% Student's-t UCL	0.13	0.13	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39-0.39	None	Not detected	--	--	(2)
		Copper	3	3	100	9.2	16	12	0.74-0.74	None	Maximum concentration	16	16	(4)
		Iron	3	3	100	10 J	34 J	20	4.9-4.9	None	Maximum concentration	34	34	(4)
		Manganese	3	3	100	6.1 J	62 J	26	0.074-0.074	None	Maximum concentration	62	62	(4)
		Selenium	3	3	100	0.68	1.5	1.1	0.45-0.45	None	Maximum concentration	1.5	1.5	(4)
BCC	Metals	Mercury (inorganic)	3	3	100	0.0024 J	0.093 J	0.038	NA	None	Maximum concentration	0.093	0.093	(4)
	Organometals	Methyl mercury	3	3	100	0.18 J	0.23 J	0.21	0.00055-0.0011	None	Maximum concentration	0.23	0.23	(4)
	PCBs	PCBs (total Aroclors)	8	8	100	0.065	0.18 J	0.13	NA	Normal	95% Student's-t UCL	0.15	0.15	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39-0.39	None	Not detected	--	--	(2)
		Copper	3	3	100	9.6	14	11	0.74-0.74	None	Maximum concentration	14	14	(4)
		Iron	3	2	67	10 J	18 J	14	4.9-4.9	None	Maximum concentration	18	18	(4)
		Manganese	3	3	100	5.7 J	13 J	10	0.074-0.074	None	Maximum concentration	13	13	(4)
		Selenium	3	3	100	0.74	0.91	0.82	0.45-0.45	None	Maximum concentration	0.91	0.91	(4)
LBC	Metals	Mercury (inorganic)	4	3	75	0.0092 J	0.022 J	0.014	NA	None	Maximum concentration	0.022	0.022	(4)
	Organometals	Methyl mercury	4	4	100	0.10 J	0.21 J	0.15	0.00055-0.0010	Normal	95% Student's-t UCL	0.20	0.20	(1)
	PCBs	PCBs (total Aroclors)	8	8	100	0.024 J	0.42 J	0.14	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	0.33	0.33	(1)
	Metals	Antimony	3	0	0	--	--	--	0.39-0.39	None	Not detected	--	--	(2)
		Copper	3	3	100	14 J	20	16	0.74-0.74	None	Maximum concentration	20	20	(4)
		Iron	3	2	67	10 J	260 J	130	4.9-4.9	None	Maximum concentration	260	260	(4)
		Manganese	3	3	100	5.0 J	6.0 J	5.3	0.074-0.074	None	Maximum concentration	6.0	6.0	(4)
		Selenium	3	3	100	0.95	1.5	1.2	0.45-0.45	None	Maximum concentration	1.5	1.5	(4)

Table 9. Blue Crab Muscle plus Hepatopancreas – Summary Statistics and Exposure Point Concentrations for Crabber Exposure via Ingestion

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (mg/kg)	Max (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Reference Sites	Metals	Mercury (inorganic)	11	10	91	0.0036 J	0.045 J	0.023	NA	Normal	95% KM (t) UCL	0.029	0.029	(1)
	Organometals	Methyl mercury	11	11	100	0.037 J	0.26 J	0.14	0.00055-0.0021	Normal	95% Student's-t UCL	0.19	0.19	(1)
	PCBs	PCBs (total Aroclors)	27	27	100	0.039 J	0.21	0.11	NA	Normal	95% Student's-t UCL	0.13	0.13	(1)
	Metals	Antimony	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Copper	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Iron	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Manganese	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Selenium	--	--	--	--	--	--	NA	--	--	--	--	(6)

Notes:
BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = not detected/no data

(1) The 95 UCL is selected as the EPC.
(2) Not detected.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the EPC.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.
(6) No available data.

Table 10. Surface Water – Summary Statistics and Exposure Point Concentrations for Angler/Crabber and Kayaker/Canoer Exposure via Direct Contact

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (µg/L)	Max (Detect) (µg/L)	Arithmetic Mean (Detects) (µg/L)	Detection Limit Range (µg/L)	Distribution	UCL Method	95 UCL (µg/L)	EPC (µg/L)	Rationale
UBC	Metals	Arsenic	205	166	81	1.4 J	50 J	4.1	0.063-20	Approximate normal	95% KM (t) UCL	4.0	4.0	(1)
		Thallium	205	12	6	0.090 J	5.8 J	2.1	0.074-7.0	Lognormal	95% KM (Chebyshev) UCL	0.44	0.44	(1)
	PAHs	Benzo[a]pyrene	35	5	14	0.036 J	2.7	0.74	0.011-0.10	Lognormal	97.5% KM (Chebyshev) UCL	0.66	0.66	(1)
		Dibenz[a,h]anthracene	35	3	9	0.013 J	3.0	1.0	0.012-0.17	None	Maximum concentration	3.0	3.0	(4)
	Volatiles	Vinyl chloride	35	5	14	0.31 J	0.38 J	0.34	0.23-0.44	Normal	95% KM (t) UCL	0.25	0.25	(1)
MBC	Metals	Arsenic	163	132	81	1.6 J	50 J	3.7	0.063-4.0	Approximate normal	95% KM (t) UCL	3.6	3.6	(1)
		Thallium	163	10	6	0.13 J	7.5 J	2.6	0.074-4.7	nonparametric	95% KM (Chebyshev) UCL	0.56	0.56	(1)
	PAHs	Benzo[a]pyrene	53	5	9	0.017 J	3.2	0.69	0.011-0.11	Lognormal	99% KM (Chebyshev) UCL	0.74	0.74	(1)
		Dibenz[a,h]anthracene	53	3	6	0.15 J	4.7	1.7	0.012-0.18	None	Maximum concentration	4.7	4.7	(4)
	Volatiles	Vinyl chloride	53	7	13	0.31 J	0.59 J	0.46	0.23-0.44	Normal	95% KM (t) UCL	0.28	0.28	(1)
BCC	Metals	Arsenic	134	106	79	1.6 J	16	3.7	0.063-4.0	Approximate normal	95% KM (t) UCL	3.3	3.3	(1)
		Thallium	134	7	5	0.16 J	6.4 J	2.3	0.074-4.7	Lognormal	95% KM (Chebyshev) UCL	0.48	0.48	(1)
	PAHs	Benzo[a]pyrene	23	3	13	0.012 J	0.086 J	0.041	0.011-0.014	None	Maximum concentration	0.086	0.086	(4)
		Dibenz[a,h]anthracene	23	1	4	0.22 J	0.22 J	0.22	0.012-0.016	None	Maximum concentration	0.22	0.22	(4)
	Volatiles	Vinyl chloride	23	0	0	--	--	--	0.23-0.23	None	Not detected	--	--	(2)
LBC	Metals	Arsenic	140	106	76	1.2 J	50 J	3.9	0.063-8.0	Approximate normal	95% KM (t) UCL	3.6	3.6	(1)
		Thallium	140	2	1	5.1 J	5.5 J	5.3	0.074-4.7	None	Maximum concentration	5.5	5.5	(4)
	PAHs	Benzo[a]pyrene	49	13	27	0.018 J	0.90	0.16	0.011-0.015	Lognormal	95% KM (BCA) UCL	0.092	0.092	(1)
		Dibenz[a,h]anthracene	49	8	16	0.080 J	1.3	0.42	0.012-0.018	Normal	95% KM (t) UCL	0.13	0.13	(1)
	Volatiles	Vinyl chloride	49	0	0	--	--	--	0.23-0.23	None	Not detected	--	--	(2)

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
PAH = polycyclic aromatic hydrocarbon
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = not detected/no data

(1) The 95 UCL is selected as the EPC.
(2) Not detected.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.

Table 11. Ambient Air – Summary Statistics and Exposure Point Concentrations for Angler/Crabber, Kayaker/Canoer, and Construction Worker via Inhalation

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Min (Detect) (µg/m^3)	Max (µg/m^3)	Arithmetic Mean (Detects) (µg/m^3)	Detection Limit Range (µg/m^3)	Distribution	UCL Method	95 UCL (µg/m^3)	EPC (µg/m^3)	Rationale
UBC	Metals	Mercury Average	60	40	67	0.01	0.11	0.047	NA	Nonparametric	95% KM (BCA) UCL	0.043	0.043	(1)
MBC	Metals	Mercury Average	60	25	42	0.011	0.058	0.039	NA	Normal	95% KM (t) UCL	0.026	0.026	(1)
BCC	Metals	Mercury Average	80	42	52	0.01	0.25	0.029	NA	nonparametric	95% KM (t) UCL	0.025	0.025	(1)
LBC	Metals	Mercury Average	91	76	84	0.01	1.3	0.21	NA	Nonparametric	97.5% KM (Chebyshev) UCL	0.36	0.36	(1)

Notes:
BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
UBC = Upper Berry's Creek
UCL = upper confidence limit
(1) The 95 UCL is selected as the EPC.

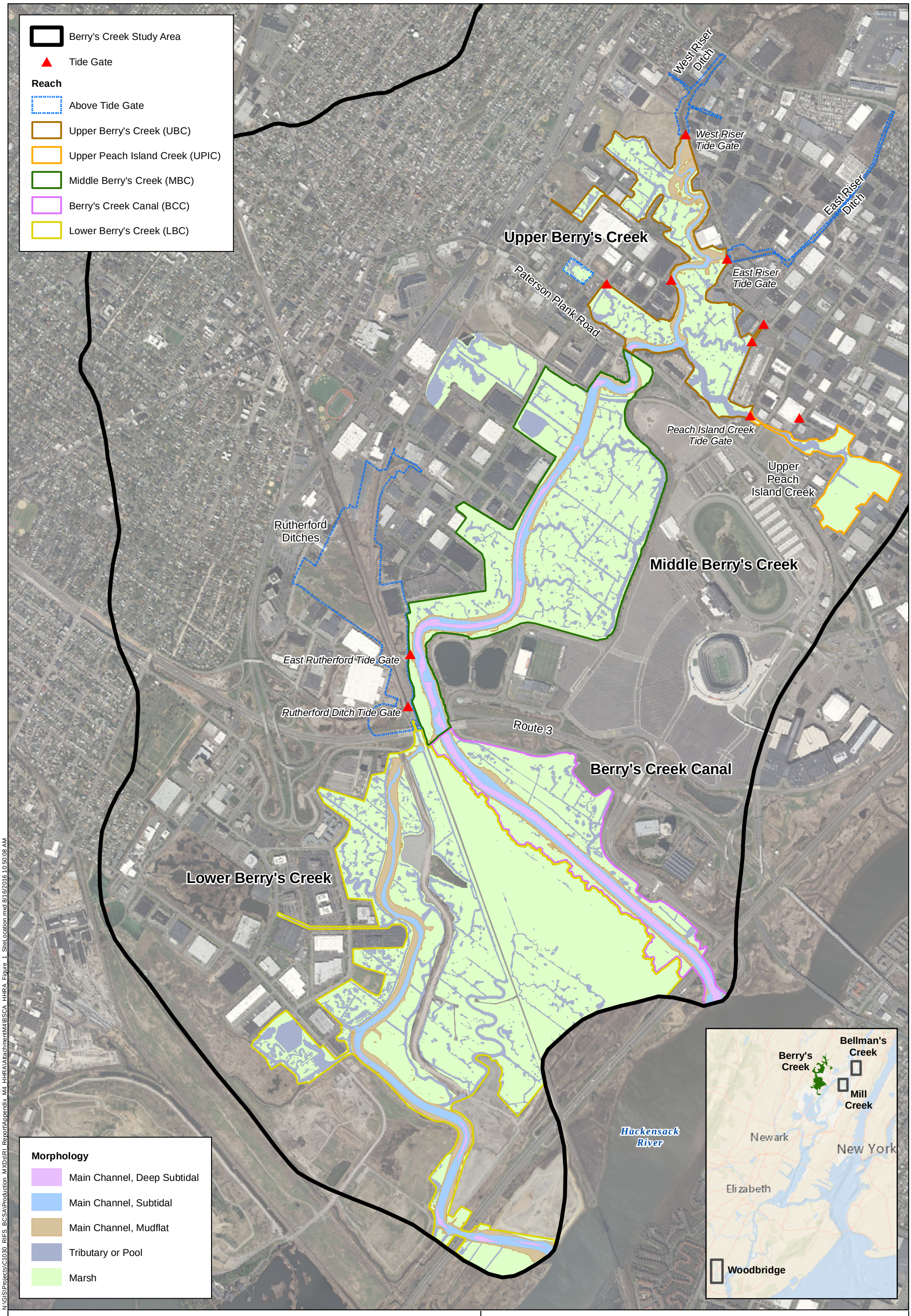
Table 12. ADAFs Mutagenic Chemicals of Potential Concern

Receptor Group		Age Category	Duration	ADAF
Younger Child	Child (0 – <6)	0 – < 2	2	10
		2 – < 6	4	3
		Weighted ADAF		5.3
Older Child	Child (6 – <18 years)	6 – < 16	10	3
		16 – < 18	2	1
		Weighted ADAF		2.7
Adult + Older Child	Child (6 – <18 years)	6 – < 16	10	3
		16 – < 18	2	1
	Adult	>=18	14	1
		Weighted ADAF		1.8
Adult + Older Child + Younger Child	Child (0 – <6)	0 – < 2	2	10
		2 – < 6	4	3
	Child (6 – <18 years)	6 – < 16	10	3
		16 – < 18	2	1
	Adult	>=18	8	1
		Weighted ADAF		2.8

Notes:
ADAF = age dependant adjustment factor

Source: USEPA (2005)

FIGURES



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Notes:
Aerial Source: NJ Imagery, Natural, 2012.

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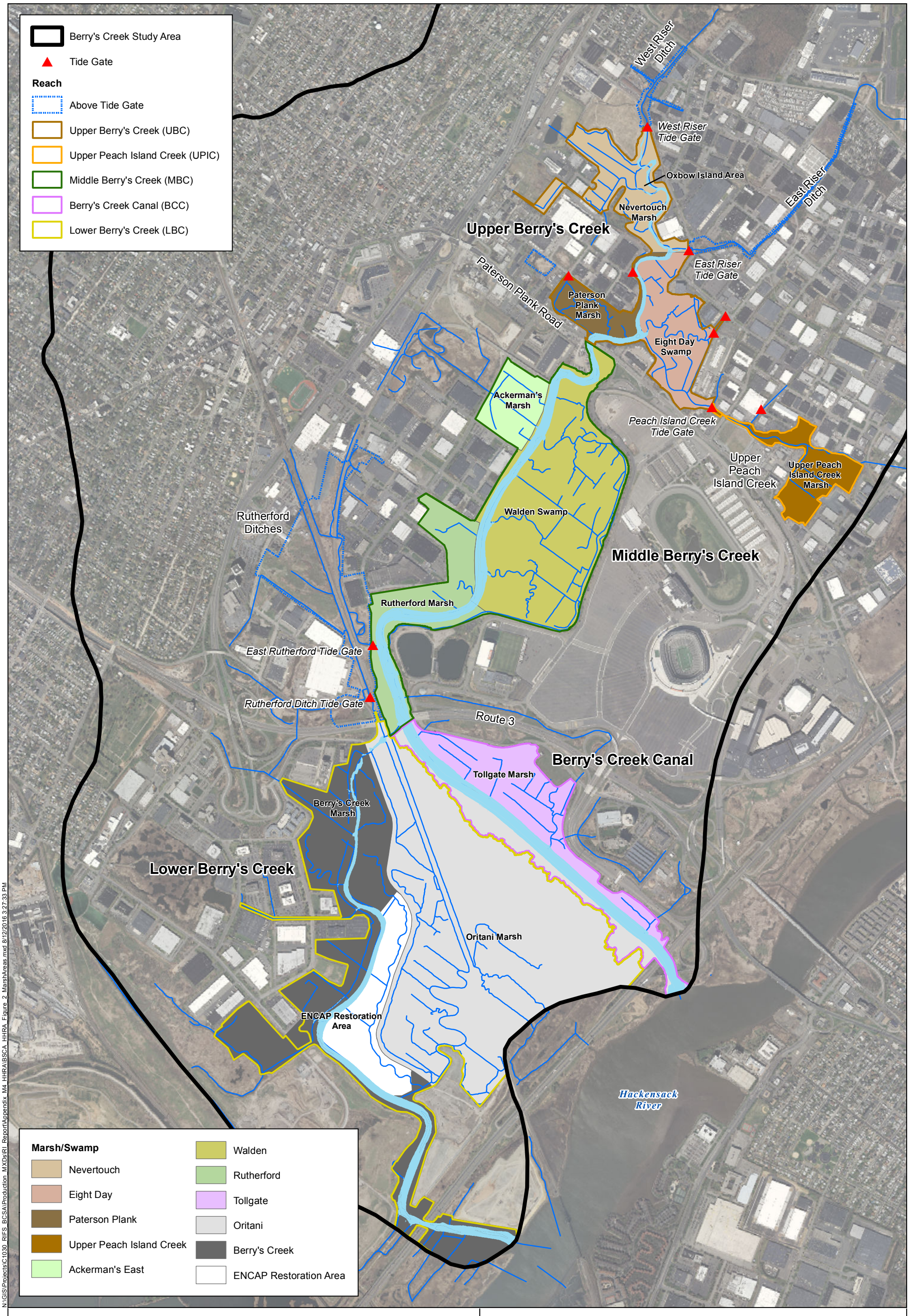
BCSA Tidal Zone Reaches and Above Tide Gate Areas

Attachment M4: Exposure and Risk Estimates
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **1**



N:\GIS\Projects\C1030_RIFS_BCSA\Production_MXDs\RI_Report\Appendix_M4_HHRA\BSCA_HHRA_Figure_2_MarshAreas.mxd 8/12/2016 3:27:33 PM

Notes:
Aerial Source: NJ Imagery, Natural, 2012.
Hydrography Source: U.S. Geological Survey National Hydrography Dataset (NHD), 2014.

0 1,000 2,000 Feet

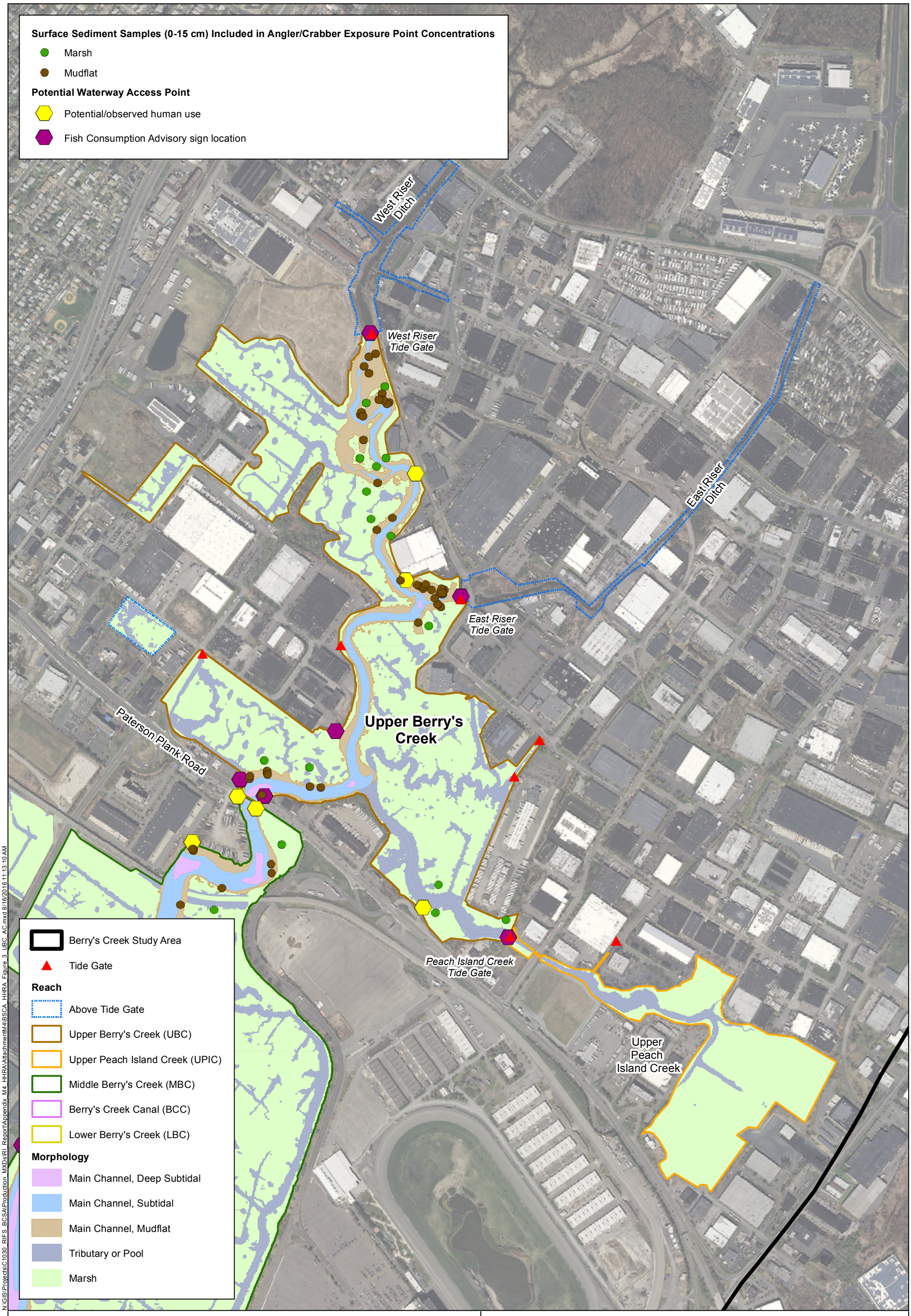
N

DRAFT

BCSA Marsh Areas

Attachment M4: Exposure and Risk Estimates
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **2**



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Notes:
Aerial Source: NJ Imagery, Natural, 2012.

0 500 1,000 Feet

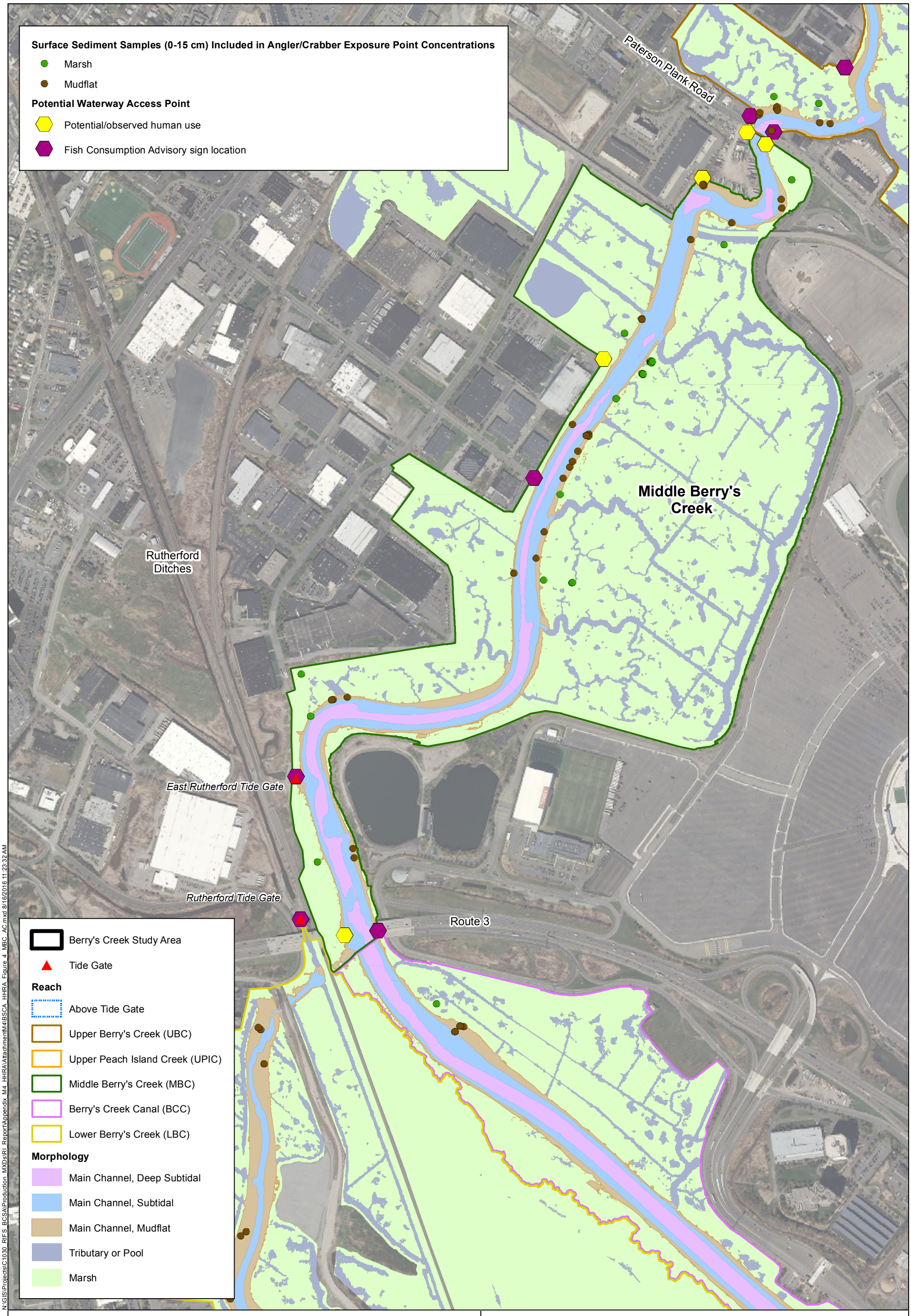
N

DRAFT

Selected Marsh and Mudflat Surface Sediment Locations for Angler/Crabber Exposure Point Concentrations: Upper Berry's Creek

Attachment M4: Exposure and Risk Estimates
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
3



Notes:
Aerial Source: NJ Imagery, Natural, 2012.

0 500 1,000 Feet

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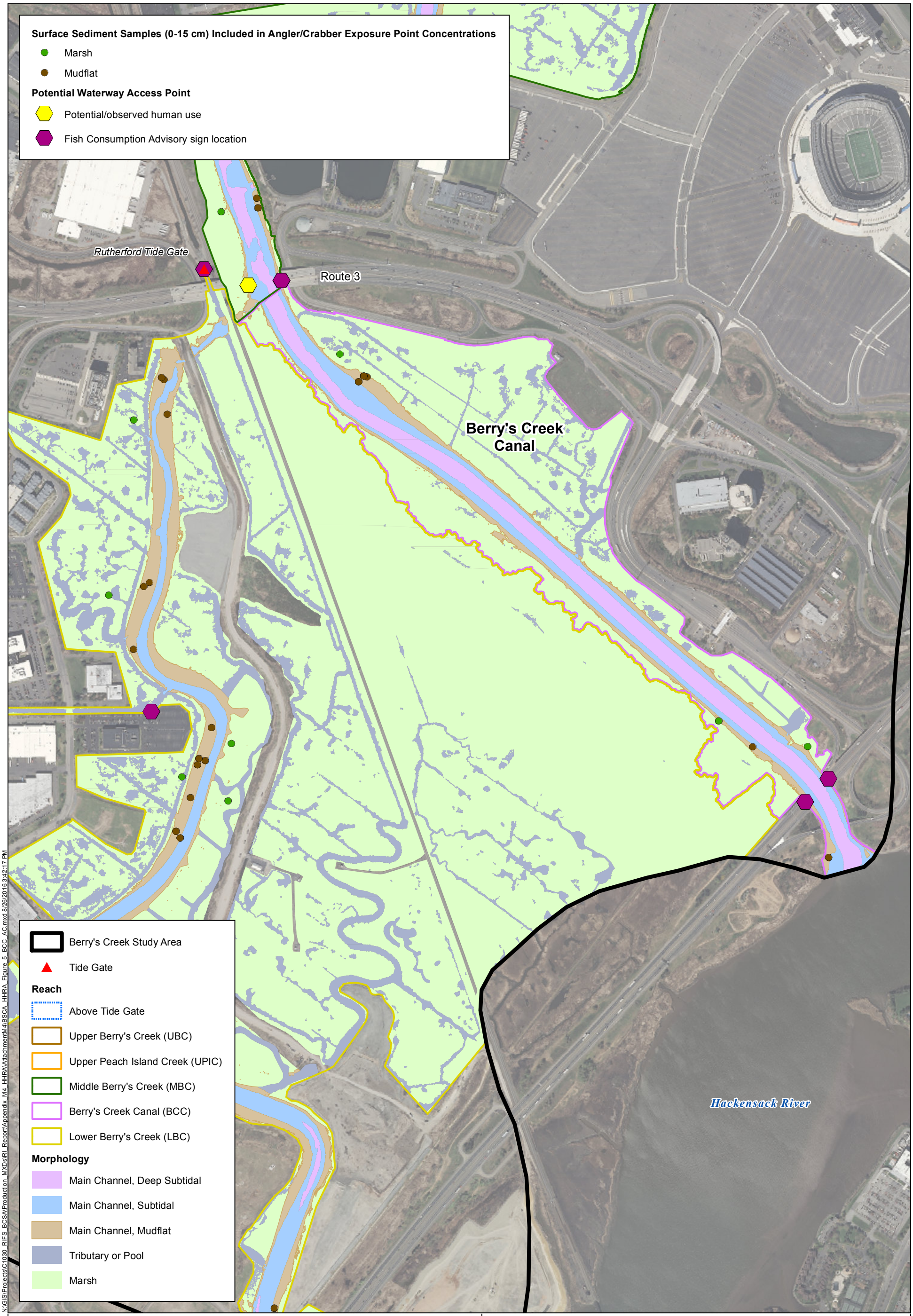
DRAFT

Selected Mudflat and Marsh Surface Sediment Locations for Angler/Crabber Exposure Point Concentrations: Middle Berry's Creek

Attachment M4: Exposure and Risk Estimate
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
4



Notes:
Aerial Source: NJ Imagery, Natural, 2012.

0 500 1,000 Feet

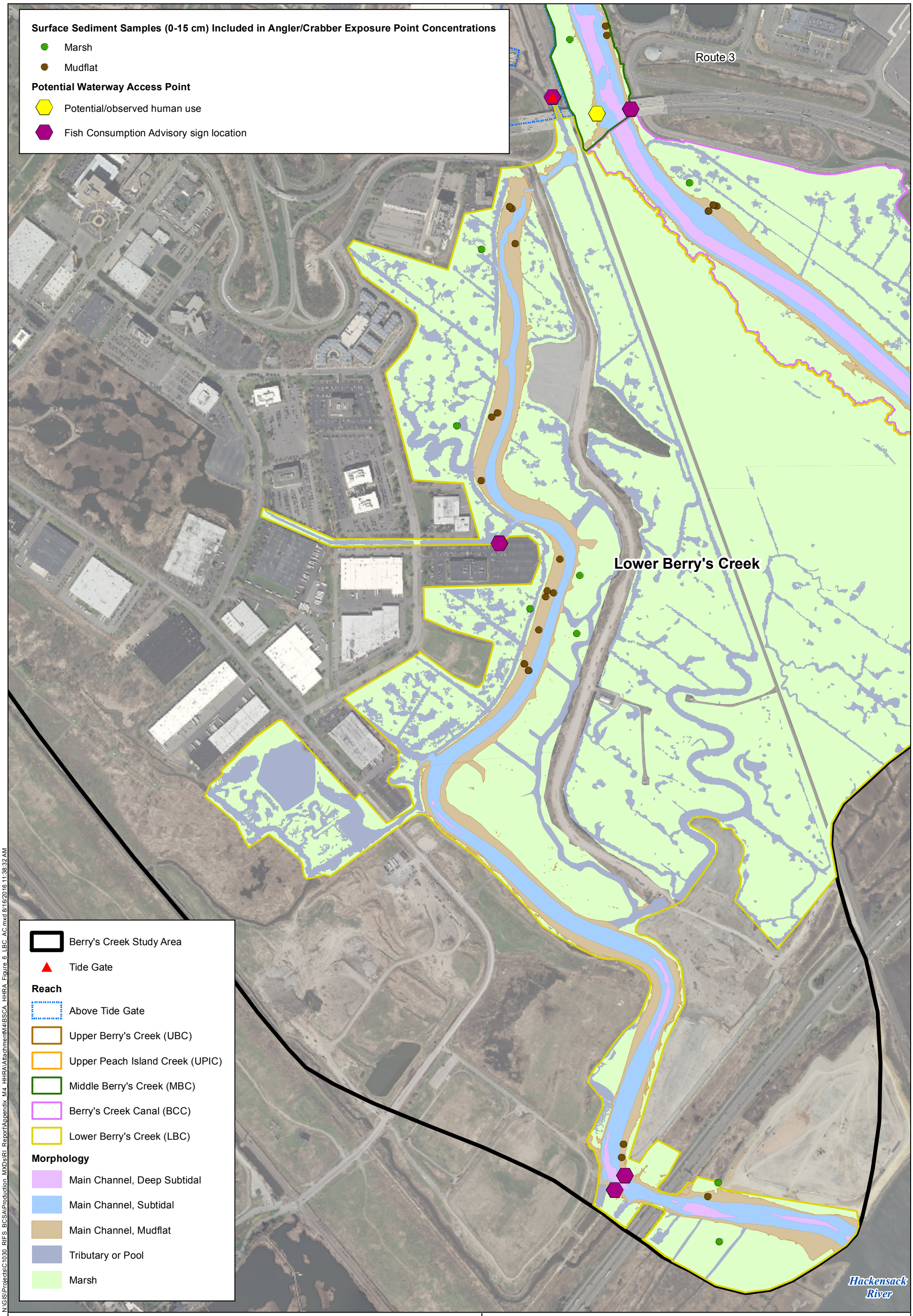
N

DRAFT

Selected Marsh and Mudflat Surface Sediment Locations for Angler/Crabber Exposure Point Concentrations: Berry's Creek Canal

Attachment M4: Exposure and Risk Estimates
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5



Notes:
Aerial Source: NJ Imagery, Natural, 2012.

0 500 1,000 Feet

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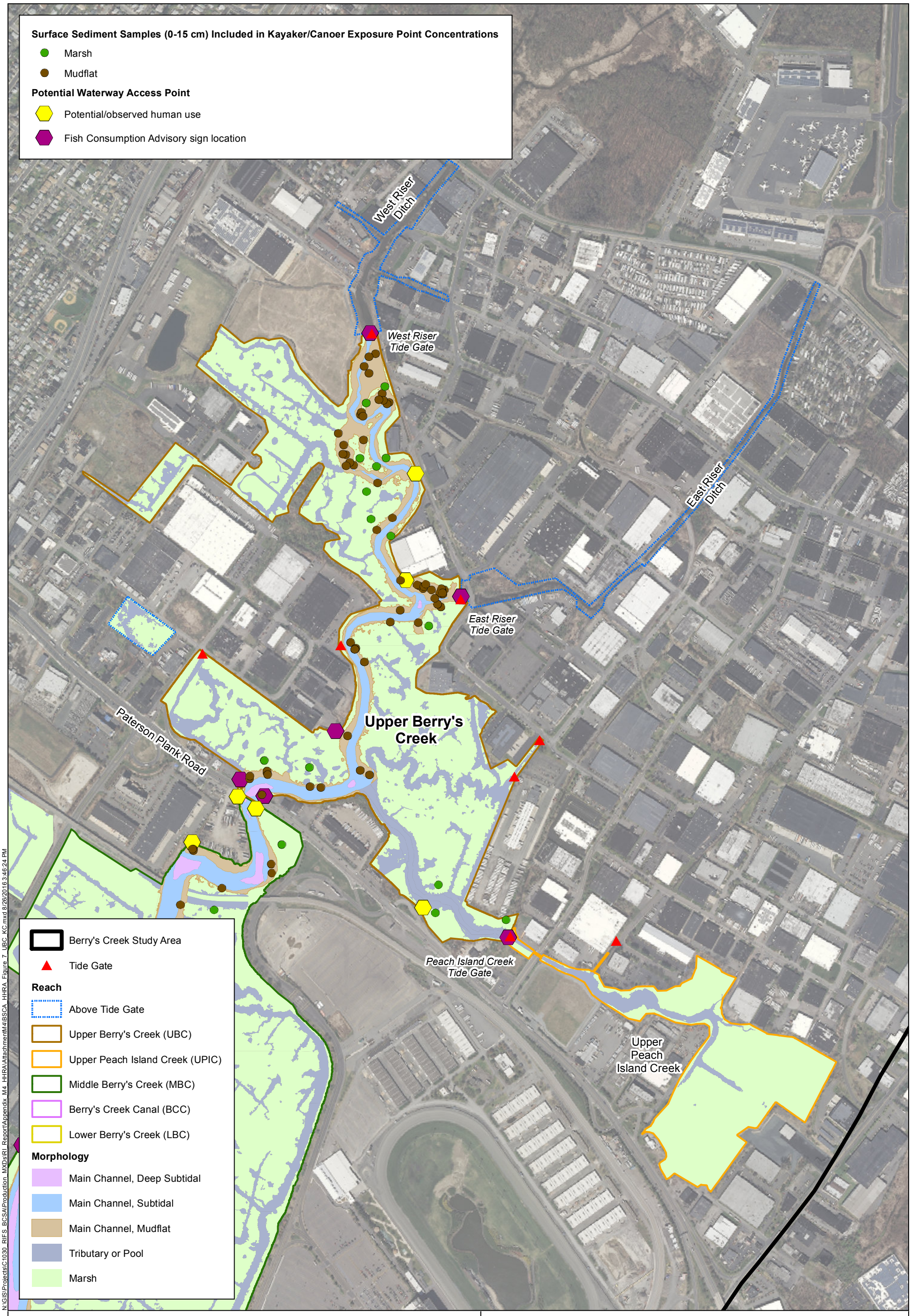
DRAFT

Selected Marsh and Mudflat Surface Sediment Locations for Angler/Crabber Exposure Point Concentrations: Lower Berry's Creek

Attachment M4: Exposure and Risk Estimates
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
6



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Notes:
Aerial Source: NJ Imagery, Natural, 2012.

0 500 1,000 Feet

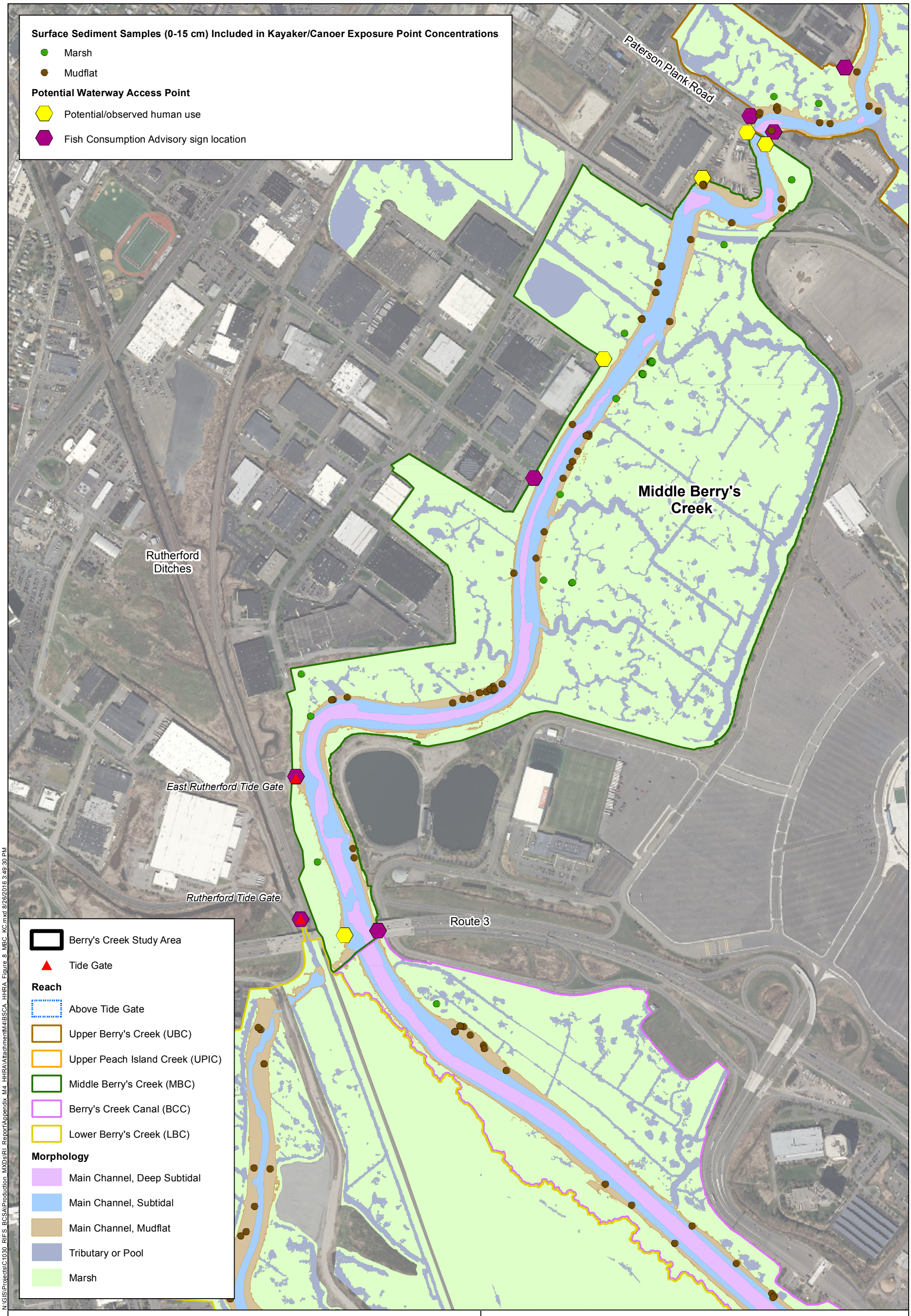
N

DRAFT

Selected Mudflat and Marsh Surface Sediment Locations for Kayaker/Canoer Exposure Point Concentrations: Upper Berry's Creek

Attachment M4: Exposure and Risk Estimates
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
7



Notes:
Aerial Source: NJ Imagery, Natural, 2012.

0 500 1,000 Feet

N

DRAFT

Selected Marsh and Mudflat Surface Sediment Locations for Kayaker/Canoer Exposure Point Concentrations: Middle Berry's Creek

Attachment M4: Exposure and Risk Estimate
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
8

Surface Sediment Samples (0-15 cm) Included in Kayaker/Canoer Exposure Point Concentrations

- Marsh
- Mudflat

Potential Waterway Access Point

- Potential/observed human use
- Fish Consumption Advisory sign location

Rutherford Tide Gate

Route 3

Berry's Creek Canal

Hackensack River

- Berry's Creek Study Area
- Tide Gate

Reach

- Above Tide Gate
- Upper Berry's Creek (UBC)
- Upper Peach Island Creek (UPIC)
- Middle Berry's Creek (MBC)
- Berry's Creek Canal (BCC)
- Lower Berry's Creek (LBC)

Morphology

- Main Channel, Deep Subtidal
- Main Channel, Subtidal
- Main Channel, Mudflat
- Tributary or Pool
- Marsh

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Notes:
Aerial Source: NJ Imagery, Natural, 2012.

0 500 1,000 Feet

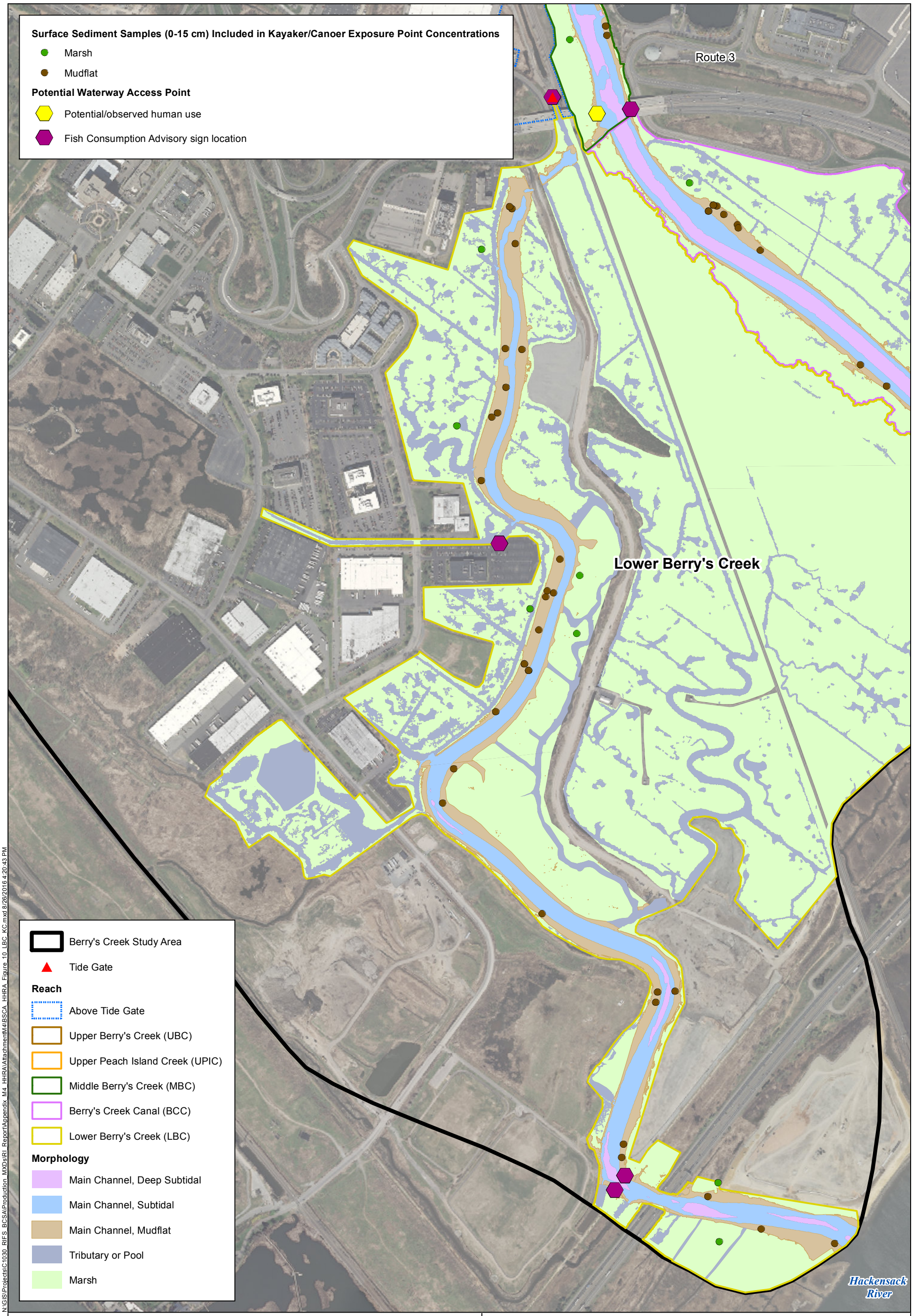
N

DRAFT

Selected Mudflat and Marsh Surface Sediment Locations for Kayaker/Canoer Exposure Unit: Berry's Creek Canal

Attachment M4: Exposure and Risk Estimates
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
9



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Notes:
Aerial Source: NJ Imagery, Natural, 2012.

0 500 1,000 Feet

N

DRAFT

Selected Mudflat and Marsh Surface Sediment Locations for Kayaker/Canoer Exposure Unit: Lower Berry's Creek

Attachment M4: Exposure and Risk Estimates
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
10

Sediment Samples Included in Construction Worker Exposure Point Concentrations

- Marsh (0-15 cm only)
- Marsh (Extending beyond 15 cm)
- Waterway (Extending beyond 15 cm)

West Riser Ditch
West Riser Tide Gate
East Riser Ditch
East Riser Tide Gate
Upper Berry's Creek
Paterson Plank Road
Peach Island Creek Tide Gate
Upper Peach Island Creek
Rutherford Ditches
Middle Berry's Creek
East Rutherford Tide Gate
Rutherford Ditch Tide Gate
Route 3
Berry's Creek Canal
Lower Berry's Creek
Hackensack River

- Berry's Creek Study Area
- Tide Gate

Reach

- Above Tide Gate
- Upper Berry's Creek (UBC)
- Upper Peach Island Creek (UPIC)
- Middle Berry's Creek (MBC)
- Berry's Creek Canal (BCC)
- Lower Berry's Creek (LBC)

Morphology

- Main Channel, Deep Subtidal
- Main Channel, Subtidal
- Main Channel, Mudflat
- Tributary or Pool
- Marsh

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Notes:
Aerial Source: NJ Imagery, Natural, 2012.

0 1,000 2,000 Feet

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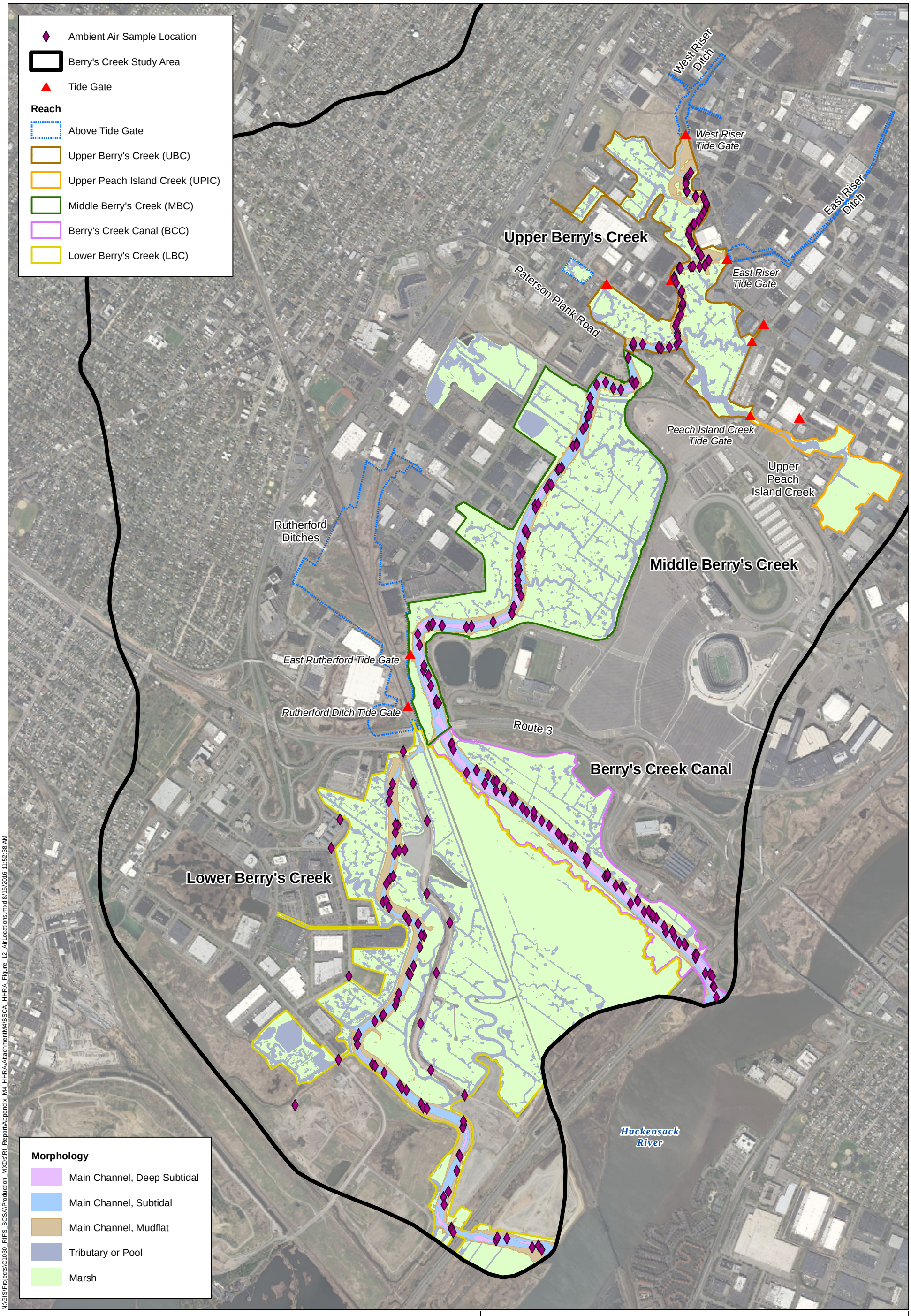
DRAFT

Marsh and Waterway Sediment Locations for Construction Worker Exposure Point Concentrations

Attachment M4: Exposures and Risk Estimates
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **11**



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Notes:
Aerial Source: NJ Imagery, Natural, 2012.

0 1,000 2,000 Feet

N

DRAFT

Locations of Ambient Air Monitors

Attachment M4: Exposure and Risk Estimates
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **12**

Surface Sediment Samples (0-15 cm) Included in Recreator Exposure Point Concentrations

Notes:
Aerial Source: NJ Imagery, Natural, 2012.

DRAFT

Surface Sediment Locations for Recreator Exposure Point Concentrations at Reference Sites

Attachment M4: Exposure and Risk Estimates
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **13**

Draft
Exhibit 1: Exposure and Risk Estimates for Divers

Exposure and Risk Estimates

Berry's Creek Study Area Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

DAD = (DAevent x EV x ED x EF x SA)/(BW x AT)

EV:	1	events/day	
ED:	0.21	years	(6 days/week for 13 weeks)
	0.86	years	(6 days/week for 52 weeks)
EF:	78	days/year	
	365	days/year	
SA:	20,900	cm2	
BW:	80	kg	
AT:	78	days	nc: ED x 365 days/year
	314	days	
	25550	days	c: 70 years x 365 days/year

DA_{event} (SW) calculations

organics:

If τ event ≤ t*, then:

DAevent = 2 FA x Kp x Cw $((6\ \tau event \times tevent)/\pi)^{(1/2)}$

If τ event > t*, then:

DAevent = FA x Kp x Cw $[(\tau\ event/(1 + B)) + 2\ \tau\ event\ ((1 + 3B + 3B^2)/((1+B)^2))]$

inorganics:

DAevent = Kp x Cw x t event

Scuba diver

	organic / inorganic	cancer / noncancer	FA (dimensionless)	Kp (cm/hr)	EPC Cw (ug/L)	EPC Cw (mg/cm^3)	τ event (hr/event)	t event (hr/event)	B (dimensionless)	DAevent	intake 3 month DAD (mg/kg-day)	intake 1 year DAD (mg/kg-day)	ABSd	CSF/unit risk (1/(mg/kg-day))	3 month cancer risk	1 year cancer risk	RfD/RfC	3 month noncancer HQ	1 year noncancer HQ
Mercury (chloride)	i	nc	-	0.001	0.32	3.20E-07	-	8	-	2.56E-09	1.40E-07	6.69E-07	-	-	-	-	0.000021	6.69E-03	3.18E-02
Mercury (elem)	i	nc	-	0.001	0.32	3.20E-07	-	8	-	2.56E-09	1.40E-07	6.69E-07	-	-	-	-	-	-	-
Methyl mercury	o	nc	-	-	0.00132	1.32E-09	-	8	-	-	-	-	-	-	-	-	0.0001	-	-
PCB (4-chlorobiphenyl)	o	c	0.6	0.75	0.102	1.02E-07	4.63	8	4.9	7.72E-07	1.29E-07	2.48E-06	1.40E-01	0.07	9.05E-09	1.73E-07	0.00007	1.85E-03	3.54E-02
PCB (hexachlorobiphenyl)	o	c	0.5	0.43	1.02E-01	1.02E-07	11.29	8	3.20E+00	1.88E-06	3.15E-07	6.03E-06	1.40E-01	3.9	1.23E-06	2.35E-05	0.00002	1.57E-02	3.02E-01

adjusted for absorbed dose based on Exhibit 4-1 of RAGS Part E

From: Tomchuk, Doug [mailto:Tomchuk.Doug@epa.gov]
Sent: Monday, November 17, 2014 11:04 AM
To: Peter Brussock
Subject: FW: BCSA - Diver Exposure SW Data

From: Smith, Lora
Sent: Thursday, November 13, 2014 4:33 PM
To: Tomchuk, Doug
Cc: Metz, Chloe
Subject: RE: BCSA - Diver Exposure SW Data

Hi Doug,

Last week you informed me of a future scuba diver who will be involved in repairs to the Rte. 3 bridge and subsequently be exposed to surface water from Berry's Creek as it will be filtered through his wetsuit to maintain body temperature. My understanding is that the diver will be on supplied air so inhalation and incidental ingestion exposure assessments were not warranted. I ran the 95% UCL values provided by Geosyntec for the primary site-related contaminants (mercury compounds and PCBs for which toxicity information are available) for a dermal risk evaluation. The resulting cancer risk and noncancer hazards were acceptable when considering an 8 hour work day for 6 days a week and up to 1 year. I have attached my worksheet for your reference.

Please feel free to contact me with any questions.

****
Regards,
Lora M. Smith-Staines, Ph.D.
U.S. Environmental Protection Agency, Region 2
Emergency and Remedial Response Division
Superfund Program
290 Broadway, 18th Fl.
New York, N.Y. 10007

212.637.4299 (office)
212.637.3083 (fax)

From: Tomchuk, Doug
Sent: Wednesday, November 12, 2014 3:24 PM
To: Smith, Lora
Subject: RE: BCSA - Diver Exposure SW Data

Okay. I will be working from home tomorrow. 732-747-8428

From: Smith, Lora
Sent: Wednesday, November 12, 2014 3:23 PM
To: Tomchuk, Doug
Subject: RE: BCSA - Diver Exposure SW Data

This is a lot to filter through plus I have another call that popped up at 3:30. I'm going to need at least until tomorrow to get you something.

****

Regards,
Lora M. Smith-Staines, Ph.D.
U.S. Environmental Protection Agency, Region 2
Emergency and Remedial Response Division
Superfund Program
290 Broadway, 18th Fl.
New York, N.Y. 10007

212.637.4299 (office)
212.637.3083 (fax)

From: Tomchuk, Doug
Sent: Wednesday, November 12, 2014 8:41 AM
To: Smith, Lora
Subject: RE: BCSA - Diver Exposure SW Data

Okay. Thanks for letting me know.

dougt

From: Smith, Lora
Sent: Wednesday, November 12, 2014 8:40 AM
To: Tomchuk, Doug
Subject: RE: BCSA - Diver Exposure SW Data

Hi Doug,

I won't get a chance to look at this until after 2. I'll see what I can do.

****

Regards,
Lora M. Smith-Staines, Ph.D.
U.S. Environmental Protection Agency, Region 2
Emergency and Remedial Response Division
Superfund Program
290 Broadway, 18th Fl.
New York, N.Y. 10007

212.637.4299 (office)
212.637.3083 (fax)

From: Tomchuk, Doug
Sent: Wednesday, November 12, 2014 7:44 AM
To: Smith, Lora
Subject: RE: BCSA - Diver Exposure SW Data

Let me know if you need anything.

dougt

From: Peter Brussock [mailto:ppbrussock@elminc.com]
Sent: Tuesday, November 11, 2014 10:54 AM
To: Tomchuk, Doug; Jennifer Wollenberg
Cc: Smith, Lora; Puvogel, Rich; Kelley, Sophia
Subject: RE: BCSA - Diver Exposure SW Data
Importance: High

Doug,
Attached is a table with the requested information. Sorry for the delay but the process to compile the information and provide the means and UCL is somewhat involved, as summarized in the attached memorandum.
Please let me know if you need anything else.
Peter

From: Tomchuk, Doug [mailto:Tomchuk.Doug@epa.gov]
Sent: Monday, November 10, 2014 7:38 AM
To: Peter Brussock; Jennifer Wollenberg
Cc: Smith, Lora; Puvogel, Rich; Kelley, Sophia
Subject: RE: BCSA - Diver Exposure

On Thursday, based on your email, I informed the divers that we expected to get back to them today (Monday) or at latest Wednesday.
Please keep me updated with the progress, and any delays. Please remember that Tuesday (11/11) is a federal holiday.

Thanks,

dougt

From: Peter Brussock [mailto:ppbrussock@elminc.com]
Sent: Thursday, November 06, 2014 11:30 AM
To: Tomchuk, Doug; Jennifer Wollenberg
Cc: Smith, Lora; Puvogel, Rich
Subject: RE: BCSA - Diver Exposure

Doug,

We expect to have the requested data and calculated averages and UCLs later today.
Peter

From: Tomchuk, Doug [mailto:Tomchuk.Doug@epa.gov]
Sent: Thursday, November 06, 2014 11:03 AM
To: Peter Brussock; Jennifer Wollenberg
Cc: Smith, Lora; Puvogel, Rich
Subject: RE: BCSA - Diver Exposure

Thanks.

dougt

From: Peter Brussock [mailto:ppbrussock@elminc.com]
Sent: Thursday, November 06, 2014 11:02 AM
To: Tomchuk, Doug; Jennifer Wollenberg
Cc: Smith, Lora; Puvogel, Rich
Subject: RE: BCSA - Diver Exposure

Doug,
Geosyntec is working on the compilation of the data from the stations near Route 3. I just asked them for an update.
Peter

From: Tomchuk, Doug [mailto:Tomchuk.Doug@epa.gov]
Sent: Thursday, November 06, 2014 10:59 AM
To: Peter Brussock; Jennifer Wollenberg
Cc: Smith, Lora; Puvogel, Rich
Subject: RE: BCSA - Diver Exposure

Any thoughts on when we might get the exposure numbers? I want to be able to get back to the two groups that have called.

Doug Tomchuk

From: Peter Brussock [mailto:ppbrussock@elminc.com]
Sent: Monday, November 03, 2014 4:25 PM
To: Tomchuk, Doug; Jennifer Wollenberg
Cc: Smith, Lora; Puvogel, Rich
Subject: RE: BCSA - Diver Exposure

Doug,
We can get together those data pretty quickly. I will send them 'reply all' , probably while you are out of the office.
Peter

From: Tomchuk, Doug [mailto:Tomchuk.Doug@epa.gov]
Sent: Monday, November 03, 2014 4:15 PM

To: Peter Brussock; Jennifer Wollenberg
Cc: Smith, Lora; Puvogel, Rich
Subject: BCSA - Diver Exposure

Peter/Jen,

I spoke with Jon Germano this afternoon. (Cell 610-417-5275).
Jon is a professional diver, placing concrete around the bridge piers on Rt 3 in Berry's Creek.
He explained that he should be working there 8 hours/day, 6 Days/week, for about 3 months.
He uses Berry's Creek water that is heated to 85 to 90 degrees and pumped into his wetsuit.
I explained that the major exposure route that we are concerned with would be consumption of fish, but had not realized how long his exposure would be at first. To be cautious with this, I thought it best to check with our risk assessor, Lora Smith.

Lora said she'd like to run some numbers on this to check whether there is a concern.
Can you provide us with the exposure concentrations for surface water in the area of the Route 3 Bridge?
We'd be looking for the average concentration, and the 95% UCL for surface water.
Please confirm whether you can provide those numbers, and your timing to do so.
If you have any other thoughts on the matter, please let me know.

I will be unavailable tomorrow, but if you really need to reach me – cell 732-859-7571.

Thank you,

dougt

Draft
Exhibit 2: Exposure Point Concentration Program and Results

Exposure and Risk Estimates

Berry's Creek Study Area Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

INTRODUCTION

Exposure point concentrations (EPCs) are derived for chemicals of potential concern (COPCs) for each medium and exposure unit to support lifetime cancer risk and noncancer hazard quotient calculations in the baseline human health risk assessment (BHHRA). Typically the sample mean or the 95th percentile upper confidence limit (UCL) of the mean are used as the EPC in exposure and risk assessment (USEPA 1992, 2002). The first step in determining the EPC is calculation of the 95 percent UCL, which is defined as an expected maximum value for the mean that would be observed in 95 percent of sampling efforts. Depending on the method used, and to gain adequate coverage of the sample mean, alternative intervals of 97.5 or 99 percent may also be used. Distribution selection, calculations of the UCL, and selection of EPCs, were conducted using R version 3.2.5 with functions developed to be consistent with U.S. Environmental Protection Agency's (EPA) ProUCL (Version 5.0.00) program.

R is statistical programming language and environment that provides the flexibility for dealing with multiple data input formats and generation of customized and tailored outputs that are automated and greatly reduce the amount of processing time required in reporting EPCs. Due to the customizable nature of R, functions can be defined to calculate UCLs with similar methods used in ProUCL. Because of limitations on ProUCL input and output, the amount of time invested in post-processing of UCL data summaries from ProUCL increases dramatically with the number and combination of exposure media, exposure units, and COPCs being evaluated: the analyst must manually select and copy by hand the UCLs from the ProUCL output, and when the number of exposure media and COPCs are large, this is a very time intensive task. R allows for greater flexibility in the data inputs accepted and customization of the UCL output results, which reduces analytical processing time. Additionally, R can produce customized data visualizations and additional diagnostics for distribution fitting for censored and uncensored data sets.

Distribution selection and UCL calculation methods were developed in R version 3.2.5 (R Core Team 2016). Custom functions were developed to calculate UCLs for various distributions using the following packages:

- {fitdistrplus} – Delignette-Muller and Dutang (2015)
- {nortest} – Gross and Ligges (2015)
- {stats} – R Core Team (2016)
- {EnvStats} – Millard (2016)
- {NADA} – Lee (2015).

DISTRIBUTION SELECTION

The data for each analyte, media, and exposure unit were evaluated for a discernible distribution. Similar to ProUCL, data were tested for normality by graphical data visualization with quantile-quantile (Q-Q) plots and quantitatively with goodness of fit (GOF) statistics including the Shapiro-Wilks (S-W) test[1] for samples sizes $n \leq 50$ and the Lilliefors test[2] for sample sizes $n > 50$. Lognormality was also tested using the above methods and transformation of the data using natural log. The Anderson-Darling (A-D) and the Kolmogorov-Smirnov (K-S) test statistics were used to evaluate data for the gamma distribution. Gamma critical values for the A-D and K-S tests were taken from tables provided in ProUCL 5.0.00 Technical Guide in (tables A-1 through A-6) (Singh et al. 2007; Singh and Singh 2013). A significance level of 0.05 was used in combination with visual inspection of the Q-Q plots for all distribution tests. In addition to GOF tests, ProUCL guidance recommends the use of σ (standard deviation of natural log(x); where x are the detected concentrations) to determine potential skewness in the data set. When $\sigma < 0.5$, the data were considered to be symmetric or mildly skewed, and normal or approximate normal distributions were selected. When $\sigma > 1.0$, the data were considered to be moderate to highly skewed, and alternative distributions to normal or approximate normal were considered.

Data were determined to follow a normal or approximate normal distribution in the following cases: 1) $\sigma < 0.5$ (standard deviation of log detected values were less than 0.5), regardless of S-W and Lilliefors test results or 2) $\sigma < 1.0$ and either S-W or Lilliefors *p*-value was greater than 0.05. Data were determined to follow a lognormal distribution when either the S-W or Lilliefors test on the natural lognormal transformed data resulted in a *p*-value greater than 0.05. Data were determined to follow a gamma distribution if either the A-D and K-S test statistics were less than the critical values. If the data did not pass any GOF test, distribution free (nonparametric) methods were used. If the data contained less than four detected values, then the data were evaluated for a distribution and the maximum detected concentration was used as the EPC.

When the data were determined to follow normal or approximate normal distributions regardless of the other possible distributions, normal or approximate normal was selected as the distribution for the UCL calculation. When the data were determined to follow both lognormal and gamma distributions, but not to follow normal or approximate normal distributions, the following criteria were used to determine the distribution for the UCL calculation:

- If only one GOF test passed (S-W/Lilliefors for lognormal and A-D/K-S for gamma) for a distribution but the other distribution passed both, then the distribution with two passing GOF tests was selected.

[1] Shapiro-Wilks normality test taken from R {stats} package version 3.2.3.
[2] Lillifores normality test taken from R {nortest} package version 1.0-4.

- If only one GOF test passed (A-D or K-S) or if both GOF tests passed for both distributions, then the Akaike information criterion (AIC) and Bayesian information criterion (BIC)[3] were calculated for each distribution fit and the distribution with the lowest AIC or BIC was selected.

Figures 1 through 570 show the graphical and GOF distribution testing output for EPCs developed as part of the BHHRA.

UCL METHOD SELECTION

The selection of the UCL method implemented in the custom R code is consistent with ProUCL's recommendations as provided in ProUCL 4.1.00 User Guide (Singh et al. 2010) and ProUCL 5.0.00 Technical Guide (Singh and Singh 2013) in all but two cases (described below). UCL methods were selected based on the following criteria in order of their application:

1. Censoring—if the data are uncensored (all detect) or censored (contain nondetects)

2. Distribution

3. Skewness (as defined by calculating the standard deviation of log detected values, σ)

4. Frequency of detection (in case of censored data sets)

5. Sample size.

Tables 1 and 2 summarize the UCL method selection criteria for uncensored and censored data sets, respectively.

In two cases, the custom R code selects a different UCL method than is recommended by ProUCL:

- When the distribution type was approximate normal, the Modified Student's-t UCL was selected instead of the Student's-t UCL, as the data were indicated to be slightly skewed based on the calculation of σ.

- In cases where the H-UCL was recommended by ProUCL, the UCLs based on Chebyshev inequality methods were selected instead. ProUCL 5.0.00 technical guidance states that the H-UCL based on the Land's statistic "yields unrealistically large UCL95 values for moderately skewed to highly skewed data sets. On the other hand, when the mean of a logged data set is negative, the H-statistic tends to yield an impractically low value of H-UCL especially when the sample size is large" and was included in ProUCL version 5.0.00 for historical purposes for research and comparison (Singh and Singh 2013). Singh et al. (1997) recommend the

[3] AIC and BIC are two methods for evaluating the relative quality of statistical models to fit a given data set. In general, the smaller the AIC or BIC value, the better the model fit for a given set of data.

Chebyshev inequality as an alternative to the Land's statistics for calculating UCLs for lognormally distributed data.

When more than one UCL method is recommended by ProUCL, the final UCL was selected by the custom R code as follows:

- For approximate normal distributions where the Modified Student's-t, Bootstrap-BCA, Adjust Central Limit Theorem (CLT) UCL or the censored equivalents were recommended, the Modified Student's-t UCL was selected.

- For gamma distributions where the Adjusted Gamma, Hall's Bootstrap and Bootstrap-t UCLs are recommended, the Adjusted Gamma was selected.

- For cases where the Hall's Bootstrap and Bootstrap-t UCL were recommended, the Bootstrap-t UCL was selected.

- For cases where the Regression on Order Statistics (ROS) and Kaplan Meier (KM) methods were recommended, the KM method was selected.

- For lognormally distributed data where $\sigma>3$, the Bootstrap-t UCL was selected over the Chebyshev and Hall's Bootstrap UCL methods.

UCL CALCULATION

UCLs were calculated based on the selected method as described above. Tables 3 through 6 display a selection of UCLs from the BHHRA evaluation to compare results generated in R to those generated with ProUCL 5.0.00. Data were selected for these tables so as to include at least one, and in some cases two, examples of each combination of censoring level (100%, 100–80%, 80–60%, 60–40%, 40–20%, and <20%), selected distribution (normal, lognormal, gamma, and nonparametric), possible distribution (meaning possible distribution combination; e.g., gamma and lognormal), and UCL method.

UCLs calculated in R and ProUCL were in agreement for the majority of the calculations; however, there were two cases where UCLs were calculated in R following a different procedure than ProUCL in order to produce results that are more consistent with original method specifications, or more consistent across UCL methods.

The ProUCL method for calculating the KM mean and standard deviation was based on the methods outlined by Bechtel Jacobs (2000). This same method was employed for the basis of the calculation generated in R with one difference. After generating the KM step function, Bechtel Jacobs Company defined two cases for calculating the sum of grouped areas below the curve. The first case applied to data where the minimum concentration was detected; the area below was

calculated to be inclusive of the lowest concentration step. When the minimum concentration was not detected, the sum of the area below the curve was the sum of all areas excluding the lowest group. The ProUCL method for calculating the KM mean and standard deviation treated all cases as if the lowest concentration was detected. The KM-based UCL calculations in R added an additional section to address data where the minimum value was not detected. With this adjustment, the R-based KM calculation was tested with the example data provided by Bechtel Jacobs (2000) and verified that the resulting KM mean and standard deviation methods were replicating the author's results.

For the majority of UCL methods, ProUCL applied two-sided confidence interval assumptions when calculating UCLs for normal, lognormal, and nonparametric methods. The gamma UCL methods, however, appeared to use one-sided confidence interval assumptions. UCL results for the Approximate Gamma UCL could only be replicated using the EnvStats package when the confidence interval type was set to one-sided. To be consistent among the UCL calculation assumptions for different distributions, the R-generated UCLs for the Approximate and Adjusted Gamma methods were revised to use a two-sided confidence interval.

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TABLES

Table 1. UCL Method Selection Criteria for Uncensored Datasets

Distribution	Skewness	Sample Size	Recommended UCL	Alternative UCL
None	--	$n < 4$	Maximum concentration	--
Normal	$\sigma < 1.0$	$n \geq 4$	95% Student's-t UCL	--
Approximate Normal	$\sigma < 0.5$	$n \geq 4$	95% Modified Student's-t UCL	95% Adjusted CLT UCL
Lognormal	$0.5 \leq \sigma < 1.0$	$n \geq 4$	95% Chebyshev (Mean, SD) UCL	95% Bootstrap-Percentile UCL, 95% Bootstrap-BCA UCL
	$1.0 \leq \sigma < 1.5$	$n \geq 4$	95% Chebyshev (Mean, SD) UCL	--
	$1.5 \leq \sigma < 2.0$	$4 \leq n < 20$	99% Chebyshev (Mean, SD) UCL	97.5% Chebyshev (Mean, SD) UCL
		$n \geq 20$	95% Chebyshev (Mean, SD) UCL	--
	$2.0 \leq \sigma < 2.5$	$4 \leq n < 20$	95% Chebyshev (Mean, SD) UCL	--
		$20 \leq n < 50$	97.5% Chebyshev (Mean, SD) UCL	--
		$n \geq 50$	95% Chebyshev (Mean, SD) UCL	--
	$2.5 \leq \sigma < 3.0$	$4 \leq n < 30$	99% Chebyshev (Mean, SD) UCL	--
		$30 \leq n < 70$	97.5% Chebyshev (Mean, SD) UCL	--
		$n \geq 70$	95% Chebyshev (Mean, SD) UCL	--
	$3.0 \leq \sigma < 3.5$[a]	$4 \leq n < 15$	95% Bootstrap-t UCL	95% Hall's Bootstrap UCL, 95% Chebyshev (Mean, SD) UCL
		$15 \leq n < 50$	99% Chebyshev (Mean, SD) UCL	--
		$50 \leq n < 100$	97.5% Chebyshev (Mean, SD) UCL	--
		$n \geq 100$	95% Chebyshev (Mean, SD) UCL	--
	$\sigma < 3.5$[a]	$n \geq 4$	Use nonparametric methods.	--
Gamma	$k \leq 1$	$4 \leq n < 15$	95% Bootstrap-t UCL	95% Hall's Bootstrap UCL, 95% Adjusted Gamma UCL
		$15 \leq n < 50$	95% Adjusted Gamma UCL	--
		$n \geq 50$	95% Approximate Gamma UCL	--
	$k > 1$	$4 \leq n < 50$	95% Adjusted Gamma UCL	--
		$n \geq 50$	95% Approximate Gamma UCL	--

Table 1. UCL Method Selection Criteria for Uncensored Datasets

Distribution	Skewness	Sample Size	Recommended UCL	Alternative UCL
Nonparametric	$0.5 \leq \sigma < 1.0$	$n \geq 4$	95% Chebyshev (Mean, SD) UCL	--
	$1.5 \leq \sigma < 2.0$	$4 \leq n < 20$	97.5% Chebyshev (Mean, SD) UCL	--
		$n \geq 20$	95% Chebyshev (Mean, SD) UCL	--
	$2.0 \leq \sigma < 2.5$	$4 \leq n < 15$	95% Hall's Bootstrap UCL	--
		$15 \leq n < 20$	99% Chebyshev (Mean, SD) UCL	--
		$20 \leq n < 50$	97.5% Chebyshev (Mean, SD) UCL	--
		$n \geq 50$	95% Chebyshev (Mean, SD) UCL	--
	$2.5 \leq \sigma < 3.0$	$4 \leq n < 15$	95% Hall's Bootstrap UCL	--
		$15 \leq n < 30$	99% Chebyshev (Mean, SD) UCL	--
		$30 \leq n < 70$	97.5% Chebyshev (Mean, SD) UCL	--
		$n \geq 70$	95% Chebyshev (Mean, SD) UCL	--
	$3.0 \leq \sigma < 3.5$[a]	$4 \leq n < 15$	95% Hall's Bootstrap UCL	99% Chebyshev (Mean, SD) UCL
		$15 \leq n < 50$	99% Chebyshev (Mean, SD) UCL	--
		$50 \leq n < 100$	97.5% Chebyshev (Mean, SD) UCL	--
		$n \geq 100$	95% Chebyshev (Mean, SD) UCL	--
	$\sigma < 3.5$[a]	$n \geq 4$	99% Chebyshev (Mean, SD) UCL	--

Notes:

σ = standard deviation of the natural-log transformed detected values
BCA = bias-corrected accelerated bootstrap method
CLT = central limit theorem
k = shape parameter for gamma distribution
n = sample size
SD = standard deviation
UCL = upper confidence limit
-- = not applicable

[a] For highly skewed data sets with sigma exceeding 3.0 it is suggested the user preprocesses the data. It is very likely that the data consist of outliers and/or come from multiple populations.

Table 2. UCL Method Selection Criteria for Censored Datasets

Distribution	Skewness	Sample Size	FOD	Recommended UCL	Alternative UCL
None	--	n < 4	FOD > 0%	Maximum concentration	--
Normal	σ < 1.0	n ≥ 4	0% < FOD < 100%	95% KM (t) UCL	95% KM (Bootstrap-Percentile) UCL
Approximate Normal	σ < 0.5	n ≥ 4	0% < FOD < 100%	95% KM (t) UCL	95% KM (BCA) UCL
Lognormal	σ < 1.0	4 ≤ n < 70	80% ≤ FOD < 100%	95% KM (Chebyshev) UCL	--
		n ≥ 70		95% KM (BCA) UCL	--
		n ≥ 4	60% ≤ FOD < 80%	95% KM (BCA) UCL	--
		n ≥ 4	0% < FOD < 60%	95% KM (t) UCL	95% KM (Bootstrap-Percentile) UCL
	1.0 ≤ σ < 1.5	4 ≤ n < 40	50% ≤ FOD < 100%	97.5% KM (Chebyshev) UCL	--
		n ≥ 40		95% KM (Chebyshev) UCL	--
		n ≥ 4	0% < FOD < 50%	95% KM (BCA) UCL	--
	1.5 ≤ σ < 2.0	4 ≤ n < 40	50% ≤ FOD < 100%	99% KM (Chebyshev) UCL	--
		n ≥ 40		97.5% KM (Chebyshev) UCL	--
		4 ≤ n < 50	0% < FOD < 50%	97.5% KM (Chebyshev) UCL	--
		n ≥ 50		95% KM (Chebyshev) UCL	--
	σ ≥ 2.0	4 ≤ n < 60	FOD > 0%	99% KM (Chebyshev) UCL	--
		n ≥ 60		97.5% KM (Chebyshev) UCL	--
Gamma	k ≤ 1	4 ≤ n < 15	0% < FOD < 100%	95% KM (Bootstrap-t) UCL	95% KM (Hall's Bootstrap) UCL, 95% KM (Adjusted Gamma) UCL
	k ≤ 1	15 ≤ n < 50	0% < FOD < 100%	95% KM (Adjusted Gamma) UCL[a]	95% GROS (Adjusted Gamma) UCL[b], 95% KM (BCA) UCL,
	k ≤ 1	n ≥ 50	0% < FOD < 100%	95% KM (Approximate Gamma) UCL[a]	95% GROS (Approximate Gamma) UCL[b], 95% KM (t) UCL
	k >1	4 ≤ n < 50	0% < FOD < 100%	95% KM (Adjusted Gamma) UCL	95% GROS (Adjusted Gamma) UCL[b], 95% KM (BCA) UCL
		n ≥ 50	0% < FOD < 100%	95% KM (Approximate Gamma) UCL	95% GROS (Approximate Gamma) UCL[b], 95% KM (t) UCL
Nonparametric	σ < 0.5	n ≥ 4	FOD > 0%	95% KM (t) UCL	95% KM (BCA) UCL
	0.5 ≤ σ < 1.0	4 ≤ n < 70	80% ≤ FOD < 100%	95% KM (Chebyshev) UCL	--
		n ≥ 70		95% KM (BCA) UCL	--
		n ≥ 4	60% ≤ FOD < 80%	95% KM (BCA) UCL	--
		n ≥ 4	0% < FOD < 60%	95% KM (t) UCL	95% KM (Bootstrap-Percentile) UCL
	1.0 ≤ σ < 1.5	4 ≤ n < 40	50% ≤ FOD < 100%	97.5% KM (Chebyshev) UCL	--
		n ≥ 40		95% KM (Chebyshev) UCL	--
		n ≥ 4	0% < FOD < 50%	95% KM (BCA) UCL	--
	1.5 ≤ σ < 2.0	4 ≤ n < 40	50% ≤ FOD < 100%	99% KM (Chebyshev) UCL	--
		n ≥ 40		97.5% KM (Chebyshev) UCL	--
		4 ≤ n < 50	0% < FOD < 50%	97.5% KM (Chebyshev) UCL	--
		n ≥ 50		95% KM (Chebyshev) UCL	--
	σ ≥ 2.0	4 ≤ n < 60	FOD > 0%	99% KM (Chebyshev) UCL	--
		n ≥ 60		97.5% KM (Chebyshev) UCL	--

Table 2. UCL Method Selection Criteria for Censored Datasets

Distribution	Skewness	Sample Size	FOD	Recommended UCL	Alternative UCL

Notes:

σ = standard deviation of the natural-log transformed detected values
BCA = bias-corrected accelerated bootstrap method
FOD = frequency of detection
GROS = gamma regression on order statistics
k = shape parameter for gamma distribution
KM = Kaplan Meier
n = sample size
UCL = upper confidence limit
-- = not applicable

[a] Adjusted or Approximate Gamma methods used only when k > 0.10.

[b] Regression on order methods for censored data may be used as an alternative method only when k > 0.5 and FOD > 50%.

Table 3. Comparison of R and ProUCL Distributions, UCL Methods, and UCL Values for Normally Distributed Data

Exposure Medium	Exposure Unit	Chemical Class	COPC	n	n (Detected)	FOD	σ	Units	Selected Distribution	All Distributions	UCL Method	UCL Value	ProUCL Selected Distribution	ProUCL All Distributions	ProUCL Method	ProUCL UCL Value	Rationale
Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points	UBC	Metals	Iron	41	41	100%	0.298	mg/kg	Normal	Normal	95% Student's-t UCL	29,000	Normal	Normal	95% Student's-t UCL	29,000	(1)
		Pesticides	Aldrin	18	8	44%	0.973	mg/kg	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.027	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.028	(9)
	MBC	Metals	Cadmium	33	32	97%	0.839	mg/kg	Normal	Normal, gamma	95% KM (t) UCL	3.5	Normal	Normal, gamma, lognormal	95% KM (t) UCL	3.5	(9)
	LBC	Metals	Thallium	16	6	38%	0.186	mg/kg	Normal	Normal, lognormal	95% KM (t) UCL	1.7	Normal	Normal, gamma, lognormal	95% KM (t) UCL	1.8	(9)
			Nickel	16	16	100%	0.237	mg/kg	Approximate normal	Approximate normal	95% Modified Student's-t UCL	45	Nonparametric	--	95% Student's-t UCL	44	(12)
			Zinc	16	16	100%	0.246	mg/kg	Normal	Normal, gamma	95% Student's-t UCL	290	Normal	Normal, gamma, lognormal	95% Student's-t UCL	290	(1)
		PAHs	Indeno[1,2,3-cd]pyrene	13	13	100%	0.680	mg/kg	Normal	Normal, gamma, lognormal	95% Student's-t UCL	0.52	Normal	Normal, gamma, lognormal	95% Student's-t UCL	0.52	(1)
		Pesticides	Aldrin	13	9	69%	0.380	mg/kg	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.0040	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.0044	(9)
			Heptachlor epoxide	10	4	40%	0.245	mg/kg	Normal	Normal, lognormal	95% KM (t) UCL	0.0016	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.0022	(9)
	Bellman's Creek	Metals	Arsenic	27	27	100%	0.684	mg/kg	Normal	Normal, gamma, lognormal	95% Student's-t UCL	16	Normal	Normal, gamma, lognormal	95% Student's-t UCL	16	(1)
	Mill Creek	Metals	Cobalt	14	9	64%	0.591	mg/kg	Normal	Normal, gamma	95% KM (t) UCL	14	Normal	Normal, gamma, lognormal	95% KM (t) UCL	14	(1)
		PCBs	PCBs (total Aroclors)	14	8	57%	0.969	mg/kg	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.12	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.12	(1)
Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats	UBC	Metals	Antimony	52	12	23%	0.557	mg/kg	Normal	Normal, lognormal	95% KM (t) UCL	1.2	Normal	Normal, gamma, lognormal	95% KM (t) UCL	1.2	(1)
			Cobalt	52	52	100%	0.373	mg/kg	Approximate normal	Approximate normal, lognormal	95% Modified Student's-t UCL	15	Lognormal	Lognormal	95% Student's-t UCL	15	(12)
	MBC	Metals	Arsenic	45	45	100%	0.413	mg/kg	Approximate normal	Approximate normal	95% Modified Student's-t UCL	18	Nonparametric	--	95% Student's-t UCL	18	(12)
			Cadmium	45	44	98%	0.745	mg/kg	Normal	Normal	95% KM (t) UCL	3.5	Normal	Normal	95% KM (t) UCL	3.5	(1)
	BCC	Metals	Cobalt	16	15	94%	0.375	mg/kg	Approximate normal	Approximate normal	95% KM (t) UCL	9.9	Nonparametric	--	95% KM (Chebyshev) UCL	12	(12)
		PAHs	Indeno[1,2,3-cd]pyrene	15	14	93%	0.815	mg/kg	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.52	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.52	(1)
		Pesticides	Aldrin	15	7	47%	0.429	mg/kg	Approximate normal	Approximate normal, lognormal	95% KM (t) UCL	0.0063	Approximate normal	Approximate normal, gamma, lognorma	95% KM (t) UCL	0.0073	(9)
	LBC	Metals	Thallium	27	9	33%	0.170	mg/kg	Normal	Normal, gamma, lognormal	95% KM (t) UCL	1.6	Normal	Normal, gamma, lognormal	95% KM (t) UCL	1.6	(1)
		Pesticides	Aldrin	24	18	75%	0.453	mg/kg	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.0038	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.004	(9)
	Bellman's Creek	Metals	Antimony	27	6	22%	0.690	mg/kg	Normal	Normal, lognormal	95% KM (t) UCL	1.1	Normal	Normal, gamma, lognormal	95% KM (t) UCL	1.1	(1)
	Mill Creek	Metals	Cobalt	14	9	64%	0.591	mg/kg	Normal	Normal, gamma	95% KM (t) UCL	14	Normal	Normal, gamma, lognormal	95% KM (t) UCL	14	(1)
			Iron	14	14	100%	0.461	mg/kg	Normal	Normal, gamma	95% Student's-t UCL	37,000	Normal	Normal, gamma, lognormal	95% Student's-t UCL	37,000	(1)
Waterway Sediment All Depths	UPIC	Metals	Antimony	11	9	82%	0.470	mg/kg	Approximate normal	Approximate normal, gamma, lognormal	95% KM (t) UCL	2.2	Gamma	Gamma, lognormal	95% Adjusted Gamma KM-UCL	2.3	(12)
	MBC	Metals	Chromium (VI)	5	4	80%	0.581	mg/kg	Normal	Normal, lognormal	95% KM (t) UCL	3.8	Normal	Normal, gamma, lognormal	95% KM (t) UCL	3.8	(1)
			Thallium	29	8	28%	0.414	mg/kg	Normal	Normal, gamma, lognormal	95% KM (t) UCL	1.4	Normal	Normal, gamma, lognormal	95% KM (t) UCL	1.4	(1)
	BCC	Metals	Vanadium	8	8	100%	0.717	mg/kg	Normal	Normal, gamma, lognormal	95% Student's-t UCL	48	Normal	Normal, gamma, lognormal	95% Student's-t UCL	48	(1)
		PAHs	Benzo[a]pyrene	7	7	100%	0.902	mg/kg	Normal	Normal, lognormal	95% Student's-t UCL	1.2	Normal	Normal, gamma, lognormal	95% Student's-t UCL	1.2	(1)
	LBC	Metals	Antimony	7	5	71%	0.103	mg/kg	Normal	Normal, lognormal	95% KM (t) UCL	1.1	Normal	Normal, gamma, lognormal	95% KM (t) UCL	1.1	(1)
			Manganese	7	7	100%	0.359	mg/kg	Normal	Normal, lognormal	95% Student's-t UCL	640	Normal	Normal, gamma, lognormal	95% Student's-t UCL	640	(1)
			Thallium	7	5	71%	0.294	mg/kg	Normal	Normal, lognormal	95% KM (t) UCL	2.3	Normal	Normal, gamma, lognormal	95% KM (t) UCL	2.4	(9)
		Pesticides	Heptachlor epoxide	5	5	100%	0.456	mg/kg	Normal	Normal, lognormal	95% Student's-t UCL	0.0015	Normal	Normal, gamma, lognormal	95% Student's-t UCL	0.0015	(1)
Marsh Sediment All Depths	Ackerman's East Marsh	Metals	Cobalt	6	5	83%	0.512	mg/kg	Normal	Normal, lognormal	95% KM (t) UCL	27	Normal	Normal, gamma, lognormal	95% KM (t) UCL	27	(1)
White Perch Fillet	MBC	Metals	Mercury	49	49	100%	0.350	mg/kg	Approximate normal	Approximate normal, lognormal	95% Modified Student's-t UCL	0.55	Lognormal	Lognormal	95% Student's-t UCL	0.54	(12)
		Organometals	Methyl mercury	59	59	100%	0.689	mg/kg	Normal	Normal	95% Student's-t UCL	0.41	Normal	Normal	95% Student's-t UCL	0.41	(1)
	BCC	Metals	Mercury	49	49	100%	0.301	mg/kg	Approximate normal	Approximate normal, gamma, lognormal	95% Modified Student's-t UCL	0.37	Gamma	Gamma, lognormal	95% Adjusted Gamma UCL	0.37	(12)
			Selenium	23	21	91%	0.282	mg/kg	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.95	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.96	(9)
	LBC	Metals	Selenium	21	16	76%	0.263	mg/kg	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.75	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.76	(9)
		Organometals	Methyl mercury	57	57	100%	0.540	mg/kg	Normal	Normal, gamma	95% Student's-t UCL	0.34	Normal	Normal, gamma	95% Student's-t UCL	0.34	(1)
	Bellman's Creek	Organometals	Methyl mercury	71	71	100%	0.371	mg/kg	Normal	Normal, gamma, lognormal	95% Student's-t UCL	0.28	Normal	Normal, gamma, lognormal	95% Student's-t UCL	0.28	(1)
	Mill Creek	Metals	Mercury	43	43	100%	0.326	mg/kg	Approximate normal	Approximate normal, gamma	95% Modified Student's-t UCL	0.24	Gamma	Gamma	95% Adjusted Gamma UCL	0.24	(12)
	Reference Sites	Organometals	Methyl mercury	125	125	100%	0.486	mg/kg	Normal	Normal	95% Student's-t UCL	0.26	Normal	Normal	95% Student's-t UCL	0.26	(1)
Blue Crab Muscle	UBC	Metals	Mercury	9	9	100%	0.187	mg/kg	Normal	Normal, gamma, lognormal	95% Student's-t UCL	0.22	Normal	Normal, gamma, lognormal	95% Student's-t UCL	0.22	(1)
	Woodbridge River	PCBs	PCBs (total Aroclors)	13	6	46%	0.405	mg/kg	Normal	Normal, lognormal	95% KM (t) UCL	0.0048	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.0053	(9)
	Reference Sites	Metals	Mercury	23	21	91%	0.414	mg/kg	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.13	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.13	(1)
		PCBs	PCBs (total Aroclors)	39	27	69%	0.650	mg/kg	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.0059	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.0059	(1)
Surface Water Total	UPIC	Metals	Arsenic	25	21	84%	0.410	µg/l	Normal	Normal, gamma, lognormal	95% KM (t) UCL	5.1	Approximate normal	Approximate normal, gamma, lognorma	95% KM (t) UCL	5.2	(9)
	UBC	Volatiles	Vinyl chloride	35	5	14%	0.083	µg/l	Normal	Normal, lognormal	95% KM (t) UCL	0.25	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.26	(9)
	MBC	Metals	Arsenic	163	132	81%	0.415	µg/l	Approximate normal	Approximate normal	95% KM (t) UCL	3.6	Nonparametric	--	95% KM (BCA) UCL	3.7	(12)
		Volatiles	Vinyl chloride	53	7	13%	0.238	µg/l	Normal	Normal, lognormal	95% KM (t) UCL	0.28	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.28	(1)
	BCC	Metals	Arsenic	134	106	79%	0.401	µg/l	Approximate normal	Approximate normal, lognormal	95% KM (t) UCL	3.3	Lognormal	Lognormal	95% KM (BCA) UCL	3.3	(12)
	LBC	Metals	Arsenic	135	101	75%	0.484	µg/l	Approximate normal	Approximate normal	95% KM (t) UCL	3.7	Nonparametric	--	95% KM (BCA) UCL	3.8	(12)
	Mill Creek	Metals	Arsenic	48	37	77%	0.376	µg/l	Normal	Normal, gamma, lognormal	95% KM (t) UCL	3.0	Normal	Normal, gamma, lognormal	95% KM (t) UCL	3.1	(9)
Ambient Air	Bellman's Creek	Metals	Mercury average	74	9	12%	0.311	µg/m^3	Approximate normal	Approximate normal	95% KM (t) UCL	0.011	Nonparametric	--	95% KM (t) UCL	0.011	(12)
	Reference Sites	Metals	Mercury average	74	9	12%	0.311	µg/m^3	Approximate normal	Approximate normal	95% KM (t) UCL	0.011	Nonparametric	--	95% KM (t) UCL	0.011	(12)

Table 3. Comparison of R and ProUCL Distributions, UCL Methods, and UCL Values for Normally Distributed Data

Exposure Medium	Exposure Unit	Chemical Class	COPC	n	n (Detected)	FOD	σ	Units	Selected Distribution	All Distributions	UCL Method	UCL Value	ProUCL Selected Distribution	ProUCL All Distributions	ProUCL Method	ProUCL UCL Value	Rationale

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
COPC = chemical of potential concern
FOD = frequency of detection
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek
UCL = upper confidence limit
UPIC = Upper Peach Island Creek
-- = not applicable
σ = standard deviation of the natural-log transformed detected values

UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

(1) Same distribution and UCL value.
(2) Alternative UCL method selected for approximate normal distributions; Modified Student's-t UCL.
(9) Kaplan-Meier mean calculation corrected for consistency with source document Bechtel Jacobs (2000) to address cases where the minimum concentration is not detected.
(12) Approximate normal distribution selected; standard deviation of log transformed detected values <0.50 which indicates minimal skew in the data.

Source:

Bechtel Jacobs (2000)

Table 4. Comparison of R and ProUCL Distributions, UCL Methods, and UCL Values for Lognormally Distributed Data

Exposure Medium	Exposure Unit	Chemical Class	COPC	n	n (Detected)	FOD	σ	Units	Selected Distribution	All Distributions	UCL Method	UCL Value	ProUCL Selected Distribution	ProUCL All Distributions	ProUCL Method	ProUCL UCL Value	Rationale
Surface Sediment (0–15 cm) Marsh and Mudflat at Access Points	UBC	PCBs	PCBs (total Aroclors)	55	55	100%	1.36	mg/kg	Lognormal	Lognormal	95% Chebyshev (Mean, Sd) UCL	6.2	Lognormal	Lognormal	95% H-UCL	5.4	(3)
	MBC	Metals	Thallium	33	8	24%	1.46	mg/kg	Lognormal	Lognormal	95% KM (BCA) UCL	10	Lognormal	Lognormal	95% KM (BCA) UCL	11	(9)
	Bellman's Creek	Metals	Zinc	27	27	100%	0.664	mg/kg	Lognormal	Gamma, lognormal	95% Chebyshev (Mean, Sd) UCL	580	Gamma	Gamma, lognormal	95% Adjusted Gamma UCL	460	(6)
		PAHs	Benzo[b]fluoranthene	22	21	95%	0.826	mg/kg	Lognormal	Gamma, lognormal	95% KM (Chebyshev) UCL	2.2	Gamma	Gamma, lognormal	95% Adjusted Gamma KM-UCL	1.8	(6)
		Pesticides	Aldrin	20	8	40%	1.03	mg/kg	Lognormal	Lognormal	95% KM (BCA) UCL	0.0074	Lognormal	Lognormal	95% KM (BCA) UCL	0.0071	(9)
		PCBs	PCBs (total Aroclors)	27	26	96%	1.31	mg/kg	Lognormal	Lognormal	97.5% KM (Chebyshev) UCL	2.7	Lognormal	Lognormal	97.5% KM (Chebyshev) UCL	2.7	(1)
	Woodbridge River	Metals	Cadmium	18	10	56%	1.23	mg/kg	Lognormal	Gamma, lognormal	97.5% KM (Chebyshev) UCL	2.0	Gamma	Gamma, lognormal	95% Adjusted Gamma KM-UCL	1.3	(6)
	Reference Sites	Metals	Cadmium	59	42	71%	1.21	mg/kg	Lognormal	Gamma, lognormal	95% KM (Chebyshev) UCL	3.0	Gamma	Gamma, lognormal	95% Approximate Gamma KM-UCL	2.3	(6)
			Thallium	59	18	31%	0.518	mg/kg	Lognormal	Gamma, lognormal	95% KM (t) UCL	1.9	Gamma	Gamma, lognormal	95% Approximate Gamma KM-UCL	2.1	(6)
		PCBs	PCBs (total Aroclors)	59	52	88%	1.32	mg/kg	Lognormal	Lognormal	95% KM (Chebyshev) UCL	1.1	Lognormal	Lognormal	95% KM (Chebyshev) UCL	1.1	(1)
Surface Sediment (0–15 cm) Marsh at Access Points & All Mudflats	UBC	PAHs	Indeno[1,2,3-cd]pyrene	32	32	100%	0.766	mg/kg	Lognormal	Gamma, lognormal	95% Chebyshev (Mean, Sd) UCL	1.1	Gamma	Gamma, lognormal	95% Adjusted Gamma UCL	0.93	(6)
		Pesticides	Aldrin	25	10	40%	1.12	mg/kg	Lognormal	Gamma, lognormal	95% KM (BCA) UCL	0.041	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.039	(11)
	MBC	Metals	Thallium	45	8	18%	1.46	mg/kg	Lognormal	Lognormal	95% KM (BCA) UCL	7.6	Lognormal	Lognormal	95% KM (BCA) UCL	10	(9)
	BCC	PAHs	Dibenz[a,h]anthracene	15	12	80%	0.772	mg/kg	Lognormal	Lognormal	95% KM (Chebyshev) UCL	0.27	Gamma	Gamma, lognormal	95% Adjusted Gamma KM-UCL	0.22	(6)
	Bellman's Creek	Metals	Cadmium	27	22	81%	1.16	mg/kg	Lognormal	Gamma, lognormal	97.5% KM (Chebyshev) UCL	6.9	Lognormal	Lognormal	97.5% KM (Chebyshev) UCL	6.9	(1)
		PAHs	Benzo[a]pyrene	22	21	95%	0.863	mg/kg	Lognormal	Gamma, lognormal	95% KM (Chebyshev) UCL	1.7	Gamma	Gamma, lognormal	95% Adjusted Gamma KM-UCL	1.3	(6)
		Pesticides	Aldrin	20	8	40%	1.03	mg/kg	Lognormal	Lognormal	95% KM (BCA) UCL	0.0071	Lognormal	Lognormal	95% KM (BCA) UCL	0.0077	(9)
			Heptachlor epoxide	21	11	52%	1.61	mg/kg	Lognormal	Lognormal	99% KM (Chebyshev) UCL	0.069	Lognormal	Lognormal	99% KM (Chebyshev) UCL	0.070	(1)
		PCBs	PCBs (total Aroclors)	27	26	96%	1.31	mg/kg	Lognormal	Lognormal	97.5% KM (Chebyshev) UCL	2.7	Lognormal	Lognormal	97.5% KM (Chebyshev) UCL	2.7	(1)
	Woodbridge River	Metals	Cadmium	18	10	56%	1.23	mg/kg	Lognormal	Gamma, lognormal	97.5% KM (Chebyshev) UCL	2.0	Gamma	Gamma, lognormal	95% Adjusted Gamma KM-UCL	1.3	(6)
	Reference Sites	Metals	Cadmium	59	42	71%	1.21	mg/kg	Lognormal	Gamma, lognormal	95% KM (Chebyshev) UCL	3.0	Gamma	Gamma, lognormal	95% Approximate Gamma KM-UCL	2.3	(6)
			Thallium	59	18	31%	0.518	mg/kg	Lognormal	Gamma, lognormal	95% KM (t) UCL	1.9	Gamma	Gamma, lognormal	95% Approximate Gamma KM-UCL	2.1	(6)
		PAHs	Indeno[1,2,3-cd]pyrene	47	44	94%	0.983	mg/kg	Lognormal	Gamma, lognormal	95% KM (Chebyshev) UCL	0.76	Gamma	Gamma, lognormal	95% Adjusted Gamma KM-UCL	0.61	(6)
		Pesticides	Aldrin	40	11	28%	1.05	mg/kg	Lognormal	Lognormal	95% KM (BCA) UCL	0.0042	Lognormal	Lognormal	95% KM (BCA) UCL	0.0039	(9)
Waterway Sediment All Depths	UBC	Metals	Antimony	35	20	57%	0.786	mg/kg	Lognormal	Lognormal	95% KM (t) UCL	2.4	Lognormal	Lognormal	95% KM (t) UCL	2.4	(1)
		Pesticides	Aldrin	16	12	75%	1.65	mg/kg	Lognormal	Lognormal	99% KM (Chebyshev) UCL	0.64	Lognormal	Lognormal	99% KM (Chebyshev) UCL	0.64	(1)
			Heptachlor	15	6	40%	2.95	mg/kg	Lognormal	Lognormal	99% KM (Chebyshev) UCL	1.4	Gamma	Gamma, lognormal	95% Adjusted Gamma KM-UCL	1.9	(6)
			Heptachlor epoxide	16	14	88%	1.81	mg/kg	Lognormal	Gamma, lognormal	99% KM (Chebyshev) UCL	0.75	Lognormal	Lognormal	99% KM (Chebyshev) UCL	0.75	(1)
	MBC	PAHs	Benzo[a]pyrene	15	14	93%	1.07	mg/kg	Lognormal	Lognormal	97.5% KM (Chebyshev) UCL	2.2	Lognormal	Lognormal	97.5% KM (Chebyshev) UCL	2.2	(1)
			Dibenz[a,h]anthracene	15	14	93%	1.09	mg/kg	Lognormal	Gamma, lognormal	97.5% KM (Chebyshev) UCL	0.35	Gamma	Gamma, lognormal	95% Adjusted Gamma KM-UCL	0.24	(6)
		Pesticides	Aldrin	6	4	67%	1.01	mg/kg	Lognormal	Lognormal	97.5% KM (Chebyshev) UCL	0.056	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.027	(11)
	BCC	Pesticides	Heptachlor epoxide	7	6	86%	1.52	mg/kg	Lognormal	Lognormal	99% KM (Chebyshev) UCL	0.039	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.013	(11)
	LBC	Metals	Mercury	12	12	100%	1.37	mg/kg	Lognormal	Gamma, lognormal	95% Chebyshev (Mean, Sd) UCL	12	Normal	Normal, gamma, lognormal	95% Student's-t UCL	8.1	(11)
Marsh Sediment All Depths	Nevertouch Marsh	Metals	Zinc	4	4	100%	1.49	mg/kg	Lognormal	Lognormal	95% Chebyshev (Mean, Sd) UCL	22,000	Normal	Normal, gamma, lognormal	95% Student's-t UCL	15,000	(5)
		PCBs	PCBs (total Aroclors)	7	7	100%	1.73	mg/kg	Lognormal	Lognormal	99% Chebyshev (Mean, Sd) UCL	20	Normal	Normal, gamma, lognormal	95% Student's-t UCL	7.2	(5)
Blue Crab Muscle	MBC	PCBs	PCBs (total Aroclors)	14	11	79%	1.15	mg/kg	Lognormal	Gamma, lognormal	95% KM (Chebyshev) UCL	0.040	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.021	(11)
	Bellman's Creek	PCBs	PCBs (total Aroclors)	17	13	76%	0.718	mg/kg	Lognormal	Gamma, lognormal	95% KM (BCA) UCL	0.0073	Gamma	Gamma, lognormal	95% Adjusted Gamma KM-UCL	0.0082	(6)
Surface Water Total	UPIC	PAHs	Benzo[a]pyrene	16	4	25%	1.89	µg/l	Lognormal	Lognormal	97.5% KM (Chebyshev) UCL	0.81	Approximate normal	Approximate normal, gamma, lognormal	95% KM (t) UCL	0.31	(11)
	UBC	Metals	Thallium	205	12	6%	1.60	µg/l	Lognormal	Gamma, lognormal	95% KM (Chebyshev) UCL	0.44	Gamma	Gamma, lognormal	95% Approximate Gamma KM-UCL	0.33	(6)
		PAHs	Benzo[a]pyrene	35	5	14%	1.94	µg/l	Lognormal	Lognormal	97.5% KM (Chebyshev) UCL	0.66	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.26	(5)
	MBC	PAHs	Benzo[a]pyrene	53	5	9%	2.00	µg/l	Lognormal	Lognormal	99% KM (Chebyshev) UCL	0.74	Lognormal	Lognormal	99% KM (Chebyshev) UCL	0.74	(1)
	BCC	Metals	Thallium	134	7	5%	1.65	µg/l	Lognormal	Lognormal	95% KM (Chebyshev) UCL	0.48	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.30	(11)
	LBC	PAHs	Benzo[a]pyrene	44	10	23%	1.11	µg/l	Lognormal	Lognormal	95% KM (BCA) UCL	0.093	Lognormal	Lognormal	95% KM (BCA) UCL	0.094	(9)
			Dibenz[a,h]anthracene	44	6	14%	1.04	µg/l	Lognormal	Lognormal	95% KM (BCA) UCL	0.12	Normal	Normal, gamma, lognormal	95% KM (t) UCL	0.13	(11)

Table 4. Comparison of R and ProUCL Distributions, UCL Methods, and UCL Values for Lognormally Distributed Data

Exposure Medium	Exposure Unit	Chemical Class	COPC	n	n (Detected)	FOD	σ	Units	Selected Distribution	All Distributions	UCL Method	UCL Value	ProUCL Selected Distribution	ProUCL All Distributions	ProUCL Method	ProUCL UCL Value	Rationale

Notes:
AIC = Akaike information criterion
BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
BIC = Bayesian information criterion
COPC = chemical of potential concern
FOD = frequency of detection
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek
UCL = upper confidence limit
UPIC = Upper Peach Island Creek
σ = standard deviation of the natural-log transformed detected values

UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

(1) Same distribution and UCL value.
(3) Alternative UCL method selected to replace H-UCL.
(5) Alternative distribution selected; Shapiro-Wilks and Lilliefors test for normality in R reported p-values <0.05.
(6) Data follow lognormal and gamma distributions; selection based on AIC and BIC values with lognormal AIC/BIC < gamma AIC/BIC.
(9) Kaplan-Meier mean calculation corrected for consistency with source document Bechtel Jacobs (2000) to address cases where the minimum concentration is not detected.
(11) Alternative distribution selected; standard deviation of log transformed detected values >1.0 indicates potentially skewed data.

Source:
Bechtel Jacobs (2000)

Table 5. Comparison of R and ProUCL Distributions, UCL Methods, and UCL Values for Gamma Distributed Data

Exposure Medium	Exposure Unit	Chemical Class	COPC	n	n (Detected)	FOD	σ	Units	Selected Distribution	All Distributions	UCL Method	UCL Value	ProUCL Selected Distribution	ProUCL All Distributions	ProUCL Method	ProUCL UCL Value	Rationale
Surface Sediment (0–15 cm) Marsh and Mudflat at Access Points	Mill Creek	Metals	Cadmium	14	10	71%	1.13	mg/kg	Gamma	Gamma, lognormal	95% KM (Adjusted Gamma) UCL	1.8	Normal	Normal, gamma, lognormal	95% KM (t) UCL	1.6	(11)
	Reference Sites	Metals	Mercury	76	72	95%	1.27	mg/kg	Gamma	Gamma	95% KM (Approximate Gamma) UCL	3.3	Gamma	Gamma	95% Approximate Gamma KM-UCL	3.3	(1)
Surface Sediment (0–15 cm) Marsh at Access Points & All Mudflats	MBC	Metals	Mercury	61	61	100%	0.802	mg/kg	Gamma	Gamma	95% Approximate Gamma UCL	21	Gamma	Gamma	95% Approximate Gamma UCL	20	(8)
	BCC	PAHs	Benz[a]anthracene	15	15	100%	1.17	mg/kg	Gamma	Gamma	95% Adjusted Gamma UCL	1	Normal	Normal, gamma	95% Student's-t UCL	0.73	(11)
	Mill Creek	Metals	Cadmium	14	10	71%	1.13	mg/kg	Gamma	Gamma, lognormal	95% KM (Adjusted Gamma) UCL	1.8	Normal	Normal, gamma, lognormal	95% KM (t) UCL	1.6	(11)
	Reference Sites	Metals	Mercury	76	72	95%	1.27	mg/kg	Gamma	Gamma	95% KM (Approximate Gamma) UCL	3.3	Gamma	Gamma	95% Approximate Gamma KM-UCL	3.3	(1)
Waterway Sediment All Depths	UBC	Metals	Copper	35	35	100%	1.06	mg/kg	Gamma	Gamma, lognormal	95% Adjusted Gamma UCL	340	Gamma	Gamma, lognormal	95% Adjusted Gamma UCL	310	(8)
	BCC	PCBs	PCBs (total Aroclors)	14	14	100%	1.16	mg/kg	Gamma	Gamma, lognormal	95% Adjusted Gamma UCL	2.5	Normal	Normal, gamma, lognormal	95% Student's-t UCL	1.7	(11)
White Perch Fillet	Mill Creek	PCBs	PCBs (total Aroclors)	53	53	100%	0.877	mg/kg	Gamma	Gamma, lognormal	95% Approximate Gamma UCL	0.65	Gamma	Gamma, lognormal	95% Approximate Gamma UCL	0.61	(8)

Notes:

BCC = Berry's Creek Canal
COPC = chemical of potential concern
FOD = frequency of detection
KM = Kaplan Meier
MBC = Middle Berry's Creek
n = sample size
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek
UCL = upper confidence limit
σ = standard deviation of the natural-log transformed detected values

UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

(1) Same distribution and UCL value.
(8) Two-sided UCL method used; ProUCL 5.0 program uses one-sided UCL method.
(11) Alternative distribution selected; standard deviation of log transformed detected values >1.0 indicates potentially skewed data.

Table 6. Comparison of R and ProUCL Distributions, UCL Methods, and UCL Values for Data Without Discernible Distributions

Exposure Medium	Exposure Unit	Chemical Class	COPC	n	n (Detected)	FOD	σ	Units	Selected Distribution	All Distributions	UCL Method	UCL Value	ProUCL Selected Distribution	ProUCL All Distributions	ProUCL Method	ProUCL UCL Value	Rationale
Surface Sediment (0–15 cm) Marsh and Mudflat at Access Points	UBC	Metals	Cadmium	40	40	100%	1.00	mg/kg	Nonparametric	Nonparametric	95% Chebyshev (Mean, Sd) UCL	34	Nonparametric	--	95% Chebyshev (Mead, Sd) UCL	34	(1)
	LBC	Metals	Antimony	16	1	6%	--	mg/kg	None	<4 detects	Maximum concentration	1.8	NA	--	--	--	(7)
	Woodbridge River	Metals	Antimony	18	9	50%	1.20	mg/kg	Nonparametric	Nonparametric	97.5% KM (Chebyshev) UCL	37	Nonparametric	--	95% KM (BCA) UCL	16	(10)
	Reference Sites	Pesticides	Heptachlor epoxide	39	13	33%	1.52	mg/kg	Nonparametric	Nonparametric	97.5% KM (Chebyshev) UCL	0.026	Nonparametric	--	97.5% KM (Chebyshev) UCL	0.026	(1)
Surface Sediment (0–15 cm) Marsh at Access Points & All Mudflats	LBC	Metals	Mercury	37	36	97%	0.545	mg/kg	Nonparametric	Nonparametric	95% KM (Chebyshev) UCL	6.7	Nonparametric	--	95% KM (Chebyshev) UCL	6.7	(1)
	Woodbridge River	Metals	Antimony	18	9	50%	1.20	mg/kg	Nonparametric	Nonparametric	97.5% KM (Chebyshev) UCL	37	Nonparametric	--	95% KM (BCA) UCL	16	(10)
	Reference Sites	Metals	Antimony	59	15	25%	1.09	mg/kg	Nonparametric	Nonparametric	95% KM (BCA) UCL	5.8	Lognormal	Lognormal	95% KM (BCA) UCL	5.6	(4)
		Pesticides	Heptachlor epoxide	39	13	33%	1.52	mg/kg	Nonparametric	Nonparametric	97.5% KM (Chebyshev) UCL	0.026	Nonparametric	--	97.5% KM (Chebyshev) UCL	0.026	(1)
Waterway Sediment All Depths	UPIC	Pesticides	Heptachlor	4	1	25%	--	mg/kg	None	<4 detects	Maximum concentration	0.029	NA	--	--	--	(7)
Marsh Sediment All Depths	Nevertouch Marsh	Pesticides	Aldrin	2	1	50%	--	mg/kg	None	<4 detects	Maximum concentration	0.26	NA	--	--	--	(7)
	Upper Peach Island Creek Marsh	PCBs	PCBs (total Aroclors)	7	7	100%	1.75	mg/kg	Nonparametric	Nonparametric	97.5% Chebyshev (Mean, Sd) UCL	2.3	Normal	Normal, gamma, lognormal	95% Student's-t UCL	1.2	(11)
	Ackerman's East Marsh	PAHs	Dibenz[a,h]anthracene	6	2	33%	--	mg/kg	None	<4 detects	Maximum concentration	0.015	Not performed	--	95% KM (t) UCL	0.019	(7)
	Oritani Marsh	Metals	Cadmium	2	1	50%	--	mg/kg	None	<4 detects	Maximum concentration	0.34	NA	--	--	--	(7)
White Perch Fillet	UBC	Metals	Manganese	3	3	100%	--	mg/kg	None	<4 detects	Maximum concentration	0.50	Normal	Normal, lognormal	95% Student's-t UCL	0.58	(7)
	BCC	Metals	Antimony	3	2	67%	--	mg/kg	None	<4 detects	Maximum concentration	0.47	Not performed	--	95% KM (BCA) UCL	--	(7)
	LBC	Metals	Iron	3	3	100%	--	mg/kg	None	<4 detects	Maximum concentration	9.0	Normal	Normal, lognormal	95% Student's-t UCL	10	(7)
	Reference Sites	PCBs	PCBs (total Aroclors)	125	125	100%	0.893	mg/kg	Nonparametric	Nonparametric	95% Chebyshev (Mean, Sd) UCL	0.66	Nonparametric	--	95% Chebyshev (Mead, Sd) UCL	0.66	(1)
Blue Crab Muscle	BCC	Metals	Iron	3	2	67%	--	mg/kg	None	<4 detects	Maximum concentration	18	Not performed	--	95% KM (BCA) UCL	--	(7)
Surface Water Total	MBC	Metals	Thallium	163	10	6%	1.78	µg/l	Nonparametric	Nonparametric	95% KM (Chebyshev) UCL	0.56	Lognormal	Lognormal	95% KM (Chebyshev) UCL	0.57	(9)
		PAHs	Dibenz[a,h]anthracene	53	3	6%	--	µg/l	None	<4 detects	Maximum concentration	4.7	Normal	Normal, lognormal	95% KM (t) UCL	0.29	(7)
Ambient Air	UBC	Metals	Mercury average	60	40	67%	0.849	µg/m^3	Nonparametric	Nonparametric	95% KM (BCA) UCL	0.042	Nonparametric	--	95% KM (BCA) UCL	0.042	(1)
	BCC	Metals	Mercury average	80	42	53%	0.526	µg/m^3	Nonparametric	Nonparametric	95% KM (t) UCL	0.025	Nonparametric	--	95% KM (t) UCL	0.025	(1)
	LBC	Metals	Mercury average	91	76	84%	1.56	µg/m^3	Nonparametric	Nonparametric	97.5% KM (Chebyshev) UCL	0.36	Nonparametric	--	97.5% KM (Chebyshev) UCL	0.36	(1)

Notes:
BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
COPC = chemical of potential concern
FOD = frequency of detection
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek
UCL = upper confidence limit
UPIC = Upper Peach Island Creek
-- = not applicable
σ = standard deviation of the natural-log transformed detected values

UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

(1) Same distribution and UCL value.
(4) Alternative distribution selected; Shapiro-Wilks and Lilliefors test for lognormality in R reported p-values <0.05.
(7) Maximum selected; less than 4 detected values.
(9) Kaplan-Meier mean calculation corrected for consistency with source document Bechtel Jacobs (2000) to address cases where the minimum concentration is not detected.
(10) Selected appropriate UCL method based on Table 16 of ProUCL 4.0 users guide.
(11) Alternative distribution selected; standard deviation of log transformed detected values >1.0 indicates potentially skewed data.

Source:
Bechtel Jacobs (2000)

FIGURES

Media:
Surface Sediment (0−15 cm)

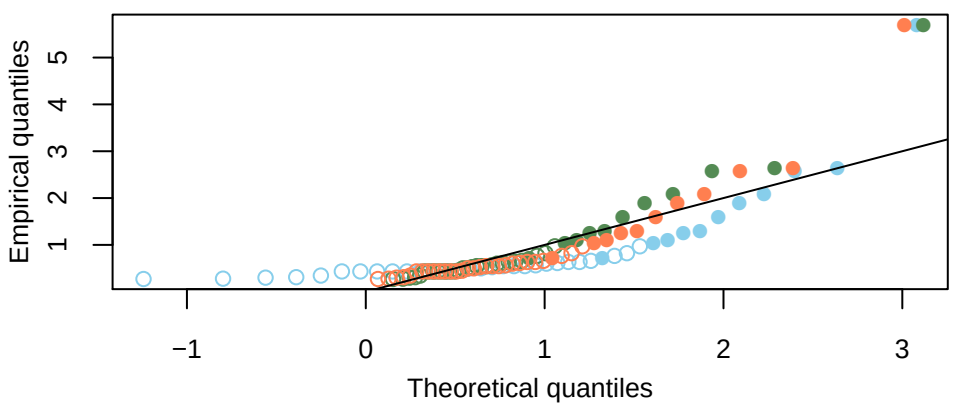
Exposure Unit:
UBC

Chemical (mg/kg):
Antimony

Legend

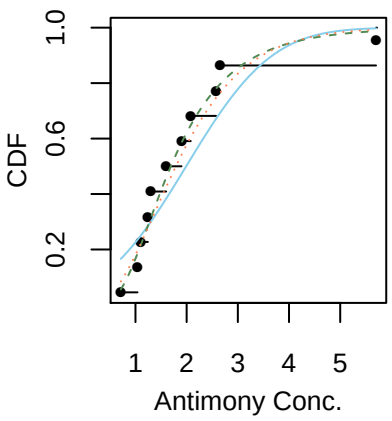
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

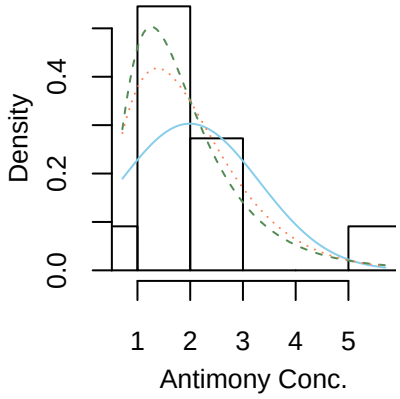


ECDF, Histogram & Q−Q (Detects Only)

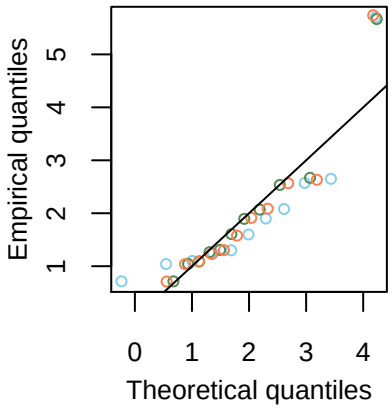
ECDF



Histogram



Q−Q



N = 40	FOD = 28%	Min (detect) = 0.71 J	Kaplan Meier Mean = 1
N (detect) = 11	SD (log detect) = 0.57	Max (detect) = 5 J	Kaplan Meier SD = 0.91

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.6e−07	–	–	–	–	114.63	118.008
Lognormal	0.0017	0.0034	–	–	–	–	56.0861	59.4638
Gamma	–	–	0.2212	0.144	2.517	0.779	69.3726	72.7504

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0033	0.12	–	–	–	–	41.2676	42.0634
Lognormal	0.79	0.85	–	–	–	–	33.3455	34.1413
Gamma	–	–	0.1537	0.27	0.3975	0.736	35.0312	35.8269

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Antimony

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Figure **1**

Media:
Surface Sediment (0−15 cm)

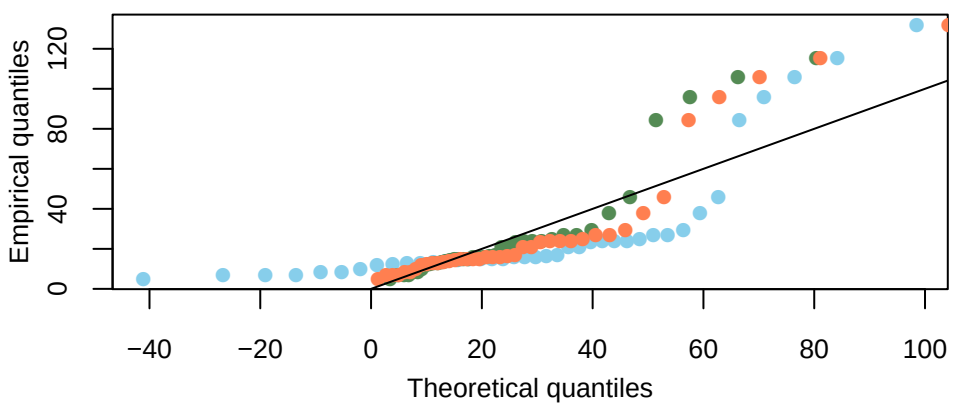
Exposure Unit:
UBC

Chemical (mg/kg):
Arsenic

Legend

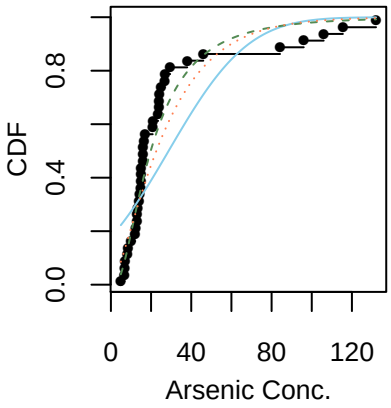
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

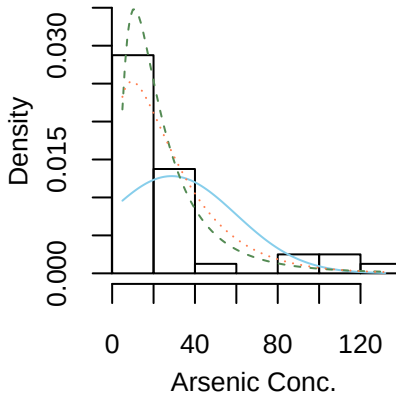


ECDF, Histogram & Q−Q (Detects Only)

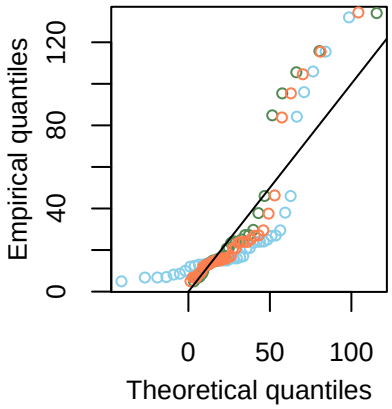
ECDF



Histogram



Q−Q



N = 40	FOD = 100%	Min (detect) = 4	Arithmetic Mean = 29
N (detect) = 40	SD (log detect) = 0.8	Max (detect) = 130 J	Arithmetic SD = 32

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.9e−11	–	–	–	–	392.599	395.977
Lognormal	0.0053	0.022	–	–	–	–	337.217	340.594
Gamma	–	–	0.2198	0.144	2.705	0.779	349.167	352.545

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Arsenic

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Figure **2**

Media:
Surface Sediment (0−15 cm)

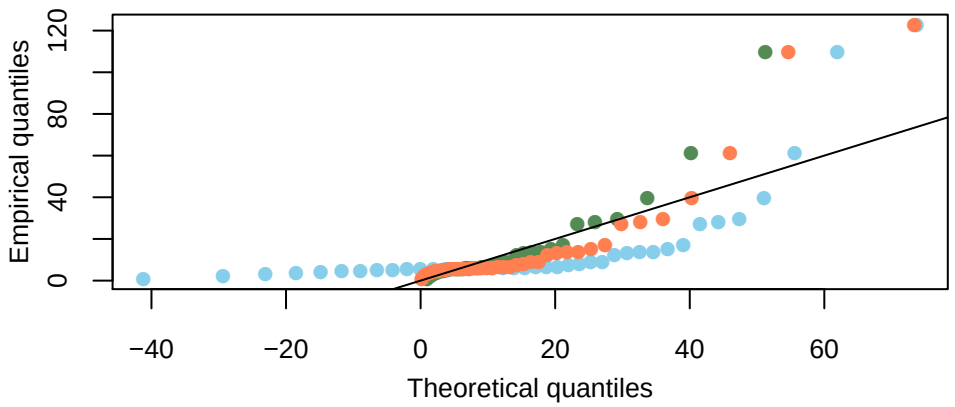
Exposure Unit:
UBC

Chemical (mg/kg):
Cadmium

Legend

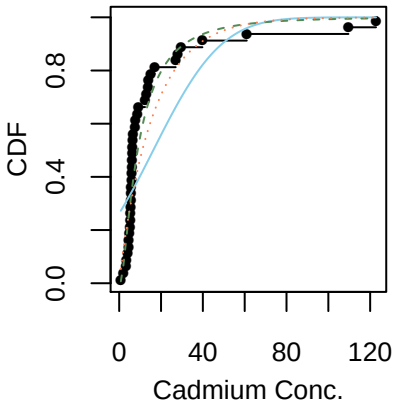
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

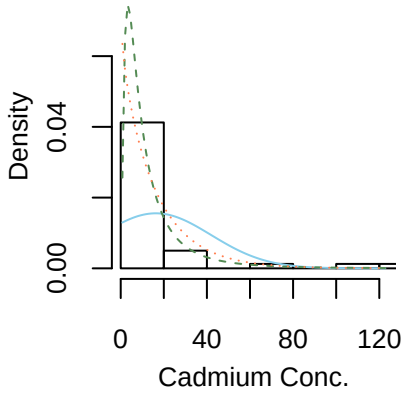


ECDF, Histogram & Q−Q (Detects Only)

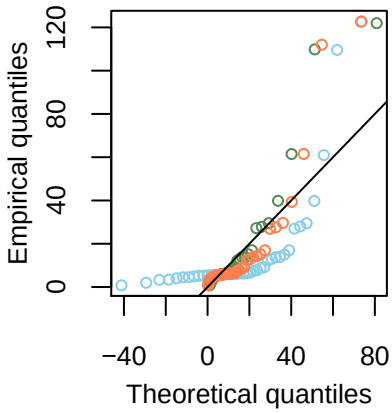
ECDF



Histogram



Q−Q



N = 40	FOD = 100%	Min (detect) = 0.78 J	Arithmetic Mean = 16
N (detect) = 40	SD (log detect) = 1	Max (detect) = 120 J	Arithmetic SD = 26

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.7e−11	–	–	–	–	377.043	380.42
Lognormal	0.0035	0.001	–	–	–	–	290.703	294.081
Gamma	–	–	0.2374	0.148	3.342	0.813	307.147	310.524

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Cadmium

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Figure **3**

Media:
Surface Sediment (0−15 cm)

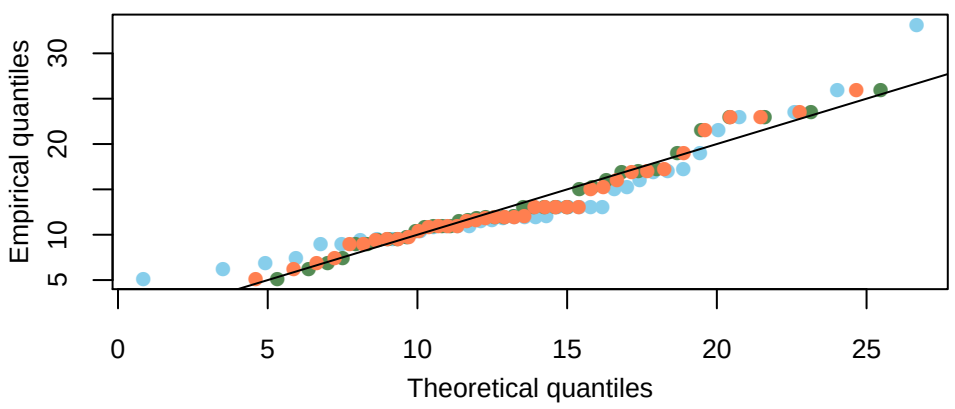
Exposure Unit:
UBC

Chemical (mg/kg):
Cobalt

Legend

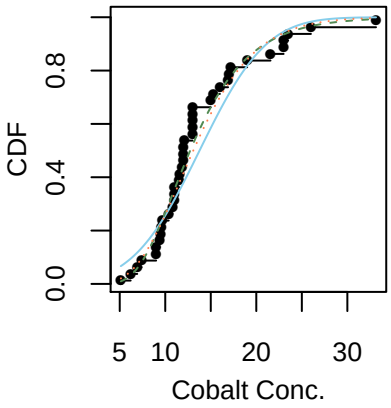
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

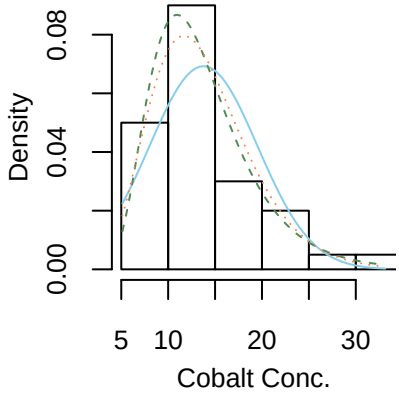


ECDF, Histogram & Q−Q (Detects Only)

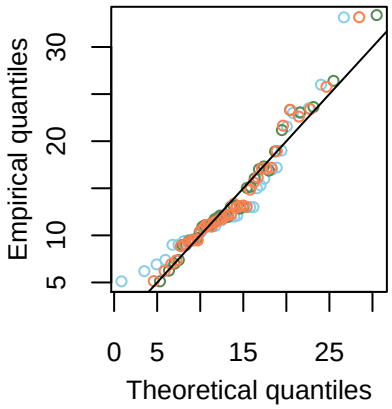
ECDF



Histogram



Q−Q



N = 40	FOD = 100%	Min (detect) = 5 J	Arithmetic Mean = 14
N (detect) = 40	SD (log detect) = 0.39	Max (detect) = 33 J	Arithmetic SD = 5

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00083	1.7e−05	–	–	–	–	257.611	260.989
Lognormal	0.59	0.018	–	–	–	–	245.624	249.002
Gamma	–	–	0.1809	0.14	0.7342	0.751	247.655	251.033

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Cobalt

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Figure **4**

Media:
Surface Sediment (0−15 cm)

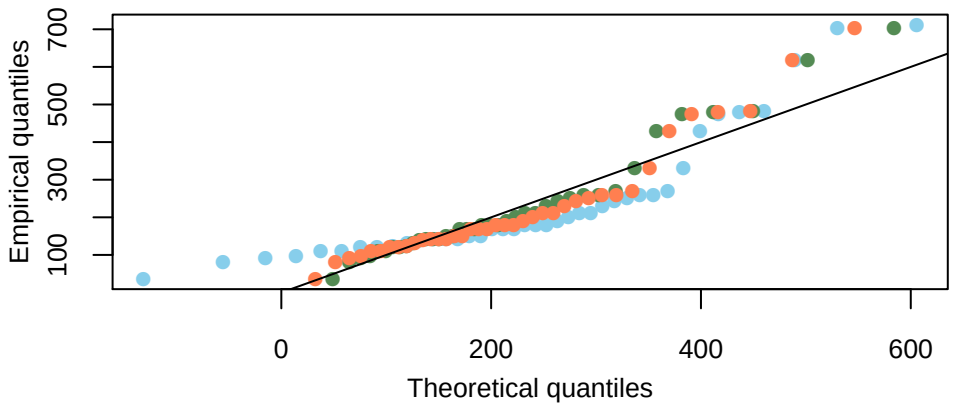
Exposure Unit:
UBC

Chemical (mg/kg):
Copper

Legend

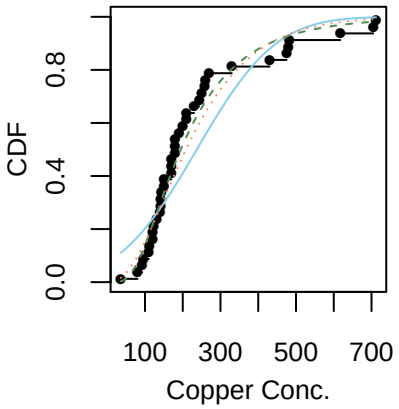
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

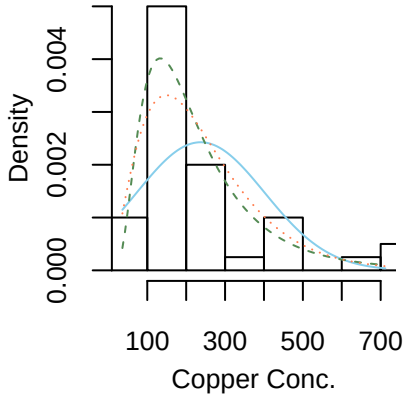


ECDF, Histogram & Q−Q (Detects Only)

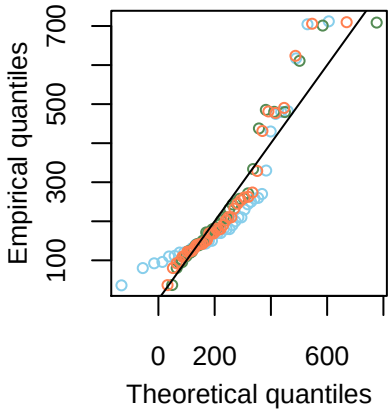
ECDF



Histogram



Q−Q



N = 40	FOD = 100%	Min (detect) = 36 J	Arithmetic Mean = 240
N (detect) = 40	SD (log detect) = 0.62	Max (detect) = 710 J	Arithmetic SD = 170

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	3.2e−05	–	–	–	–	525.719	529.097
Lognormal	0.15	0.36	–	–	–	–	500.61	503.988
Gamma	–	–	0.1458	0.141	1.253	0.759	504.517	507.894

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Copper

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Figure **5**

Media:
Surface Sediment (0−15 cm)

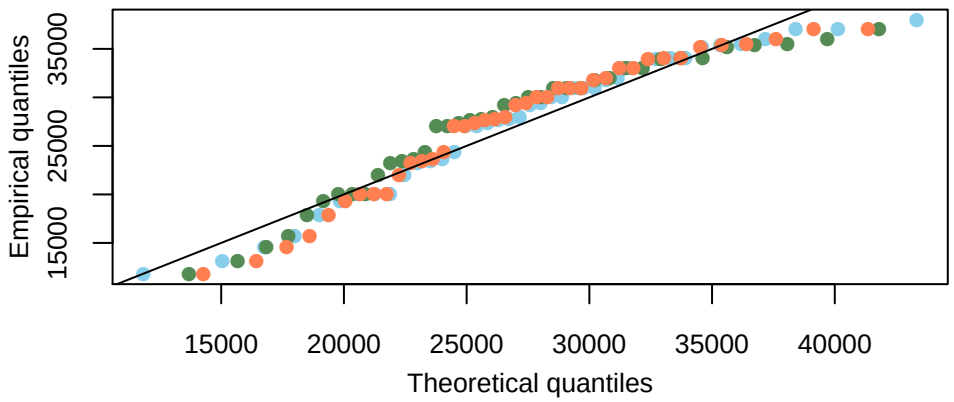
Exposure Unit:
UBC

Chemical (mg/kg):
Iron

Legend

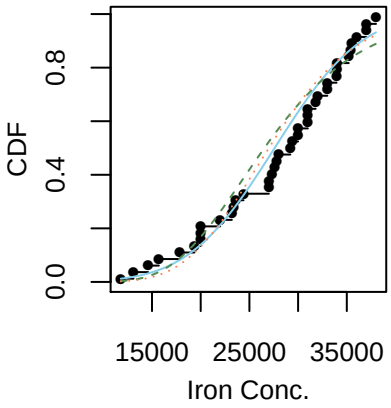
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

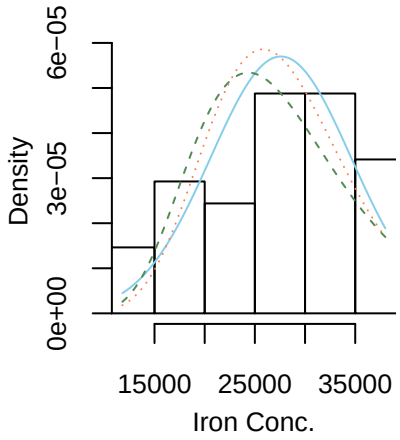


ECDF, Histogram & Q−Q (Detects Only)

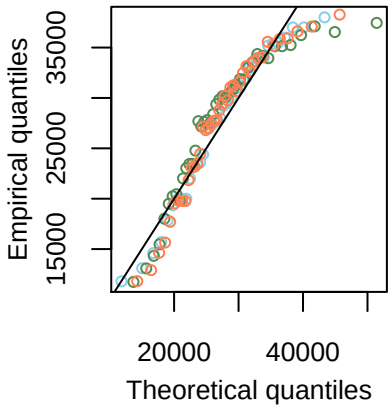
ECDF



Histogram



Q−Q



N = 41	FOD = 100%	Min (detect) = 12,000	Arithmetic Mean = 28,000
N (detect) = 41	SD (log detect) = 0.3	Max (detect) = 38,000 J	Arithmetic SD = 7,100

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.051	0.11	–	–	–	–	846.343	849.771
Lognormal	0.001	0.0016	–	–	–	–	855.223	858.65
Gamma	–	–	0.1585	0.139	1.317	0.748	852.129	855.557

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Iron

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Figure **6**

Media:
Surface Sediment (0−15 cm)

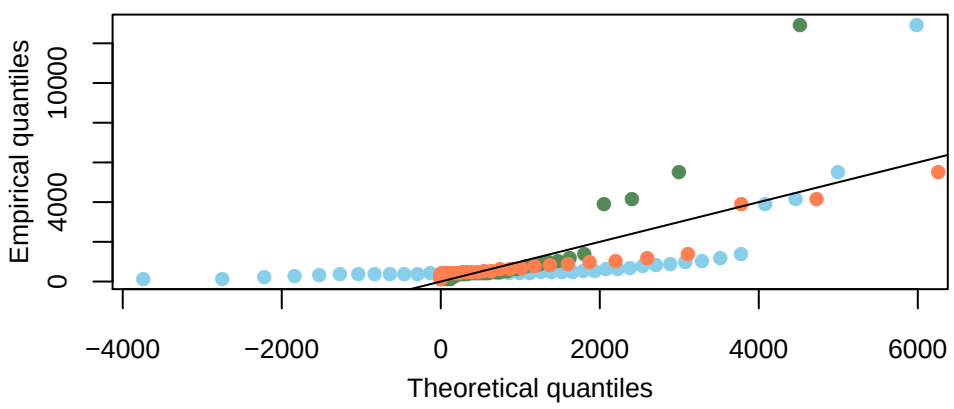
Exposure Unit:
UBC

Chemical (mg/kg):
Manganese

Legend

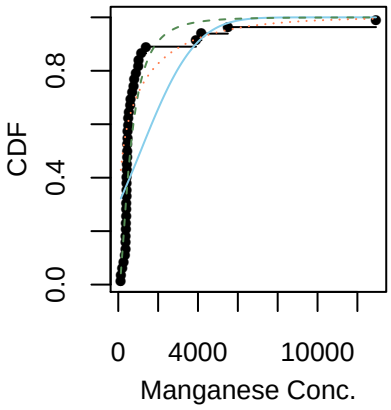
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

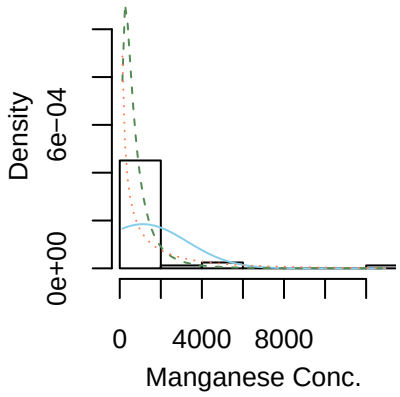


ECDF, Histogram & Q−Q (Detects Only)

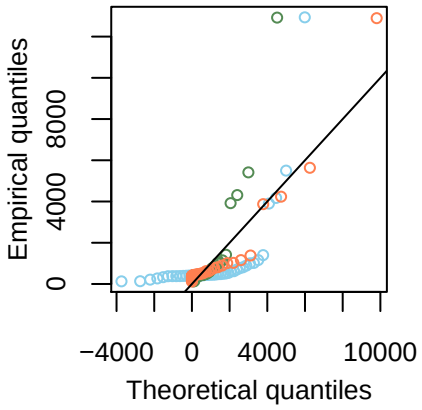
ECDF



Histogram



Q−Q



N = 41	FOD = 100%	Min (detect) = 130	Arithmetic Mean = 1,100
N (detect) = 41	SD (log detect) = 0.91	Max (detect) = 13,000 J	Arithmetic SD = 2,200

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.4e−16	–	–	–	–	749.964	753.391
Lognormal	2e−05	0.00014	–	–	–	–	636.104	639.532
Gamma	–	–	0.4512	0.1547	10.34	0.9096	692.517	695.944

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Manganese

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Figure **7**

Media:
Surface Sediment (0−15 cm)

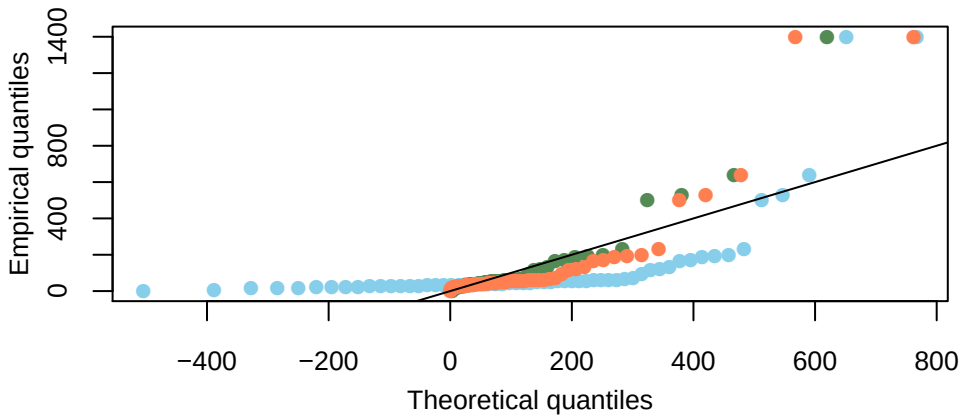
Exposure Unit:
UBC

Chemical (mg/kg):
Mercury

Legend

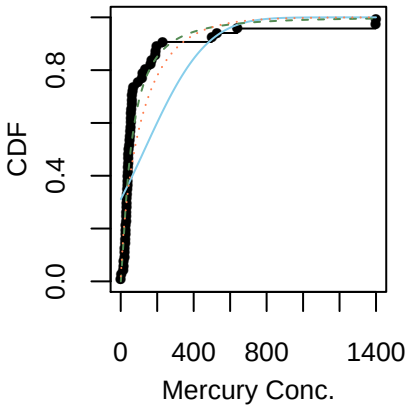
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

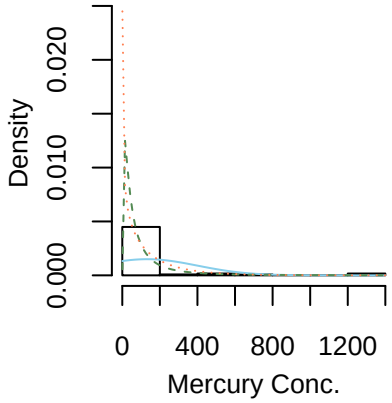


ECDF, Histogram & Q−Q (Detects Only)

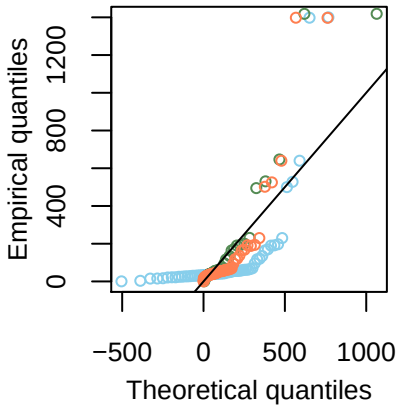
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 0.53 J	Arithmetic Mean = 130
N (detect) = 59	SD (log detect) = 1.3	Max (detect) = 1,400 J	Arithmetic SD = 270

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.5e−18	–	–	–	–	830.426	834.581
Lognormal	0.00011	2e−04	–	–	–	–	669.513	673.668
Gamma	–	–	0.2679	0.132	4.944	0.814	691.594	695.749

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Mercury

Media:
Surface Sediment (0−15 cm)

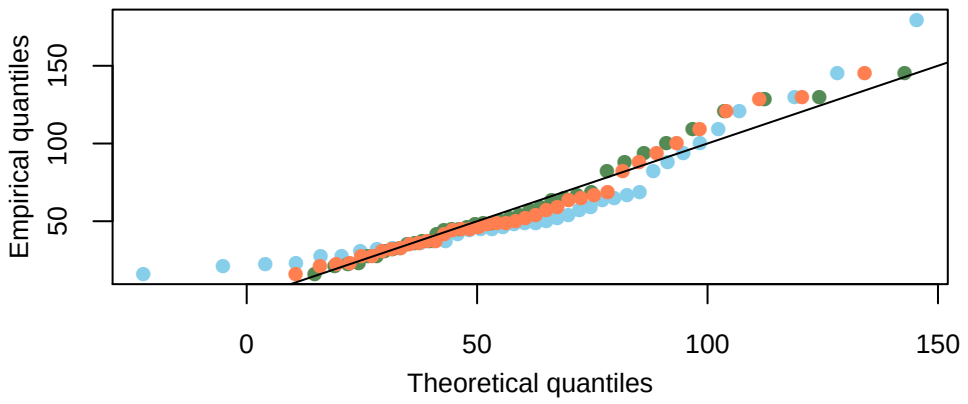
Exposure Unit:
UBC

Chemical (mg/kg):
Nickel

Legend

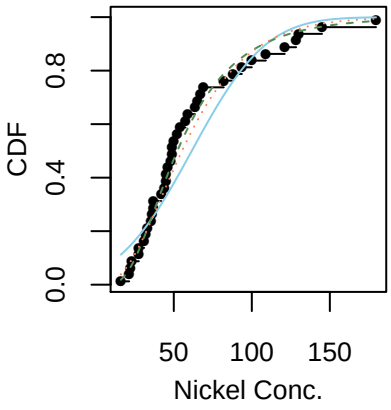
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

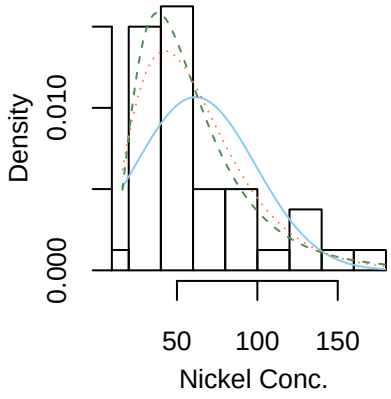


ECDF, Histogram & Q−Q (Detects Only)

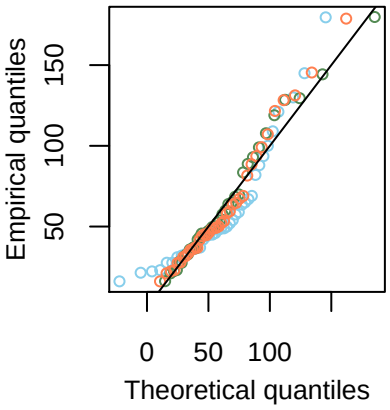
ECDF



Histogram



Q−Q



N = 40	FOD = 100%	Min (detect) = 16	Arithmetic Mean = 62
N (detect) = 40	SD (log detect) = 0.57	Max (detect) = 180 J	Arithmetic SD = 38

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00019	0.0025	–	–	–	–	407.32	410.698
Lognormal	0.79	0.74	–	–	–	–	388.29	391.668
Gamma	–	–	0.1174	0.141	0.6322	0.759	391.334	394.711

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Nickel

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Figure **9**

Media:
Surface Sediment (0−15 cm)

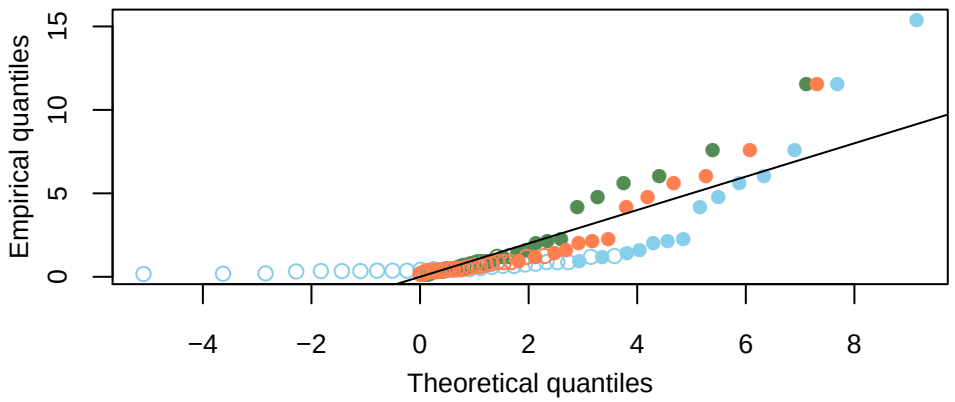
Exposure Unit:
UBC

Chemical (mg/kg):
Thallium

Legend

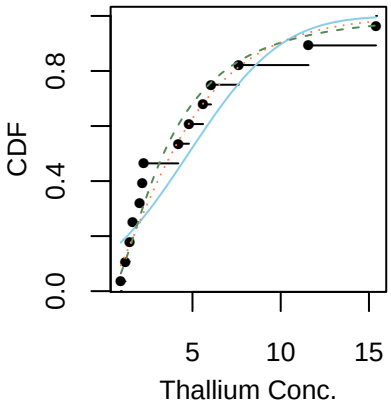
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

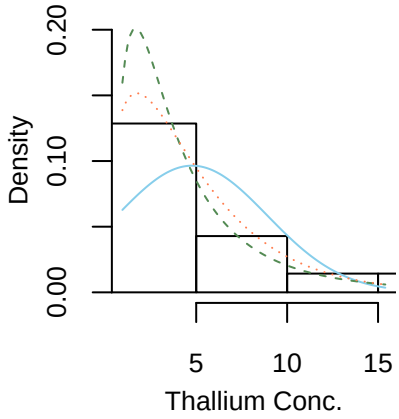


ECDF, Histogram & Q−Q (Detects Only)

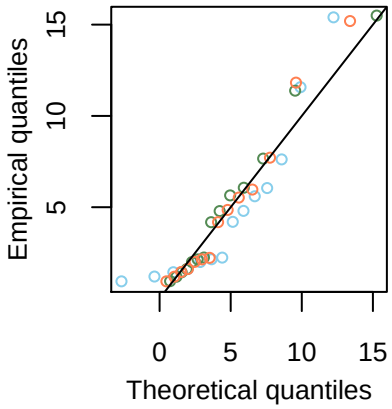
ECDF



Histogram



Q−Q



N = 40	FOD = 35%	Min (detect) = 0.94 J	Kaplan Meier Mean = 2
N (detect) = 14	SD (log detect) = 0.87	Max (detect) = 15 J	Kaplan Meier SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.6e−10	–	–	–	–	210	213.377
Lognormal	0.016	0.087	–	–	–	–	123.412	126.79
Gamma	–	–	0.2079	0.148	2.559	0.813	138.95	142.328

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0098	0.058	–	–	–	–	83.4783	84.7564
Lognormal	0.63	0.26	–	–	–	–	72.7765	74.0546
Gamma	–	–	0.2128	0.274	0.4143	0.748	74.2496	75.5277

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Thallium

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Figure **10**

Media:
Surface Sediment (0−15 cm)

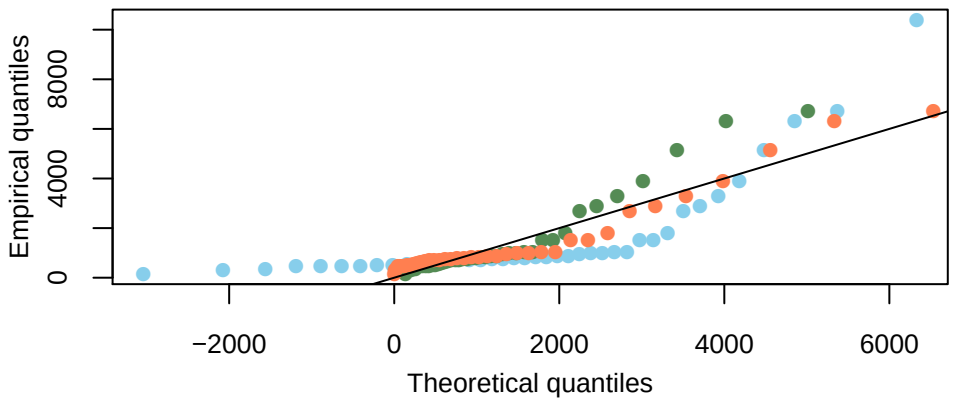
Exposure Unit:
UBC

Chemical (mg/kg):
Zinc

Legend

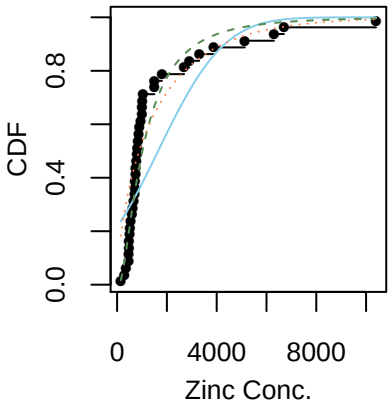
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

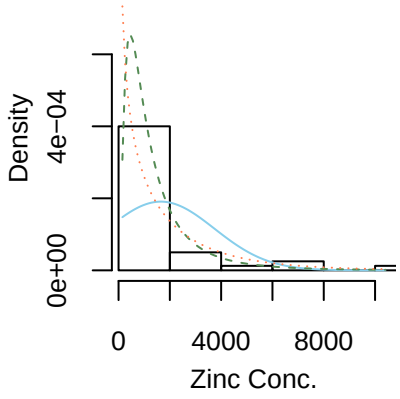


ECDF, Histogram & Q−Q (Detects Only)

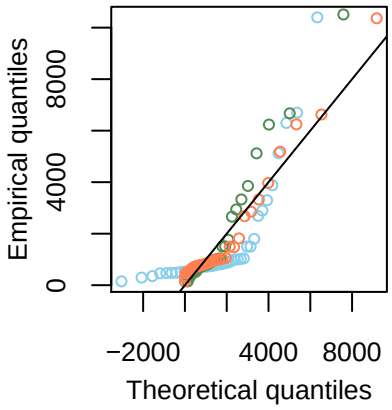
ECDF



Histogram



Q−Q



N = 40	FOD = 100%	Min (detect) = 150 J	Arithmetic Mean = 1,600
N (detect) = 40	SD (log detect) = 0.91	Max (detect) = 10,000 J	Arithmetic SD = 2,100

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.1e−12	–	–	–	–	729.127	732.505
Lognormal	0.007	7.7e−05	–	–	–	–	662.635	666.012
Gamma	–	–	0.278	0.148	3.569	0.813	684.535	687.913

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Zinc

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Figure **11**

Media:
Surface Sediment (0−15 cm)

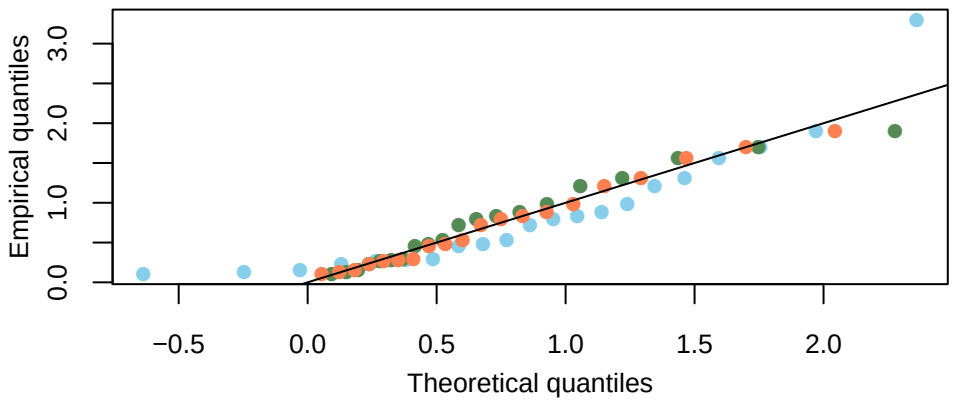
Exposure Unit:
UBC

Chemical (mg/kg):
Benz[a]anthracene

Legend

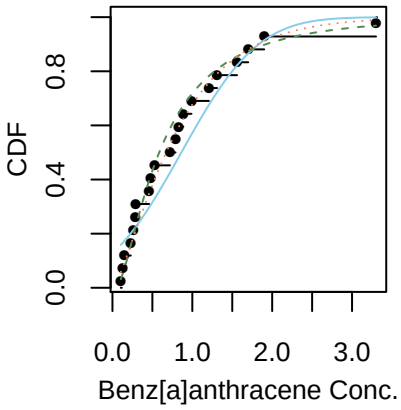
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

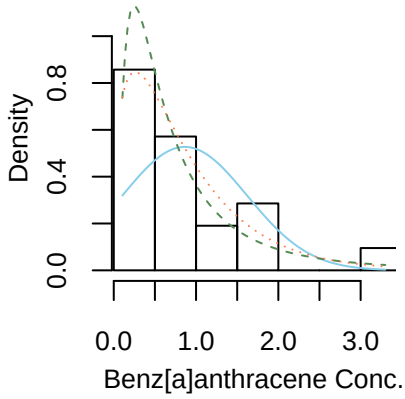


ECDF, Histogram & Q−Q (Detects Only)

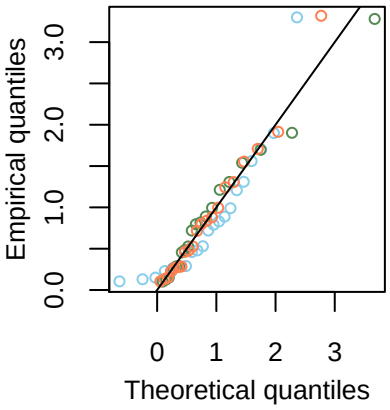
ECDF



Histogram



Q−Q



N = 21	FOD = 100%	Min (detect) = 0.11 J	Arithmetic Mean = 0.86
N (detect) = 21	SD (log detect) = 0.95	Max (detect) = 3 J	Arithmetic SD = 0.78

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0028	0.15	–	–	–	–	51.8919	53.9809
Lognormal	0.8	0.73	–	–	–	–	37.9332	40.0223
Gamma	–	–	0.1233	0.195	0.2041	0.77	38.3036	40.3927

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Benz[a]anthracene

Media:
Surface Sediment (0−15 cm)

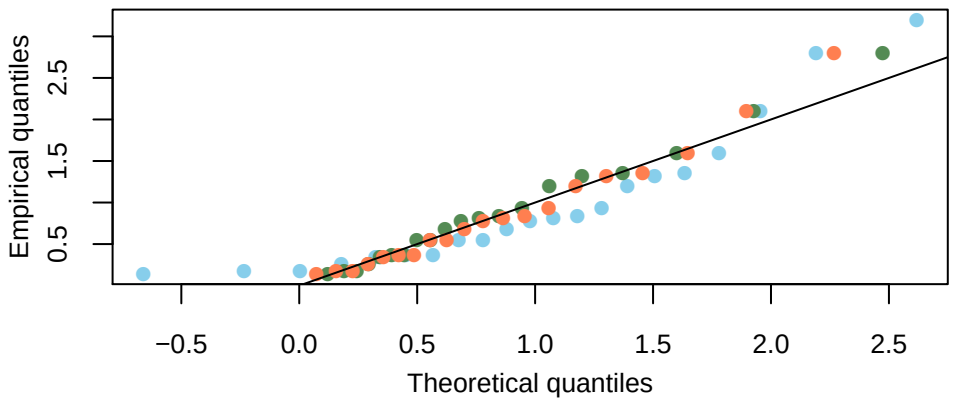
Exposure Unit:
UBC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

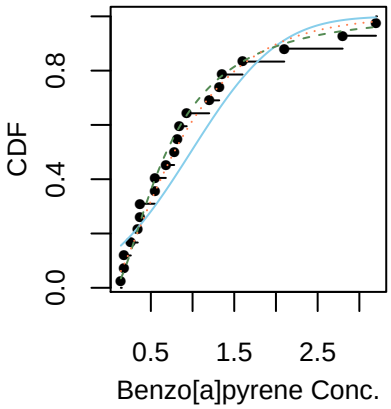
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

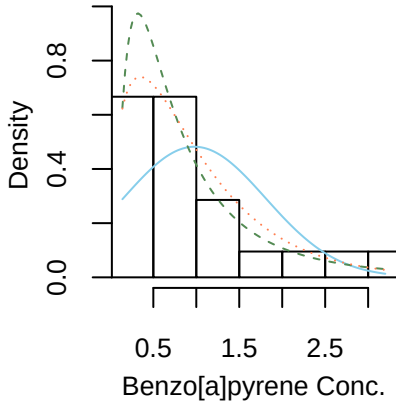


ECDF, Histogram & Q−Q (Detects Only)

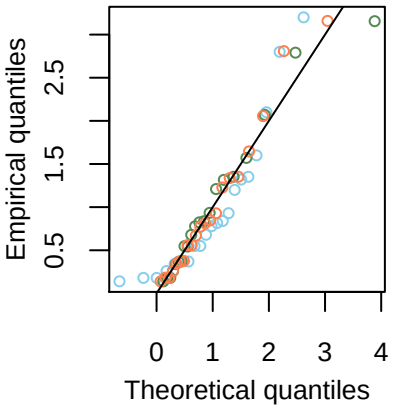
ECDF



Histogram



Q−Q



N = 21	FOD = 100%	Min (detect) = 0.14 J	Arithmetic Mean = 0.98
N (detect) = 21	SD (log detect) = 0.9	Max (detect) = 3 J	Arithmetic SD = 0.85

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0032	0.047	–	–	–	–	55.65	57.739
Lognormal	0.81	0.94	–	–	–	–	42.1697	44.2588
Gamma	–	–	0.109	0.195	0.2353	0.77	42.9531	45.0421

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Benzo[a]pyrene

Media:
Surface Sediment (0−15 cm)

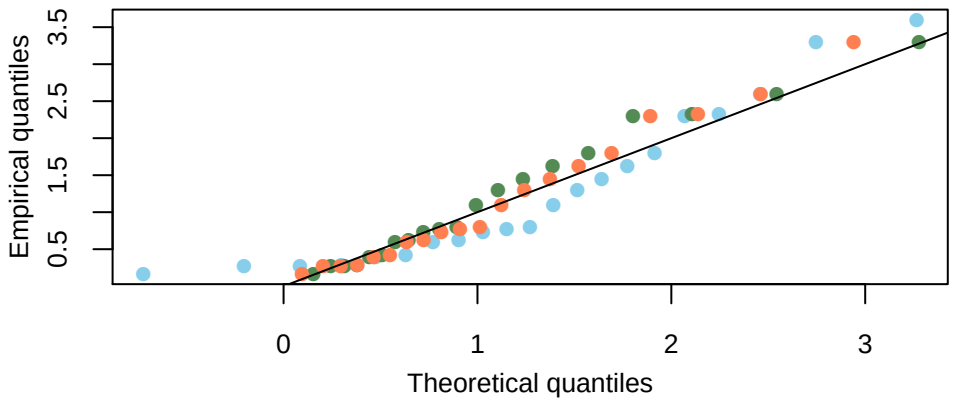
Exposure Unit:
UBC

Chemical (mg/kg):
Benzo[b]fluoranthene

Legend

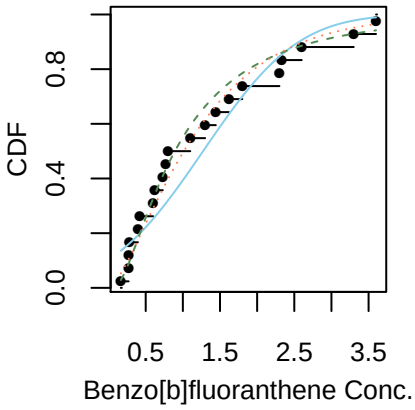
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

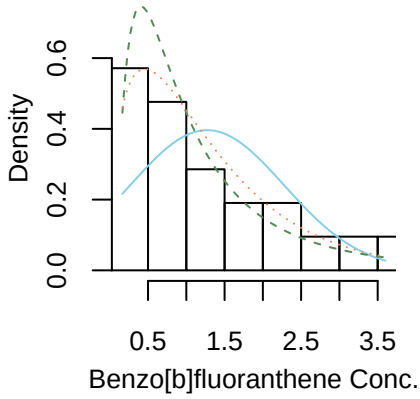


ECDF, Histogram & Q−Q (Detects Only)

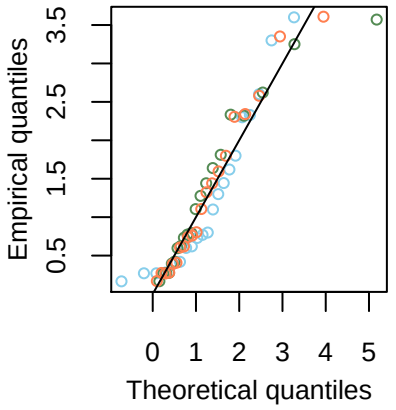
ECDF



Histogram



Q−Q



N = 21	FOD = 100%	Min (detect) = 0.17 J	Arithmetic Mean = 1
N (detect) = 21	SD (log detect) = 0.91	Max (detect) = 3 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.016	0.028	–	–	–	–	63.8849	65.9739
Lognormal	0.52	0.93	–	–	–	–	53.8208	55.9099
Gamma	–	–	0.1262	0.195	0.3129	0.77	53.8996	55.9886

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Benzo[b]fluoranthene

Media:
Surface Sediment (0−15 cm)

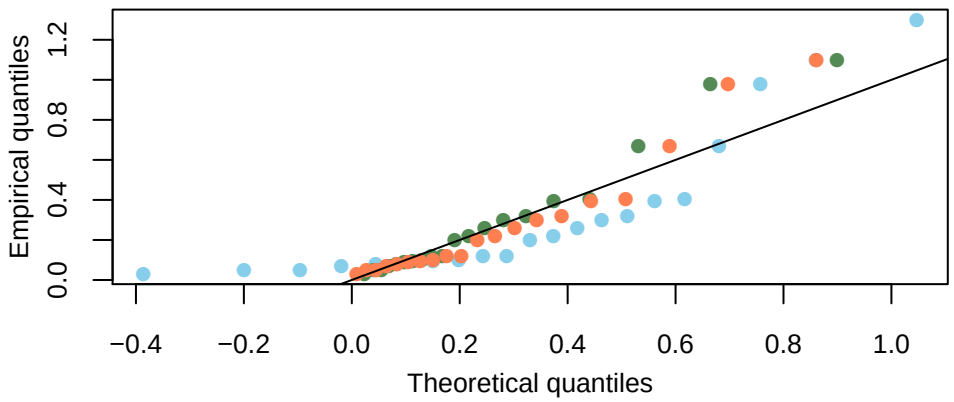
Exposure Unit:
UBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

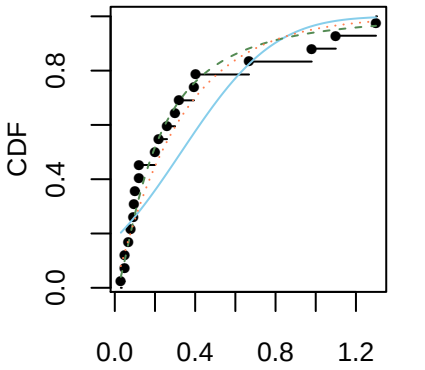
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

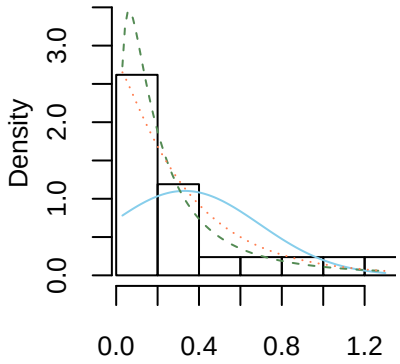


ECDF, Histogram & Q−Q (Detects Only)

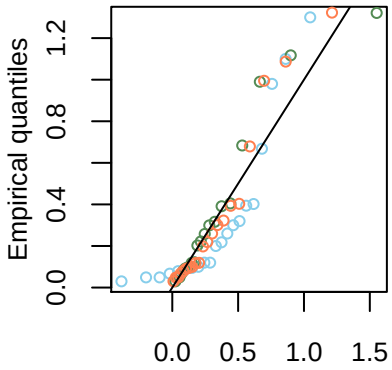
ECDF



Histogram



Q−Q



N = 21	FOD = 100%	Min (detect) = 0.03 J	Arithmetic Mean = 0.33
N (detect) = 21	SD (log detect) = 1.1	Max (detect) = 1 J	Arithmetic SD = 0.37

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00015	0.0041	–	–	–	–	20.8912	22.9802
Lognormal	0.59	0.33	–	–	–	–	−3.61219	−1.52314
Gamma	–	–	0.1809	0.195	0.6285	0.77	−0.511532	1.57751

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Dibenz[a,h]anthracene

Media:
Surface Sediment (0−15 cm)

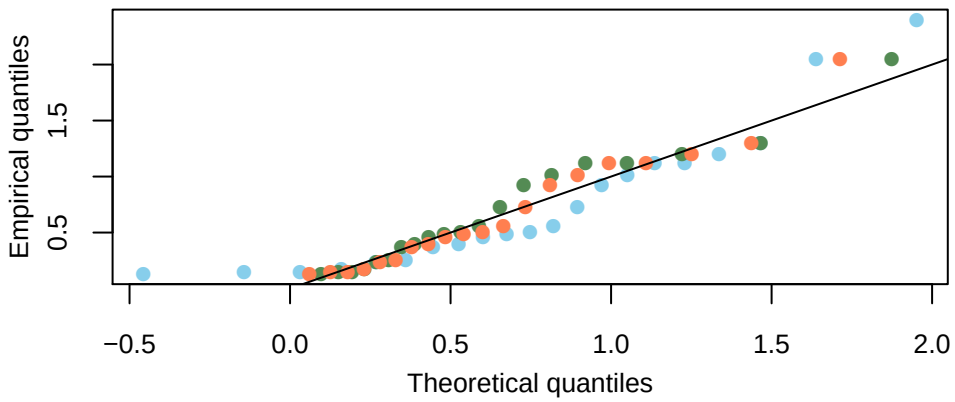
Exposure Unit:
UBC

Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

Legend

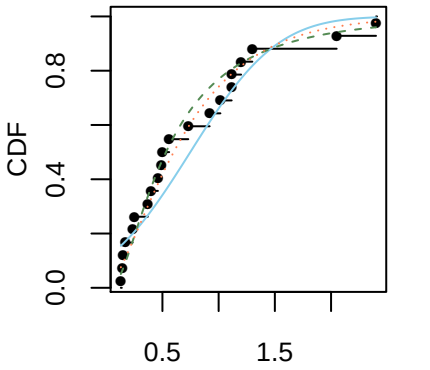
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

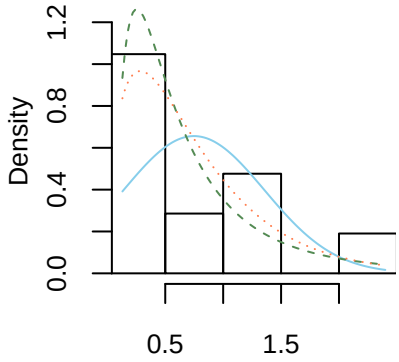


ECDF, Histogram & Q−Q (Detects Only)

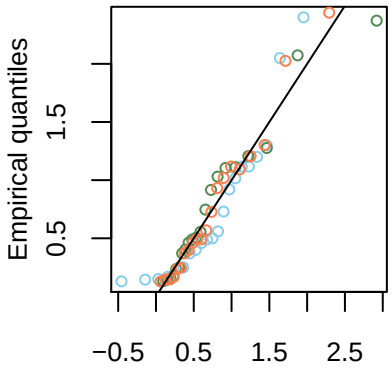
ECDF



Histogram



Q−Q



N = 21	FOD = 100%	Min (detect) = 0.13 J	Arithmetic Mean = 0.75
N (detect) = 21	SD (log detect) = 0.88	Max (detect) = 2 J	Arithmetic SD = 0.62

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0054	0.046	–	–	–	–	42.7036	44.7927
Lognormal	0.41	0.67	–	–	–	–	30.7179	32.8069
Gamma	–	–	0.1055	0.195	0.3314	0.77	31.3054	33.3945

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Indeno[1,2,3−cd]pyrene

Media:
Surface Sediment (0−15 cm)

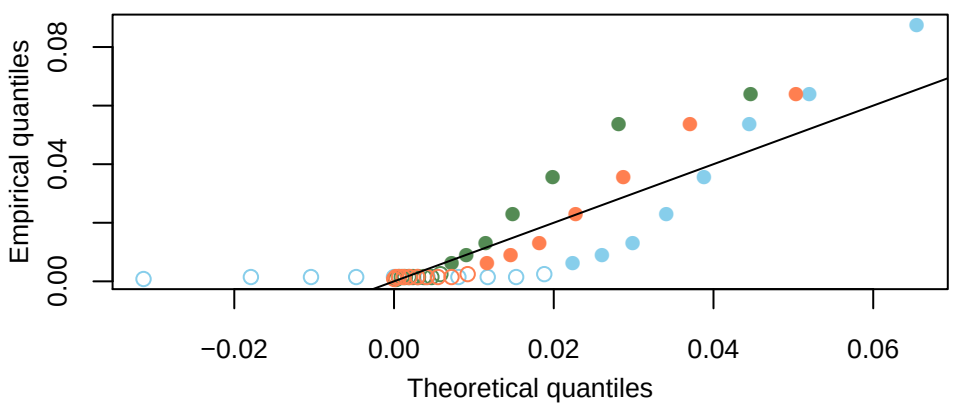
Exposure Unit:
UBC

Chemical (mg/kg):
Aldrin

Legend

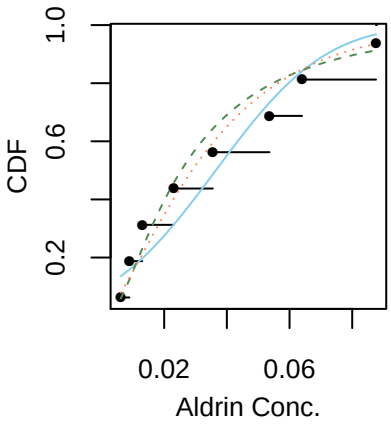
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

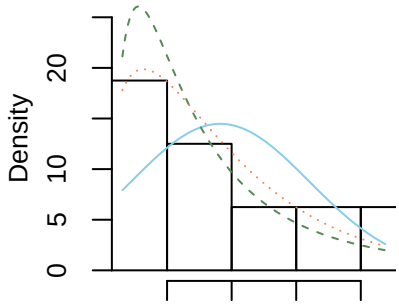


ECDF, Histogram & Q−Q (Detects Only)

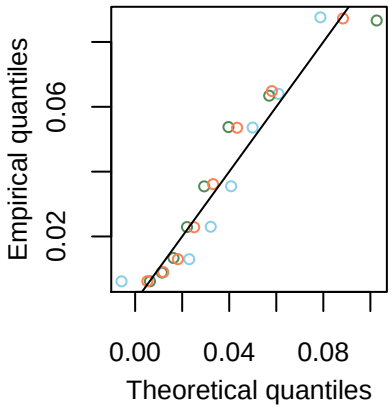
ECDF



Histogram



Q−Q



N = 18	FOD = 44%	Min (detect) = 0.0062 J	Kaplan Meier Mean = 0.016
N (detect) = 8	SD (log detect) = 0.97	Max (detect) = 0.088 J	Kaplan Meier SD = 0.026

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	5e−05	0.00031	–	–	–	–	−77.3059	−75.5251
Lognormal	0.004	0.00045	–	–	–	–	−118.313	−116.532
Gamma	–	–	0.2835	0.215	1.607	0.8	−112.882	−111.101

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.38	0.66	–	–	–	–	−30.7578	−30.5989
Lognormal	0.67	0.84	–	–	–	–	−33.5596	−33.4007
Gamma	–	–	0.1637	0.301	0.2416	0.736	−33.7616	−33.6028

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Aldrin

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Figure **17**

Media:
Surface Sediment (0−15 cm)

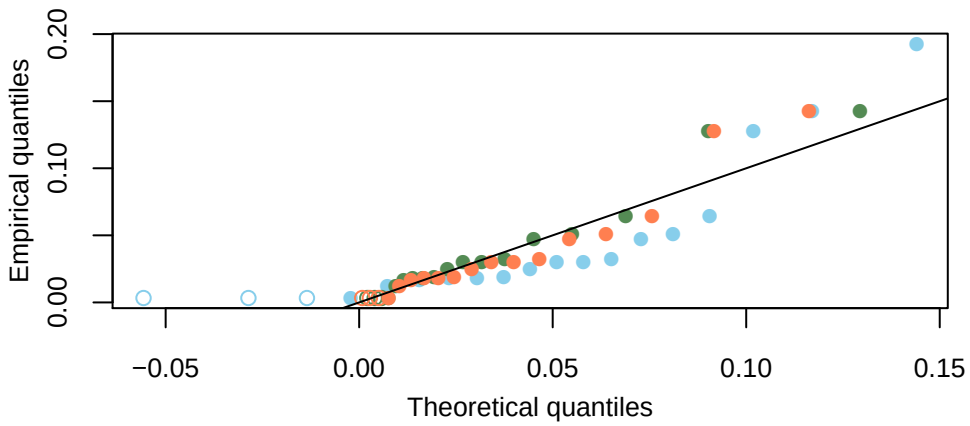
Exposure Unit:
UBC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

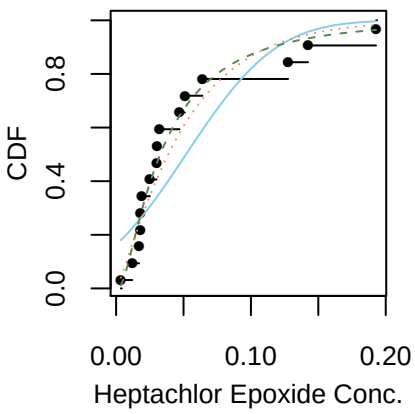
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

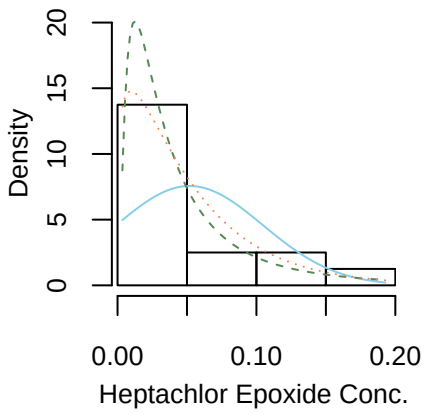


ECDF, Histogram & Q−Q (Detects Only)

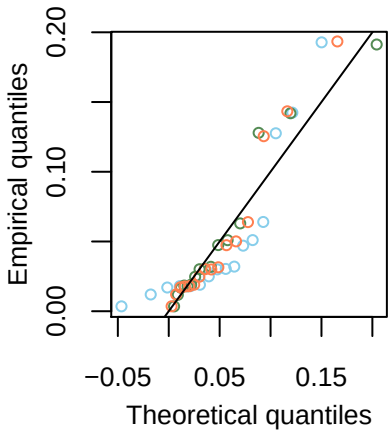
ECDF



Histogram



Q−Q



N = 19	FOD = 84%	Min (detect) = 0.0035 J	Kaplan Meier Mean = 0.044
N (detect) = 16	SD (log detect) = 1	Max (detect) = 0.19 J	Kaplan Meier SD = 0.052

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00016	0.00054	–	–	–	–	−54.7559	−52.867
Lognormal	0.17	0.36	–	–	–	–	−77.9283	−76.0394
Gamma	–	–	0.153	0.21	0.5121	0.803	−76.7303	−74.8414

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00074	0.0033	–	–	–	–	−44.7366	−43.1914
Lognormal	0.65	0.61	–	–	–	–	−60.5758	−59.0306
Gamma	–	–	0.1966	0.221	0.5998	0.763	−59.0883	−57.5432

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−Heptachlor Epoxide

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Figure **18**

Media:
Surface Sediment (0−15 cm)

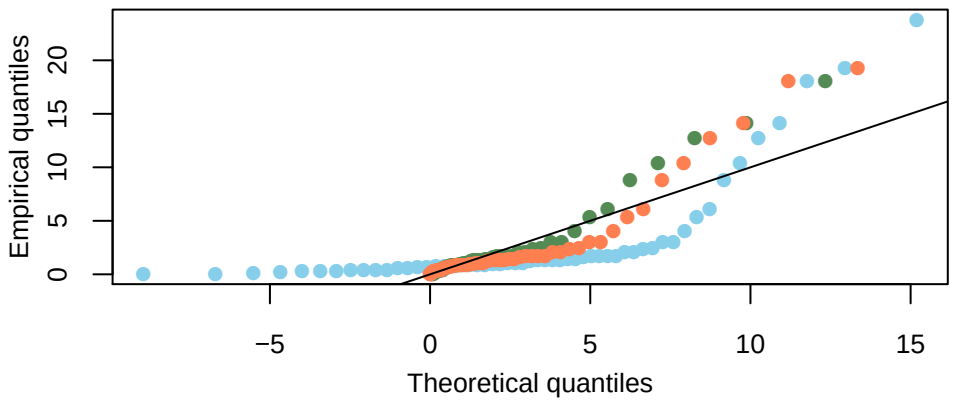
Exposure Unit:
UBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

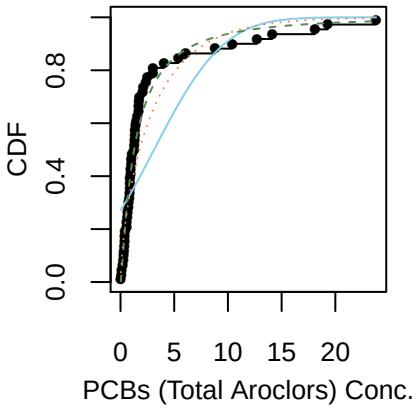
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

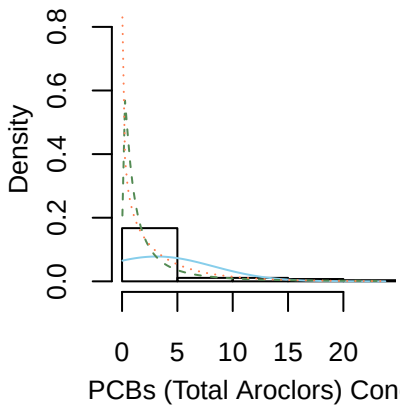


ECDF, Histogram & Q−Q (Detects Only)

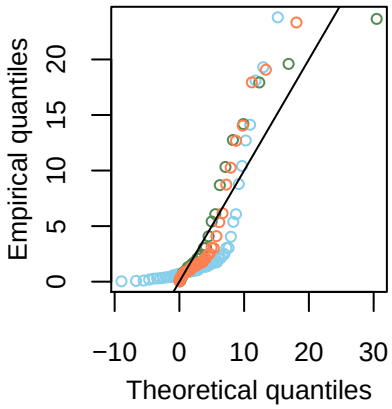
ECDF



Histogram



Q−Q



N = 55	FOD = 100%	Min (detect) = 0.03 J	Arithmetic Mean = 3
N (detect) = 55	SD (log detect) = 1.4	Max (detect) = 24 J	Arithmetic SD = 5

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	9.8e−17	–	–	–	–	339.521	343.536
Lognormal	0.15	0.067	–	–	–	–	218.804	222.819
Gamma	–	–	0.2128	0.132	2.719	0.814	232.632	236.647

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−PCBs (Total Aroclors)

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Figure **19**

Media:
Surface Sediment (0−15 cm)

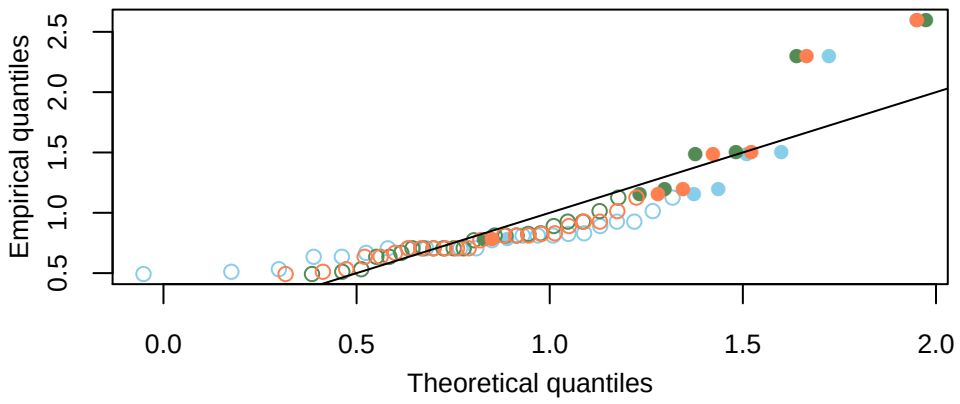
Exposure Unit:
MBC

Chemical (mg/kg):
Antimony

Legend

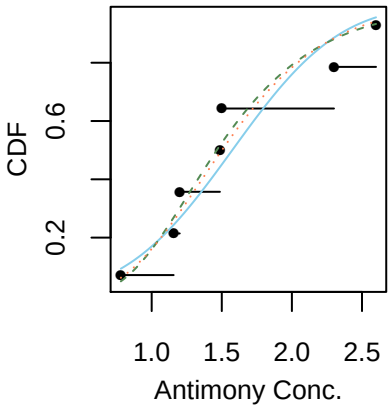
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

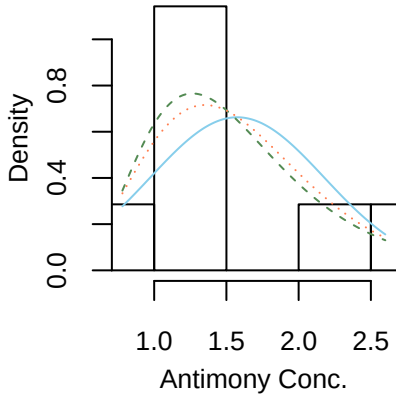


ECDF, Histogram & Q−Q (Detects Only)

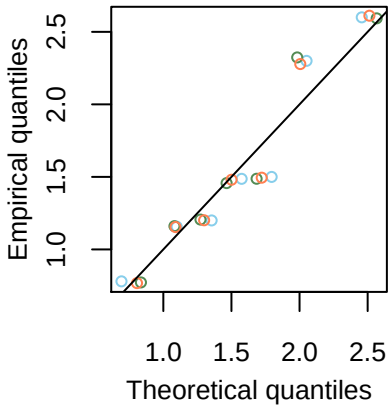
ECDF



Histogram



Q−Q



N = 33	FOD = 21%	Min (detect) = 0.78 J	Kaplan Meier Mean = 1
N (detect) = 7	SD (log detect) = 0.41	Max (detect) = 2 J	Kaplan Meier SD = 0.45

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.8e−05	–	–	–	–	43.8865	46.6889
Lognormal	0.0059	0.012	–	–	–	–	23.495	26.2974
Gamma	–	–	0.2059	0.16	1.617	0.746	28.8803	31.6827

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.42	0.16	–	–	–	–	16.7616	16.6534
Lognormal	0.77	0.61	–	–	–	–	15.7649	15.6567
Gamma	–	–	NA	NA	NA	NA	15.8745	15.7663

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Antimony

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Figure **20**

Media:
Surface Sediment (0−15 cm)

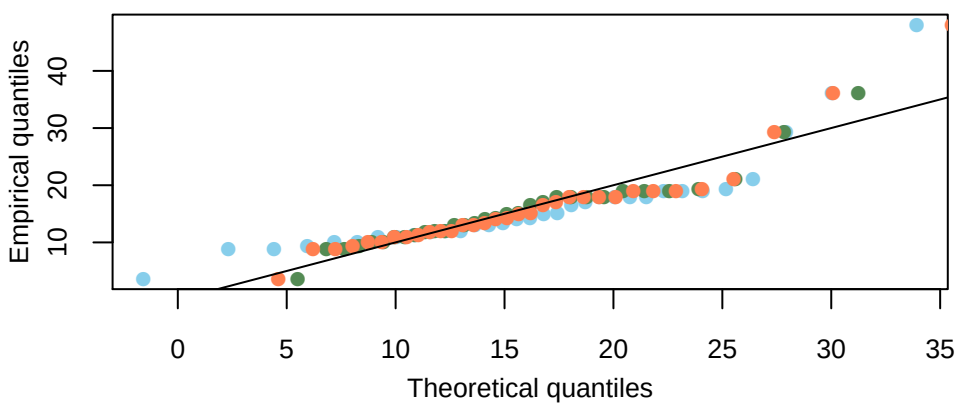
Exposure Unit:
MBC

Chemical (mg/kg):
Arsenic

Legend

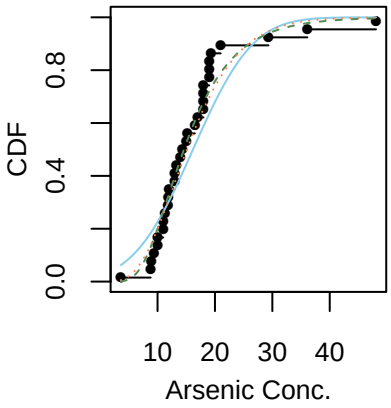
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

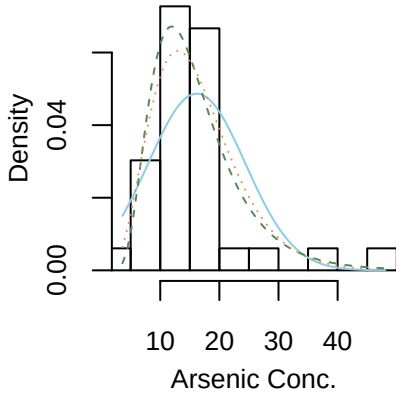


ECDF, Histogram & Q−Q (Detects Only)

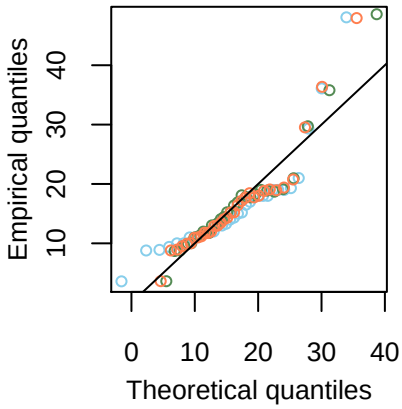
ECDF



Histogram



Q−Q



N = 33	FOD = 100%	Min (detect) = 3	Arithmetic Mean = 16
N (detect) = 33	SD (log detect) = 0.46	Max (detect) = 48 J	Arithmetic SD = 8

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−05	9.1e−05	–	–	–	–	236.488	239.481
Lognormal	0.045	0.059	–	–	–	–	221.912	224.905
Gamma	–	–	0.1685	0.16	0.9083	0.746	223.534	226.527

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Arsenic

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Figure **21**

Media:
Surface Sediment (0−15 cm)

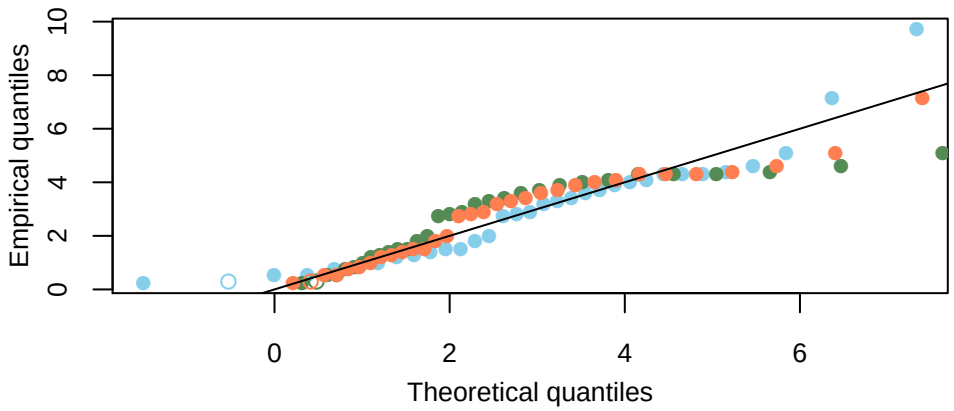
Exposure Unit:
MBC

Chemical (mg/kg):
Cadmium

Legend

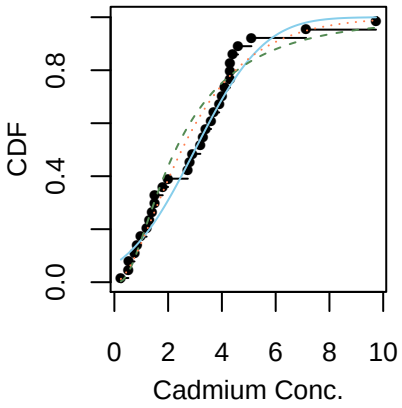
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

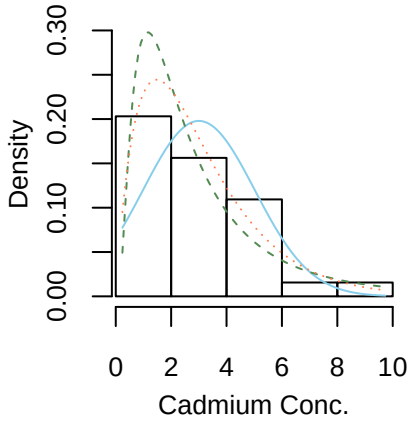


ECDF, Histogram & Q−Q (Detects Only)

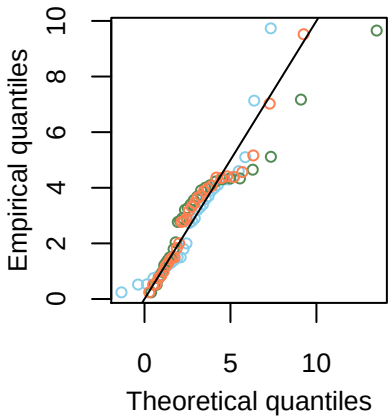
ECDF



Histogram



Q−Q



N = 33	FOD = 97%	Min (detect) = 0.24 J	Kaplan Meier Mean = 2
N (detect) = 32	SD (log detect) = 0.84	Max (detect) = 9 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.006	0.29	–	–	–	–	144.653	147.646
Lognormal	0.028	0.0068	–	–	–	–	139.928	142.921
Gamma	–	–	0.1425	0.165	0.6059	0.775	135.355	138.348

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0068	0.24	–	–	–	–	139.672	142.603
Lognormal	0.05	0.01	–	–	–	–	135.3	138.231
Gamma	–	–	0.1384	0.165	0.5775	0.775	131.26	134.191

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Cadmium

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Figure **22**

Media:
Surface Sediment (0−15 cm)

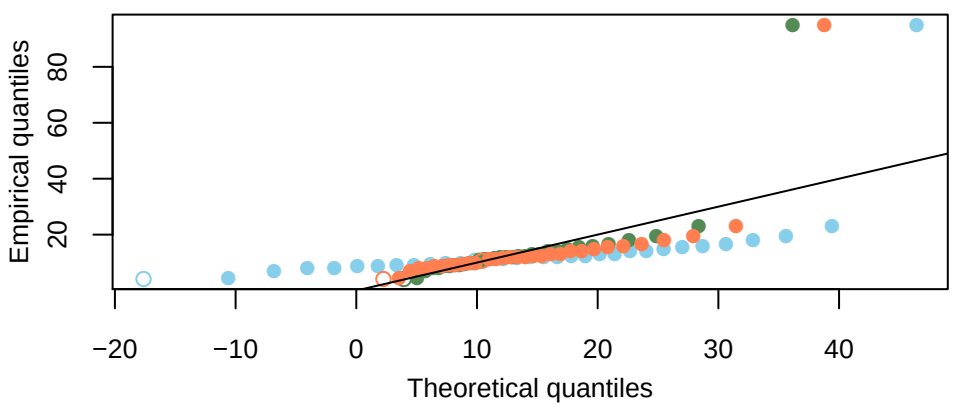
Exposure Unit:
MBC

Chemical (mg/kg):
Cobalt

Legend

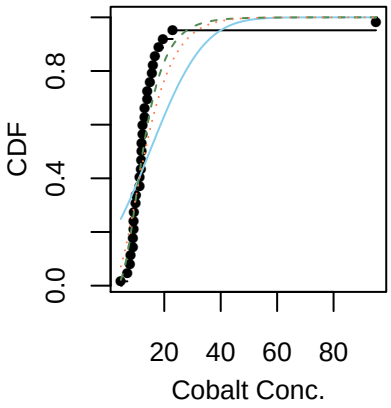
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

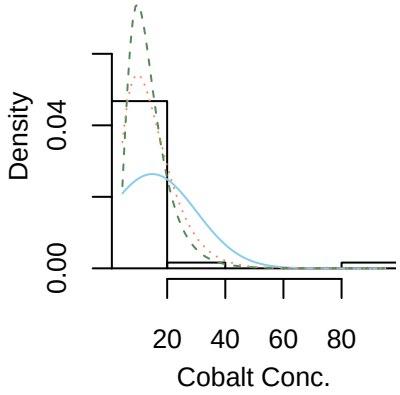


ECDF, Histogram & Q−Q (Detects Only)

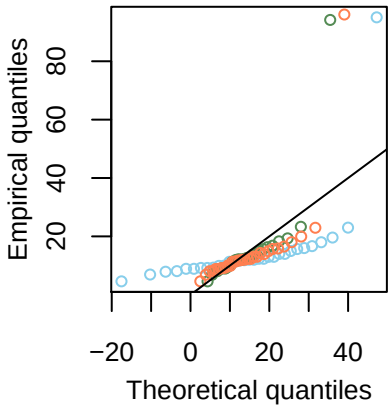
ECDF



Histogram



Q−Q



N = 33	FOD = 94%	Min (detect) = 4 J	Kaplan Meier Mean = 14
N (detect) = 31	SD (log detect) = 0.5	Max (detect) = 95 J	Kaplan Meier SD = 15

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.7e−09	–	–	–	–	275.452	278.445
Lognormal	0.00023	0.11	–	–	–	–	217.104	220.097
Gamma	–	–	0.2059	0.162	2.579	0.758	231.079	234.072

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.8e−09	–	–	–	–	260.392	263.26
Lognormal	0.00011	0.084	–	–	–	–	203.92	206.788
Gamma	–	–	0.2176	0.162	2.736	0.758	218.433	221.301

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Cobalt

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Figure **23**

Media:
Surface Sediment (0−15 cm)

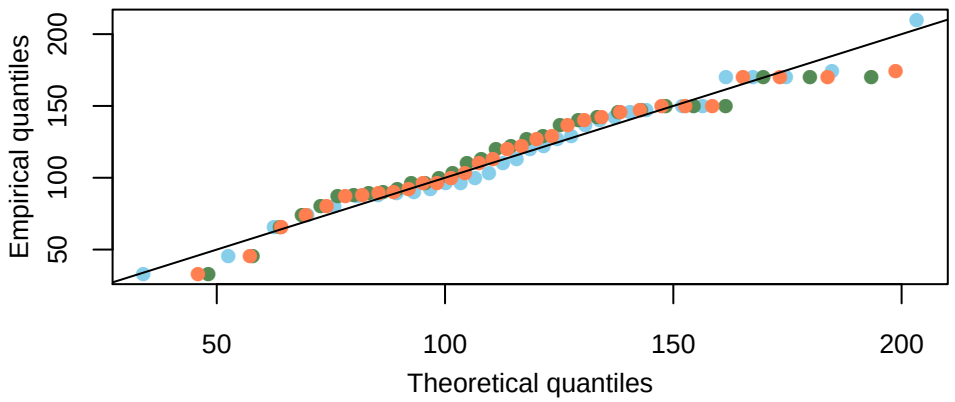
Exposure Unit:
MBC

Chemical (mg/kg):
Copper

Legend

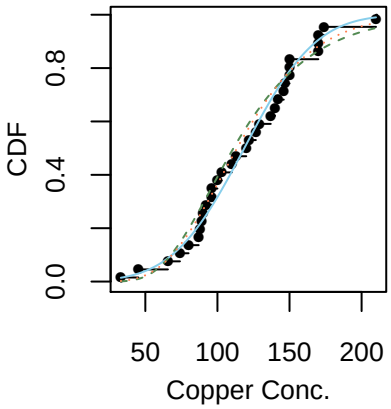
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

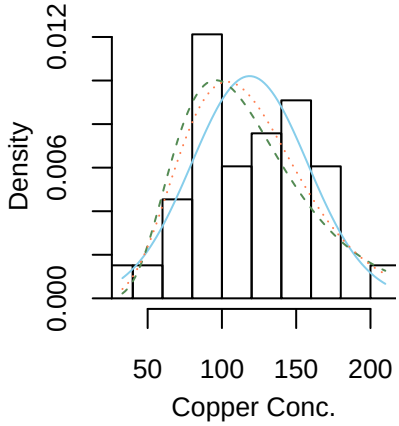


ECDF, Histogram & Q−Q (Detects Only)

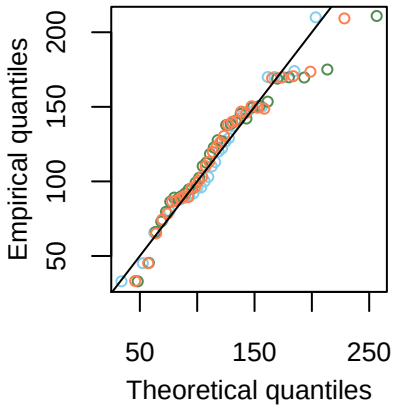
ECDF



Histogram



Q−Q



N = 33	FOD = 100%	Min (detect) = 33	Arithmetic Mean = 120
N (detect) = 33	SD (log detect) = 0.39	Max (detect) = 210 J	Arithmetic SD = 40

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.91	0.86	–	–	–	–	339.609	342.602
Lognormal	0.021	0.33	–	–	–	–	345.758	348.751
Gamma	–	–	0.09583	0.16	0.4237	0.746	342.126	345.119

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Copper

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Figure **24**

Media:
Surface Sediment (0−15 cm)

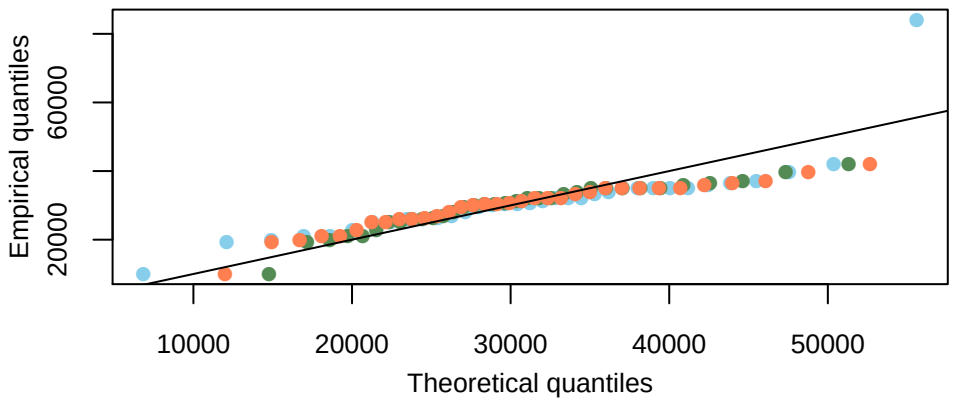
Exposure Unit:
MBC

Chemical (mg/kg):
Iron

Legend

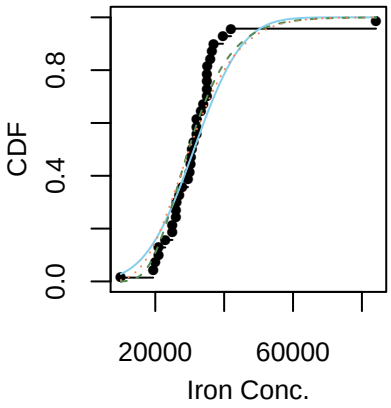
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

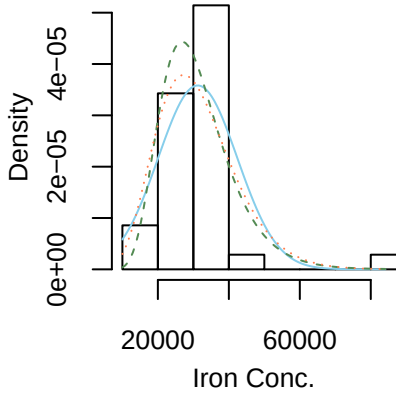


ECDF, Histogram & Q−Q (Detects Only)

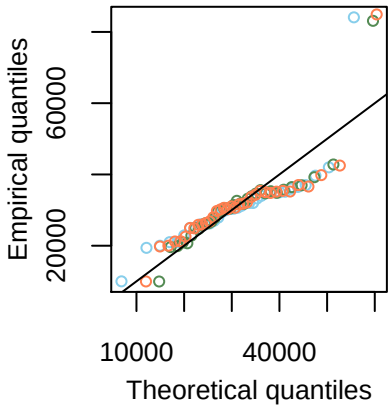
ECDF



Histogram



Q−Q



N = 35	FOD = 100%	Min (detect) = 10,000	Arithmetic Mean = 31,000
N (detect) = 35	SD (log detect) = 0.32	Max (detect) = 84,000 J	Arithmetic SD = 11,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00018	–	–	–	–	755.578	758.689
Lognormal	0.00087	0.021	–	–	–	–	744.157	747.267
Gamma	–	–	0.1864	0.149	1.7	0.75	746.007	749.117

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Iron

Media:
Surface Sediment (0−15 cm)

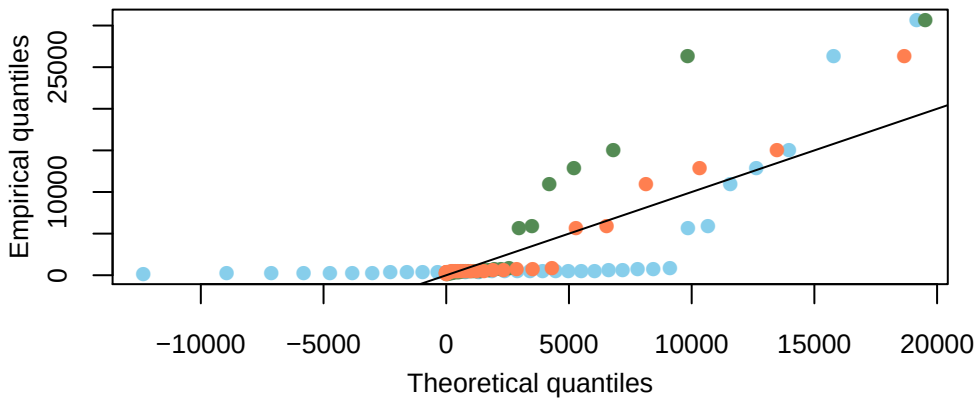
Exposure Unit:
MBC

Chemical (mg/kg):
Manganese

Legend

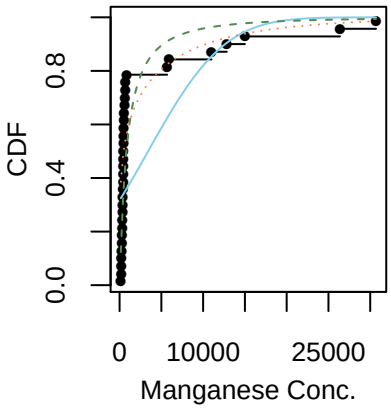
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

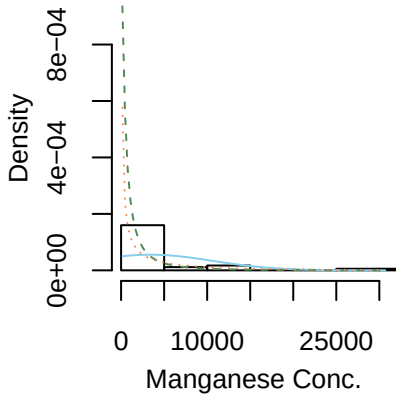


ECDF, Histogram & Q−Q (Detects Only)

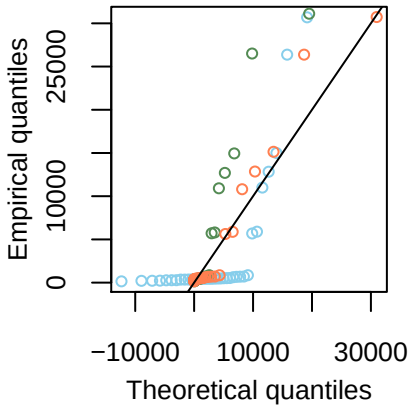
ECDF



Histogram



Q−Q



N = 35	FOD = 100%	Min (detect) = 150	Arithmetic Mean = 3,400
N (detect) = 35	SD (log detect) = 1.5	Max (detect) = 31,000 J	Arithmetic SD = 7,300

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.6e−19	–	–	–	–	725.018	728.129
Lognormal	0	4.1e−09	–	–	–	–	598.184	601.295
Gamma	–	–	0.3876	0.1651	5.841	0.9073	632.444	635.555

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Manganese

Media:
Surface Sediment (0−15 cm)

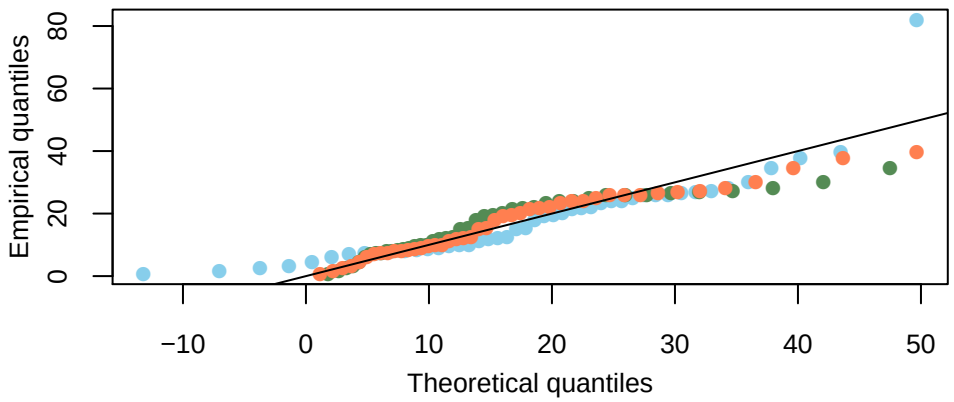
Exposure Unit:
MBC

Chemical (mg/kg):
Mercury

Legend

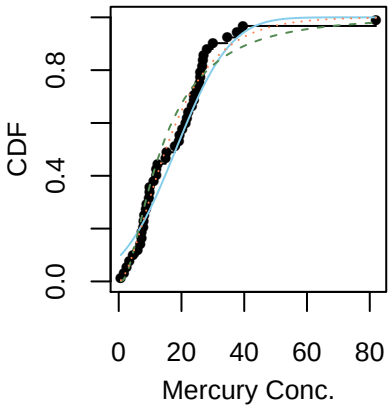
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

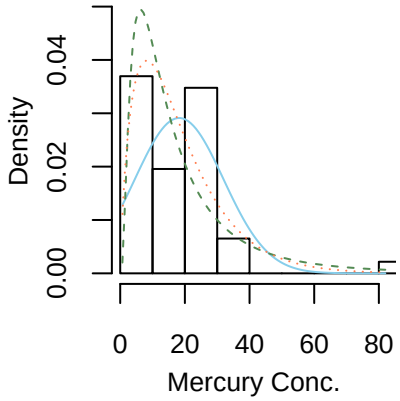


ECDF, Histogram & Q−Q (Detects Only)

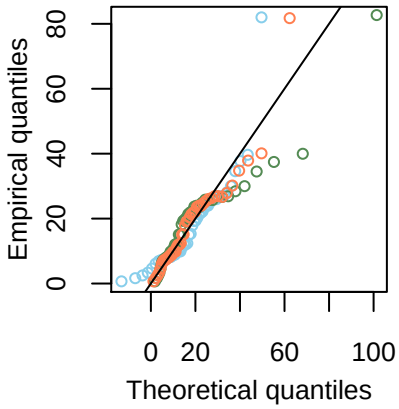
ECDF



Histogram



Q−Q



N = 46	FOD = 100%	Min (detect) = 0.68	Arithmetic Mean = 18
N (detect) = 46	SD (log detect) = 0.89	Max (detect) = 82 J	Arithmetic SD = 14

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.048	–	–	–	–	375.331	378.989
Lognormal	0.0042	0.039	–	–	–	–	362.051	365.709
Gamma	–	–	0.1048	0.136	0.566	0.777	354.963	358.62

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Mercury

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Figure **27**

Media:
Surface Sediment (0−15 cm)

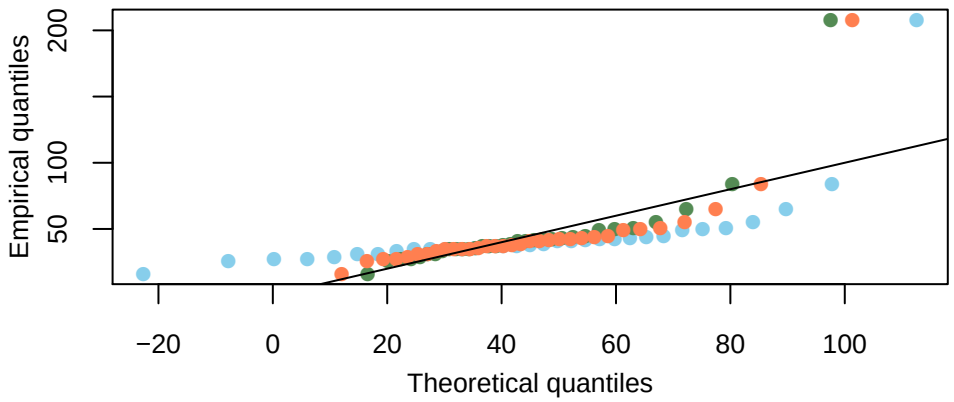
Exposure Unit:
MBC

Chemical (mg/kg):
Nickel

Legend

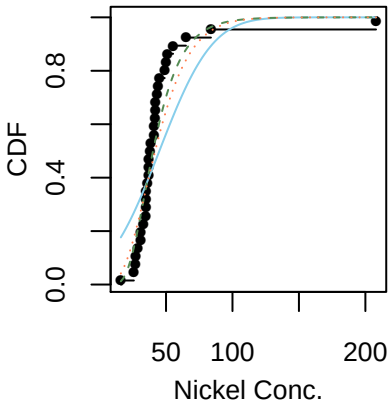
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

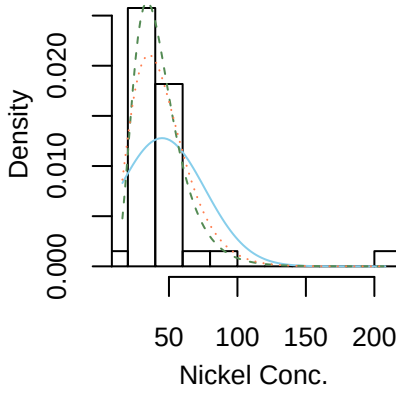


ECDF, Histogram & Q−Q (Detects Only)

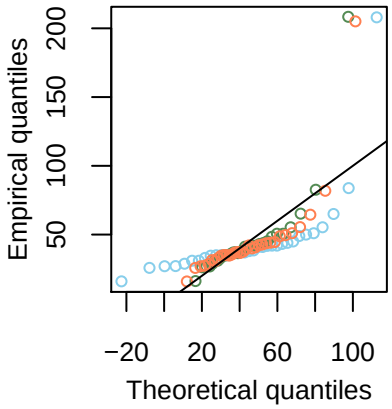
ECDF



Histogram



Q−Q



N = 33	FOD = 100%	Min (detect) = 16	Arithmetic Mean = 45
N (detect) = 33	SD (log detect) = 0.42	Max (detect) = 210 J	Arithmetic SD = 32

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.3e−08	–	–	–	–	324.741	327.734
Lognormal	0.00014	0.0071	–	–	–	–	282.472	285.465
Gamma	–	–	0.2262	0.162	2.56	0.758	293.209	296.202

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Nickel

Media:
Surface Sediment (0−15 cm)

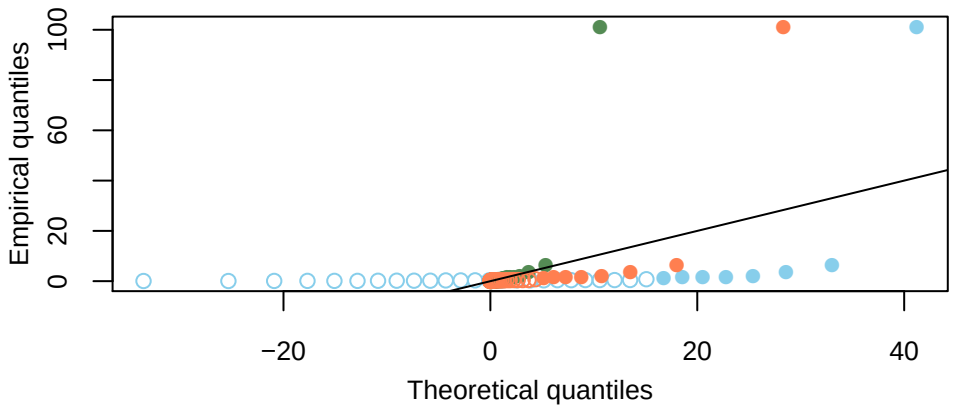
Exposure Unit:
MBC

Chemical (mg/kg):
Thallium

Legend

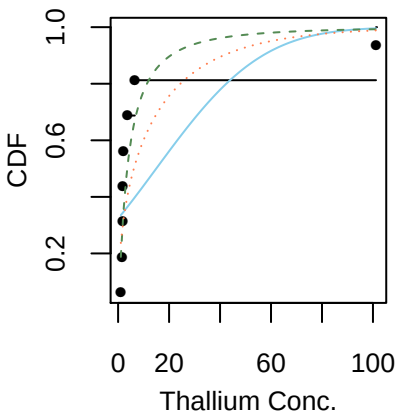
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

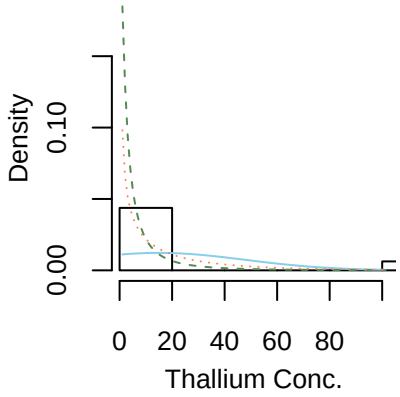


ECDF, Histogram & Q−Q (Detects Only)

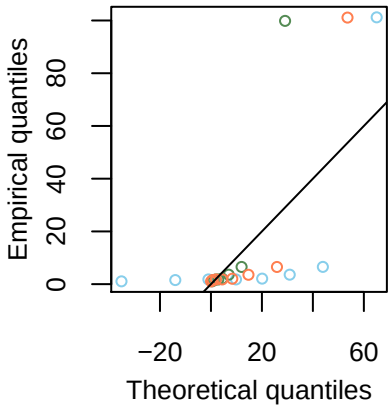
ECDF



Histogram



Q−Q



N = 33	FOD = 24%	Min (detect) = 1 J	Kaplan Meier Mean = 4
N (detect) = 8	SD (log detect) = 1.5	Max (detect) = 100 J	Kaplan Meier SD = 17

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.8e−19	–	–	–	–	285.626	288.619
Lognormal	0.00051	6.8e−05	–	–	–	–	72.0535	75.0465
Gamma	–	–	0.3417	0.1775	5.755	0.9039	111.849	114.842

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	8.7e−06	–	–	–	–	82.4705	82.6294
Lognormal	0.0077	0.096	–	–	–	–	52.0896	52.2485
Gamma	–	–	0.3633	0.3231	1.535	0.8358	58.4781	58.637

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Thallium

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Figure **29**

Media:
Surface Sediment (0−15 cm)

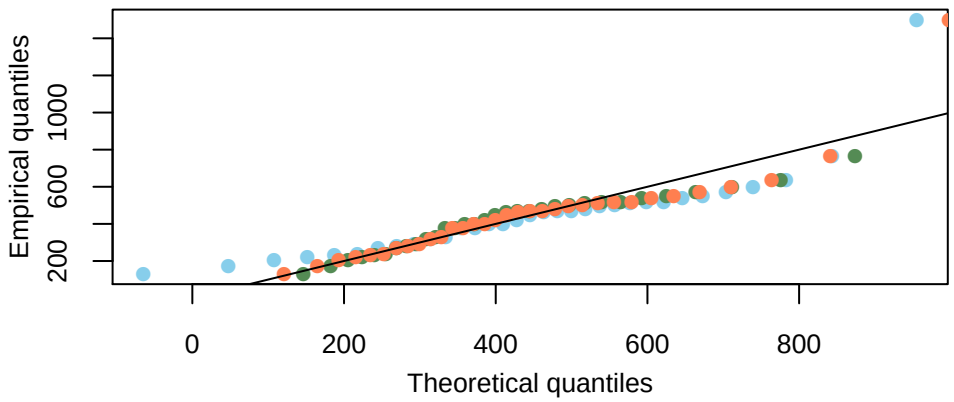
Exposure Unit:
MBC

Chemical (mg/kg):
Zinc

Legend

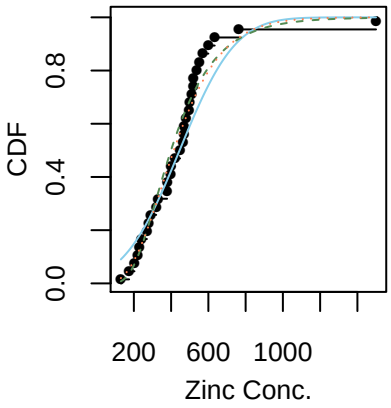
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

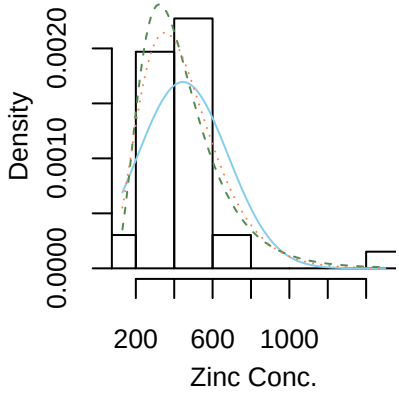


ECDF, Histogram & Q−Q (Detects Only)

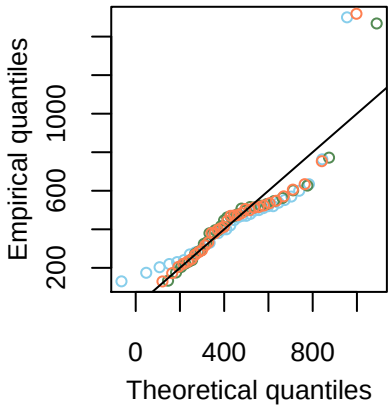
ECDF



Histogram



Q−Q



N = 33	FOD = 100%	Min (detect) = 130	Arithmetic Mean = 450
N (detect) = 33	SD (log detect) = 0.47	Max (detect) = 1,500 J	Arithmetic SD = 240

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.0082	–	–	–	–	458.079	461.072
Lognormal	0.22	0.25	–	–	–	–	442.189	445.182
Gamma	–	–	0.1178	0.162	0.603	0.758	444.028	447.021

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Zinc

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **30**

Media:
Surface Sediment (0−15 cm)

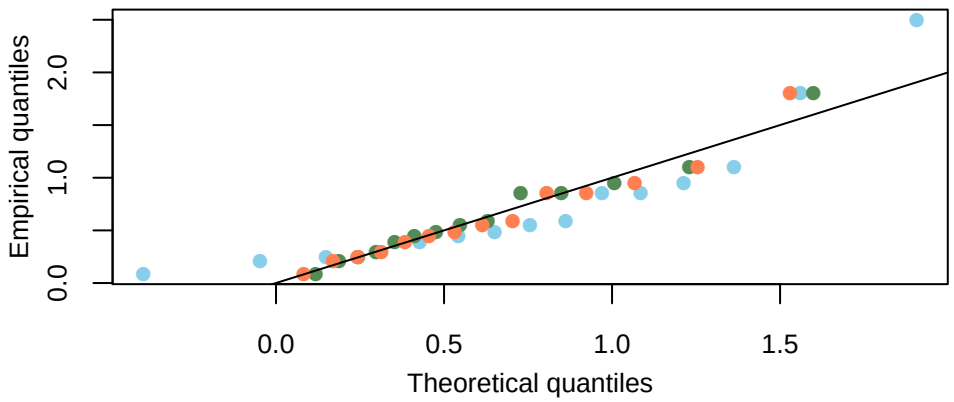
Exposure Unit:
MBC

Chemical (mg/kg):
Benz[a]anthracene

Legend

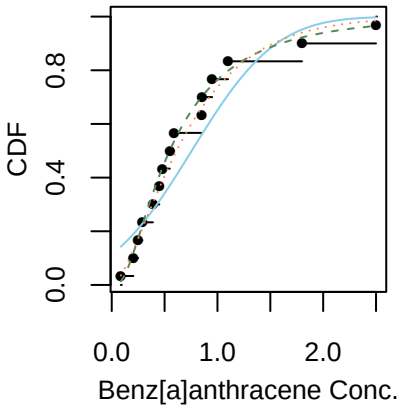
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

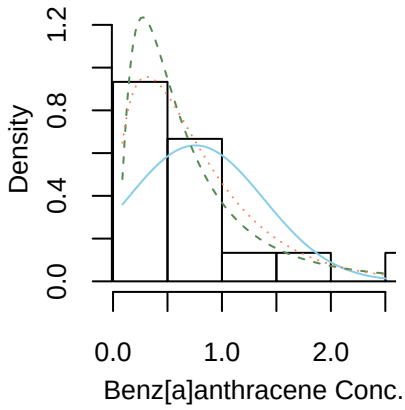


ECDF, Histogram & Q−Q (Detects Only)

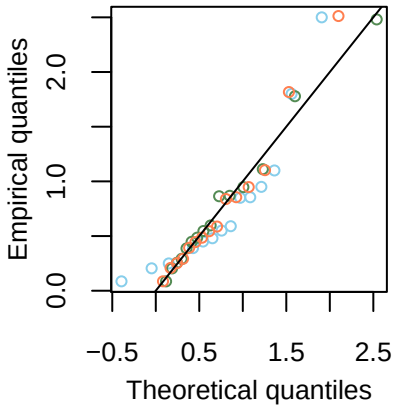
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 0.086 J	Arithmetic Mean = 0.76
N (detect) = 15	SD (log detect) = 0.87	Max (detect) = 2 J	Arithmetic SD = 0.65

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0083	0.11	–	–	–	–	32.5857	34.0018
Lognormal	1	0.97	–	–	–	–	23.1402	24.5563
Gamma	–	–	0.1188	0.228	0.1998	0.763	23.4714	24.8875

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Benz[a]anthracene

Media:
Surface Sediment (0−15 cm)

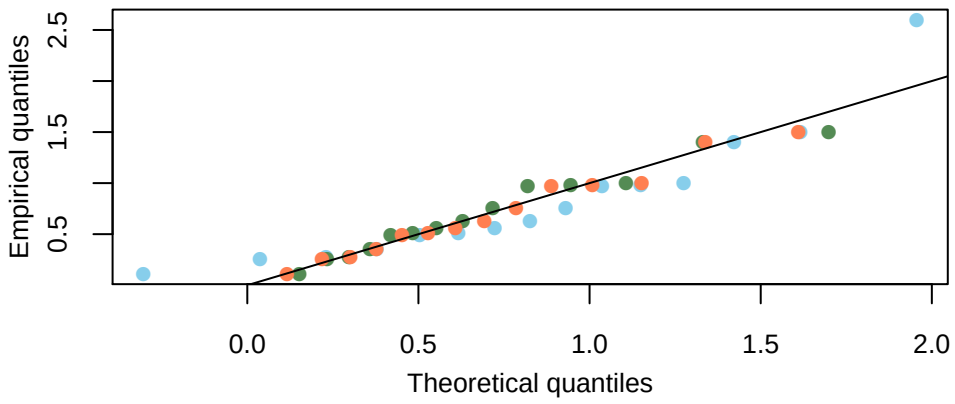
Exposure Unit:
MBC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

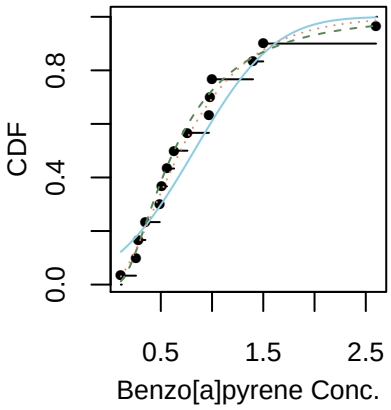
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

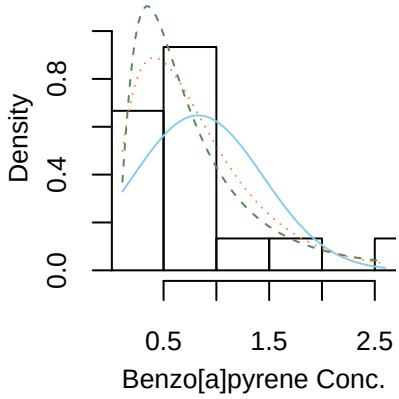


ECDF, Histogram & Q−Q (Detects Only)

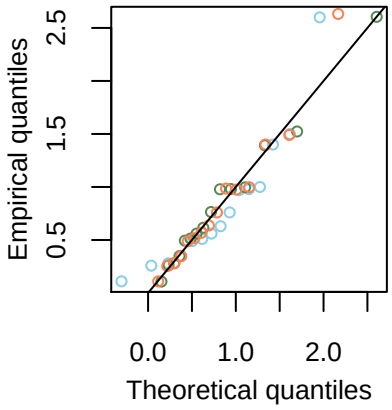
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 0.11 J	Arithmetic Mean = 0.83
N (detect) = 15	SD (log detect) = 0.8	Max (detect) = 2 J	Arithmetic SD = 0.64

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.023	0.14	–	–	–	–	32.0328	33.4489
Lognormal	0.98	0.89	–	–	–	–	25.0193	26.4354
Gamma	–	–	0.1042	0.228	0.1582	0.763	24.862	26.2781

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Benzo[a]pyrene

Media:
Surface Sediment (0−15 cm)

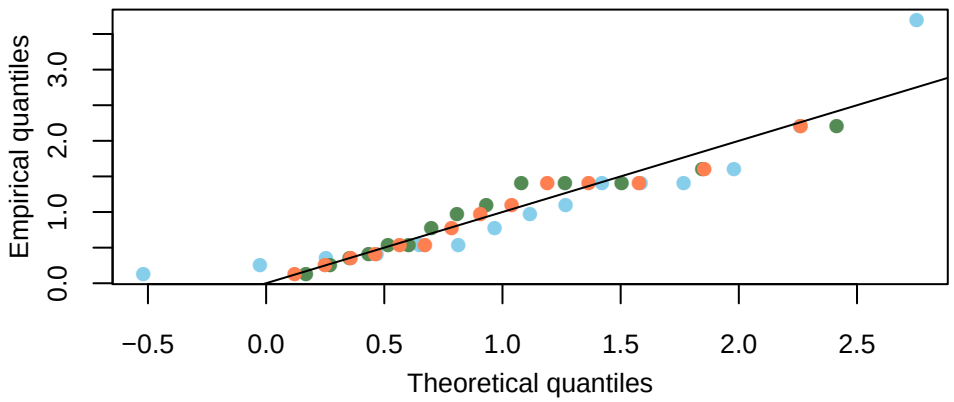
Exposure Unit:
MBC

Chemical (mg/kg):
Benzo[b]fluoranthene

Legend

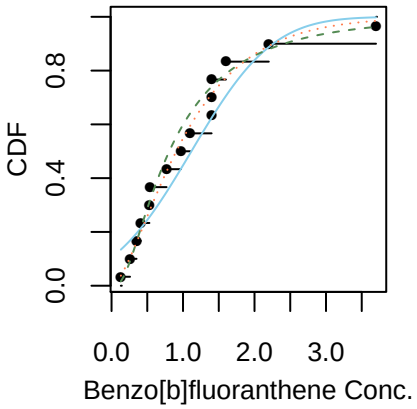
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

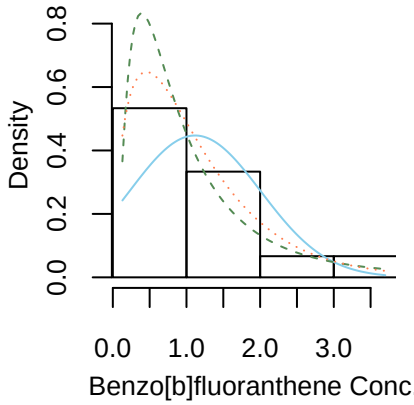


ECDF, Histogram & Q−Q (Detects Only)

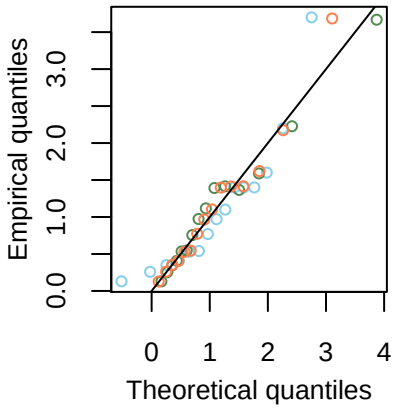
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 0.13 J	Arithmetic Mean = 1
N (detect) = 15	SD (log detect) = 0.88	Max (detect) = 3 J	Arithmetic SD = 0.92

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.018	0.21	–	–	–	–	43.1416	44.5577
Lognormal	0.95	0.68	–	–	–	–	35.4468	36.8629
Gamma	–	–	0.1162	0.228	0.1904	0.763	35.204	36.6201

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

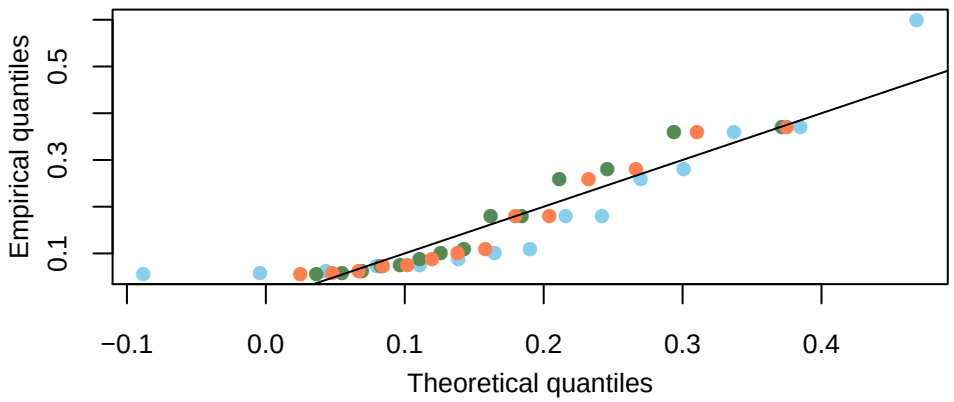
Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Benzo[b]fluoranthene

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
MBC
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

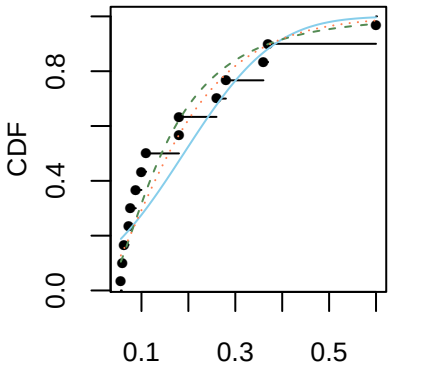
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

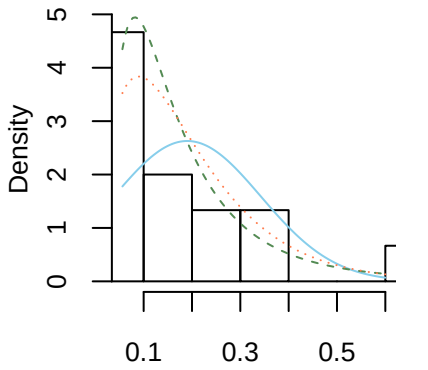


ECDF, Histogram & Q−Q (Detects Only)

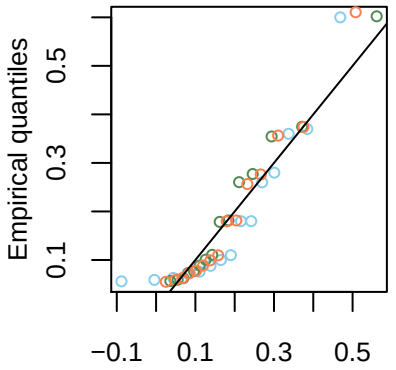
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 0.056 J	Arithmetic Mean = 0.19
N (detect) = 15	SD (log detect) = 0.77	Max (detect) = 0.6 J	Arithmetic SD = 0.16

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0068	0.034	–	–	–	–	−9.99183	−8.57573
Lognormal	0.19	0.33	–	–	–	–	−20.5988	−19.1827
Gamma	–	–	0.2023	0.228	0.6057	0.763	−18.776	−17.3599

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Dibenz[a,h]anthracene

Media:
Surface Sediment (0−15 cm)

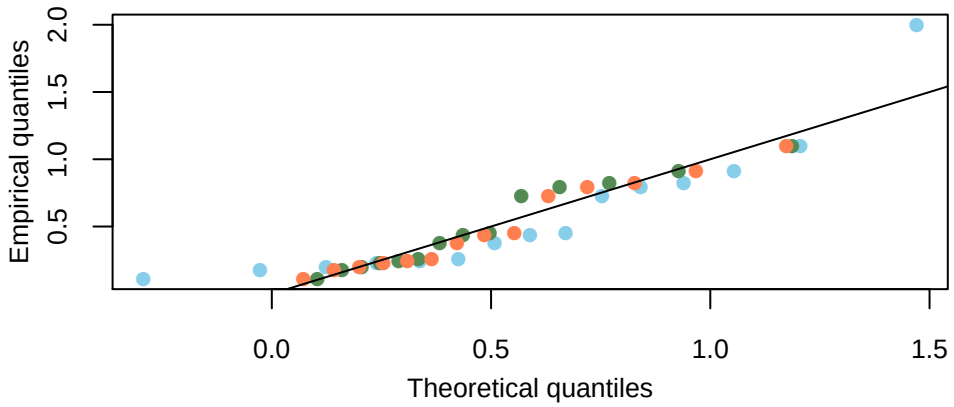
Exposure Unit:
MBC

Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

Legend

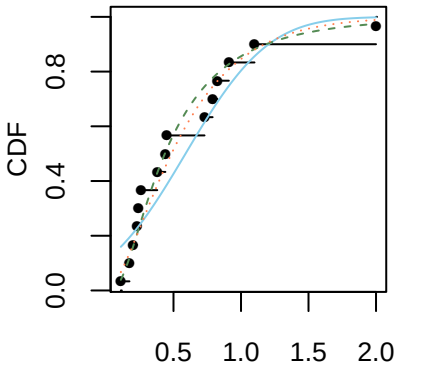
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

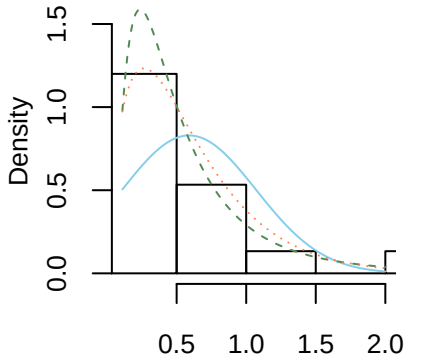


ECDF, Histogram & Q−Q (Detects Only)

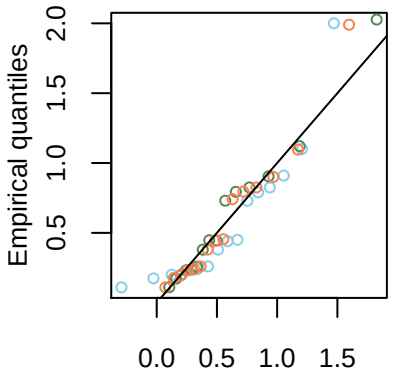
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 0.11 J	Arithmetic Mean = 0.59
N (detect) = 15	SD (log detect) = 0.81	Max (detect) = 2 J	Arithmetic SD = 0.5

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0069	0.073	–	–	–	–	24.6018	26.0179
Lognormal	0.88	0.61	–	–	–	–	14.2542	15.6703
Gamma	–	–	0.16	0.228	0.348	0.763	15.4794	16.8955

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Indeno[1,2,3−cd]pyrene

Media:
Surface Sediment (0−15 cm)

Exposure Unit:
MBC

Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 12	FOD = 25%	Min (detect) = 0.027 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.046 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Aldrin

Media:
Surface Sediment (0−15 cm)

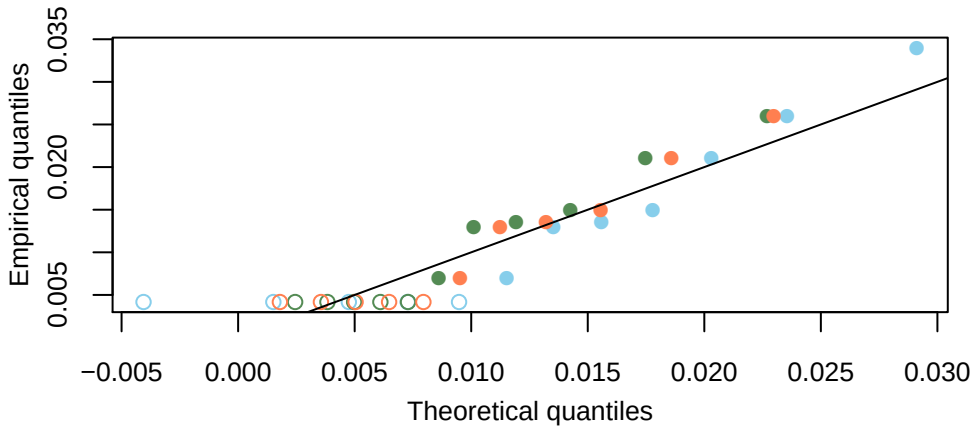
Exposure Unit:
MBC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

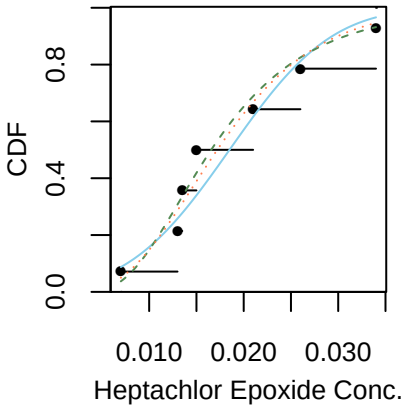
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

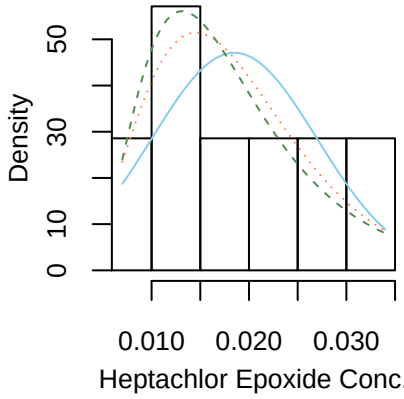


ECDF, Histogram & Q−Q (Detects Only)

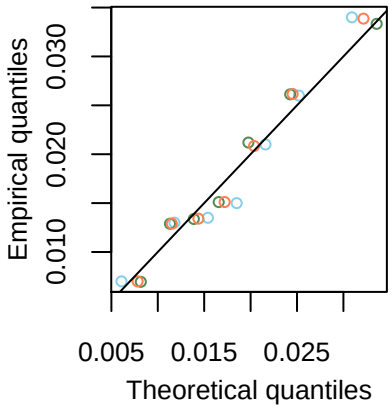
ECDF



Histogram



Q−Q



N = 12	FOD = 58%	Min (detect) = 0.007 J	Kaplan Meier Mean = 0.011
N (detect) = 7	SD (log detect) = 0.52	Max (detect) = 0.034 J	Kaplan Meier SD = 0.011

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.023	0.13	–	–	–	–	−73.5008	−72.531
Lognormal	0.035	0.028	–	–	–	–	−80.3205	−79.3507
Gamma	–	–	NA	NA	NA	NA	−79.3418	−78.372

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.71	0.38	–	–	–	–	−42.9276	−43.0358
Lognormal	0.9	0.72	–	–	–	–	−43.748	−43.8561
Gamma	–	–	NA	NA	NA	NA	−43.8535	−43.9617

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−Heptachlor Epoxide

Media:
Surface Sediment (0−15 cm)

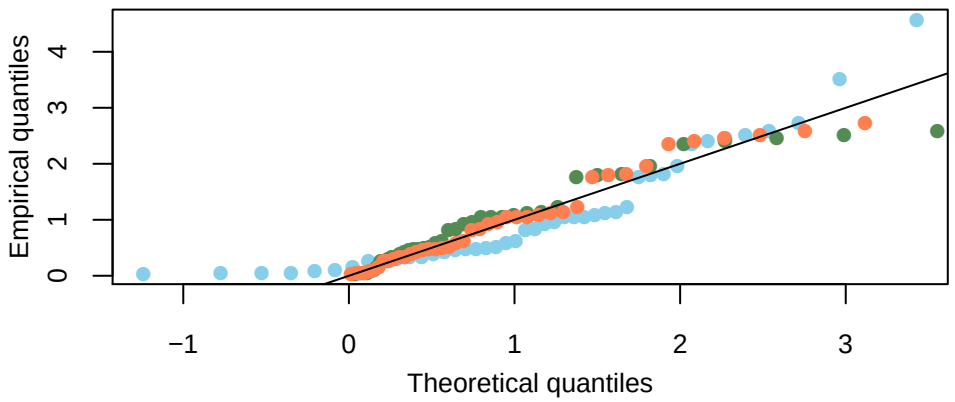
Exposure Unit:
MBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

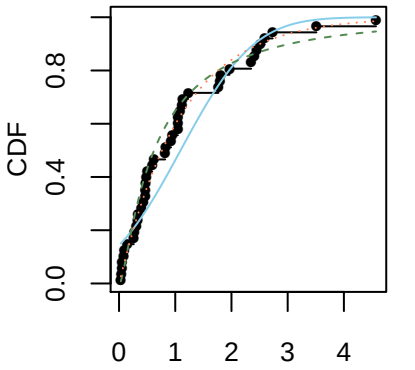
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

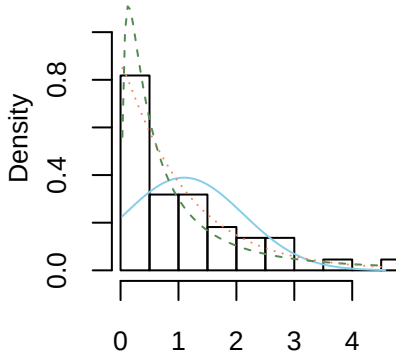


ECDF, Histogram & Q−Q (Detects Only)

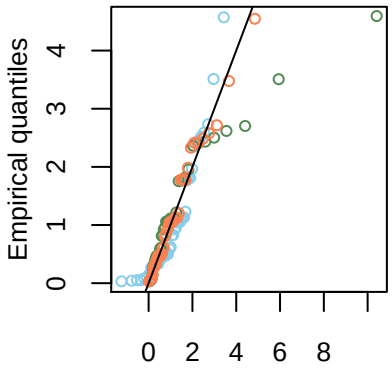
ECDF



Histogram



Q−Q



N = 44	FOD = 100%	Min (detect) = 0.032 J	Arithmetic Mean = 1
N (detect) = 44	SD (log detect) = 1.3	Max (detect) = 4 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	6e−05	0.00034	–	–	–	–	131.031	134.6
Lognormal	0.02	0.2	–	–	–	–	105.901	109.469
Gamma	–	–	0.07464	0.144	0.3048	0.779	99.9504	103.519

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−PCBs (Total Aroclors)

Media:
Surface Sediment (0−15 cm)

Exposure Unit:
BCC

Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 17%	Min (detect) = 1 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 1 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Antimony

Media:
Surface Sediment (0−15 cm)

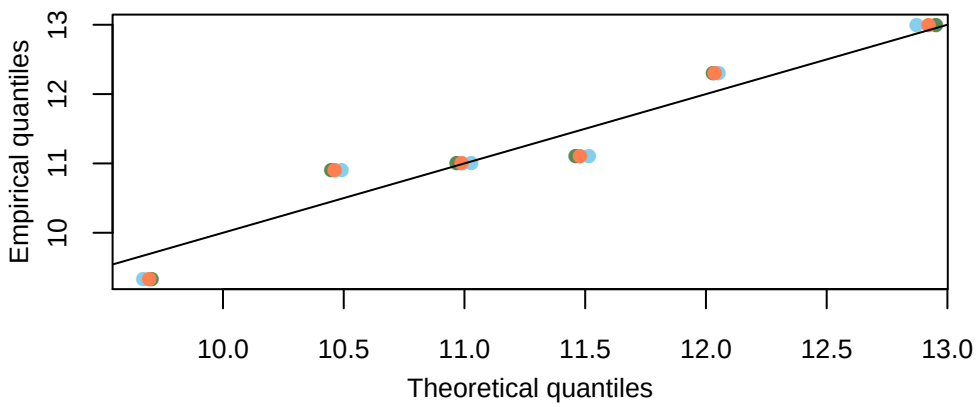
Exposure Unit:
BCC

Chemical (mg/kg):
Arsenic

Legend

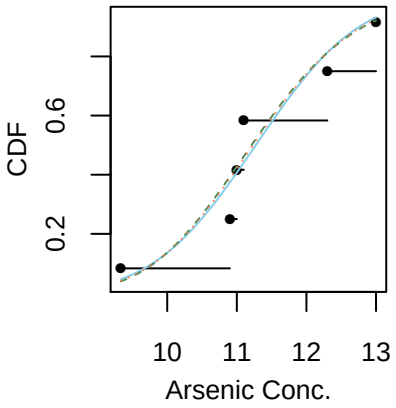
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

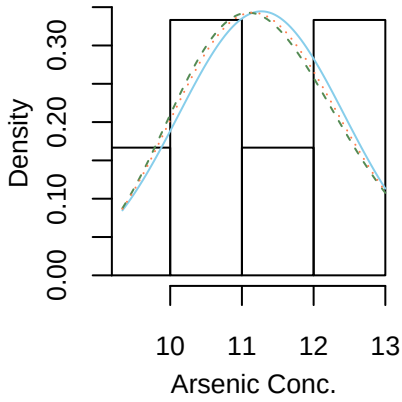


ECDF, Histogram & Q−Q (Detects Only)

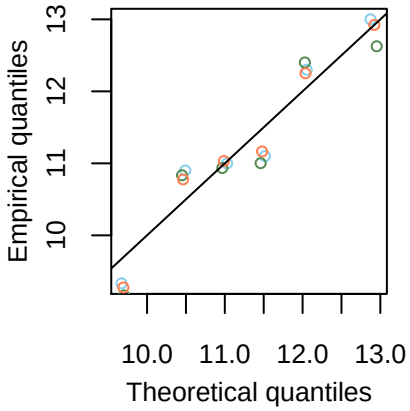
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 9 J	Arithmetic Mean = 11
N (detect) = 6	SD (log detect) = 0.11	Max (detect) = 13 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.71	0.48	–	–	–	–	22.7856	22.3691
Lognormal	0.65	0.37	–	–	–	–	22.9136	22.4971
Gamma	–	–	NA	NA	NA	NA	22.8546	22.4381

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Arsenic

Media:
Surface Sediment (0−15 cm)

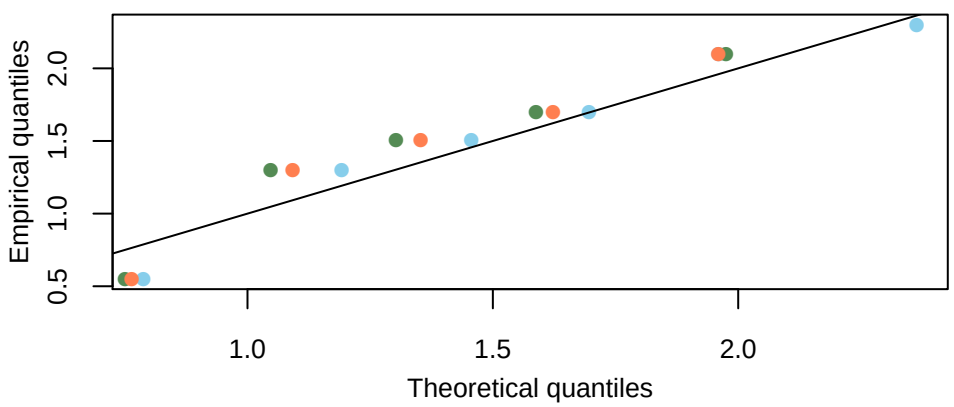
Exposure Unit:
BCC

Chemical (mg/kg):
Cadmium

Legend

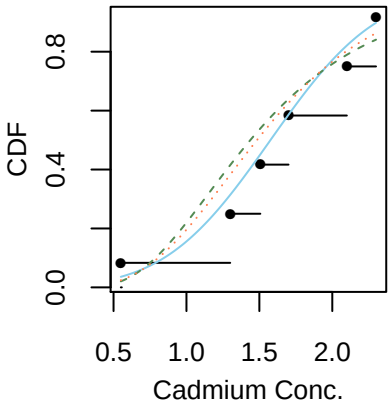
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

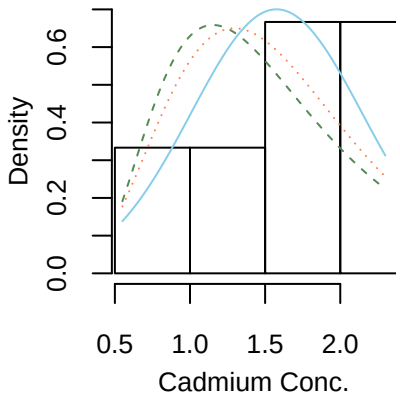


ECDF, Histogram & Q−Q (Detects Only)

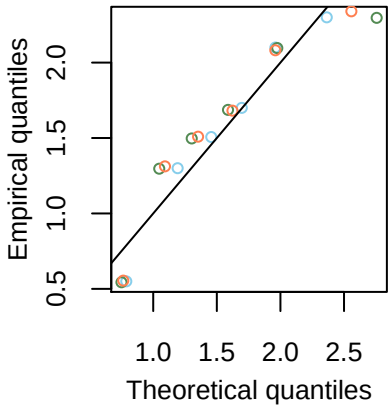
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 0.55 J	Arithmetic Mean = 1
N (detect) = 6	SD (log detect) = 0.52	Max (detect) = 2 J	Arithmetic SD = 0.62

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.81	0.89	–	–	–	–	14.2769	13.8604
Lognormal	0.17	0.25	–	–	–	–	16.3387	15.9223
Gamma	–	–	NA	NA	NA	NA	15.3873	14.9708

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Cadmium

Media:
Surface Sediment (0−15 cm)

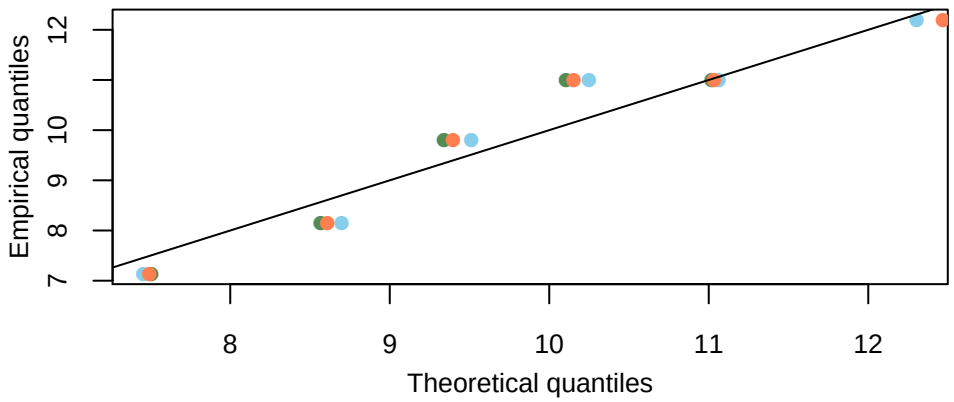
Exposure Unit:
BCC

Chemical (mg/kg):
Cobalt

Legend

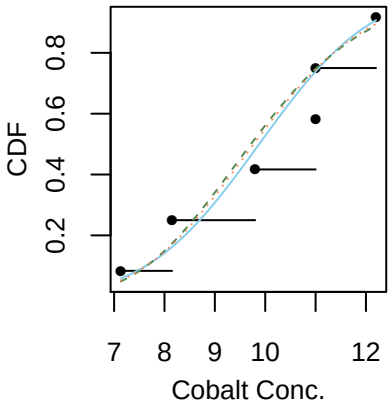
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

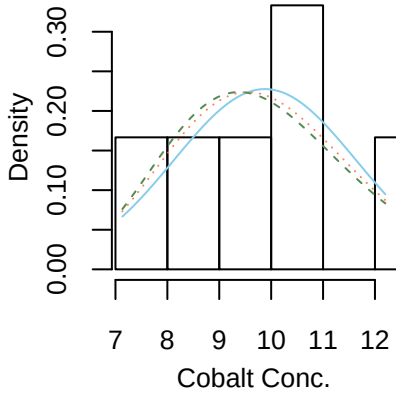


ECDF, Histogram & Q−Q (Detects Only)

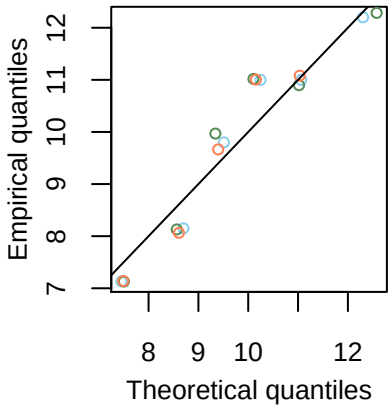
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 7 J	Arithmetic Mean = 9
N (detect) = 6	SD (log detect) = 0.2	Max (detect) = 12 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.66	0.48	–	–	–	–	27.7621	27.3456
Lognormal	0.53	0.42	–	–	–	–	28.1714	27.7549
Gamma	–	–	NA	NA	NA	NA	27.9986	27.5821

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Cobalt

Media:
Surface Sediment (0−15 cm)

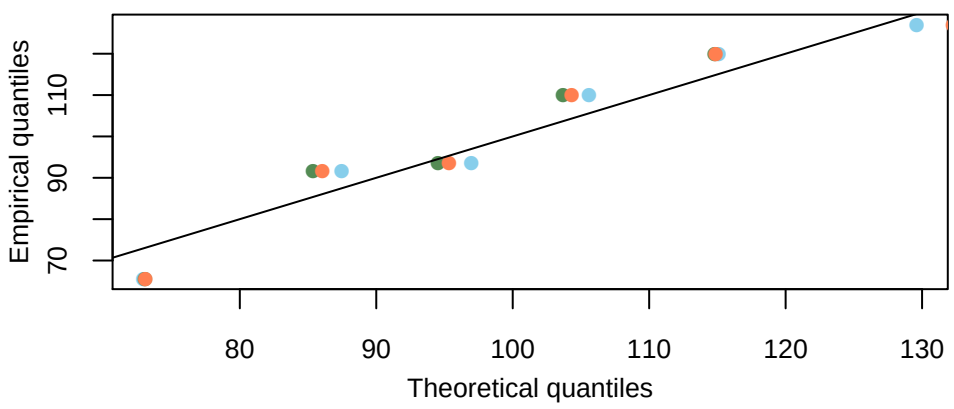
Exposure Unit:
BCC

Chemical (mg/kg):
Copper

Legend

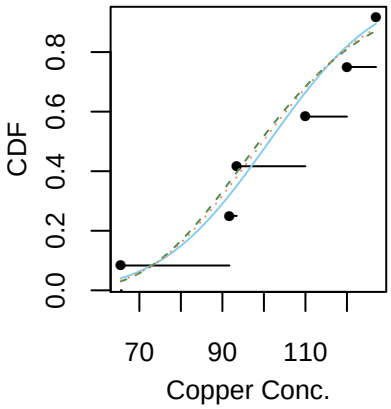
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

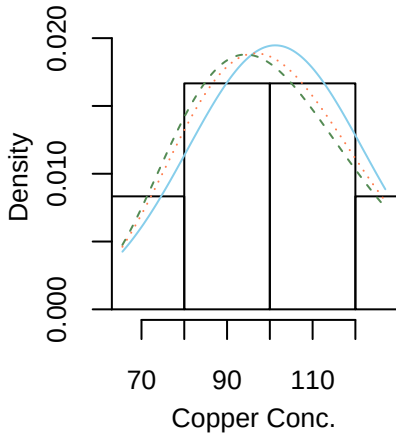


ECDF, Histogram & Q−Q (Detects Only)

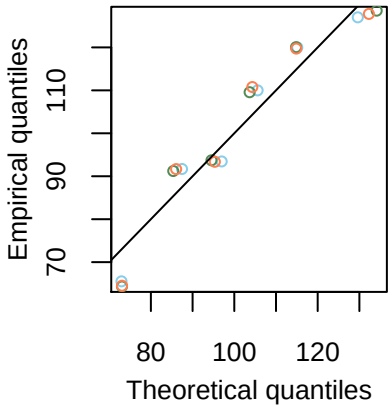
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 66 J	Arithmetic Mean = 100
N (detect) = 6	SD (log detect) = 0.24	Max (detect) = 130 J	Arithmetic SD = 22

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.74	0.86	–	–	–	–	57.2662	56.8497
Lognormal	0.48	0.57	–	–	–	–	57.9814	57.5649
Gamma	–	–	NA	NA	NA	NA	57.6825	57.266

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Copper

Media:
Surface Sediment (0−15 cm)

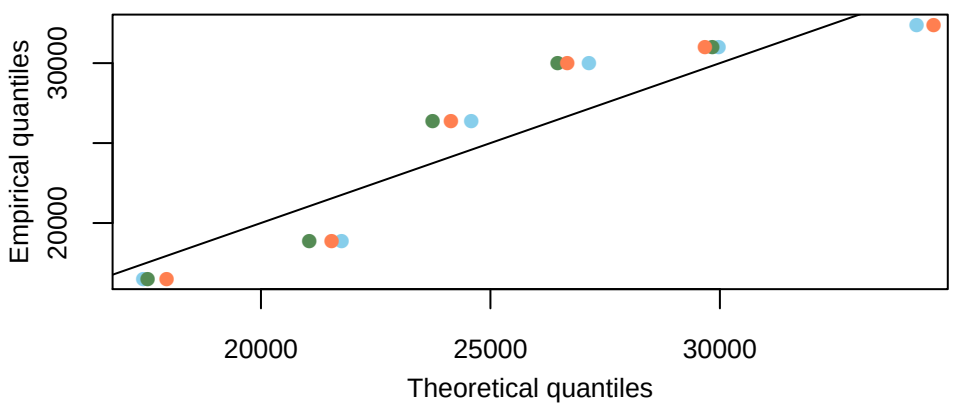
Exposure Unit:
BCC

Chemical (mg/kg):
Iron

Legend

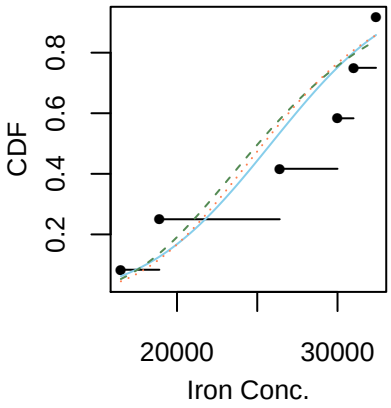
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

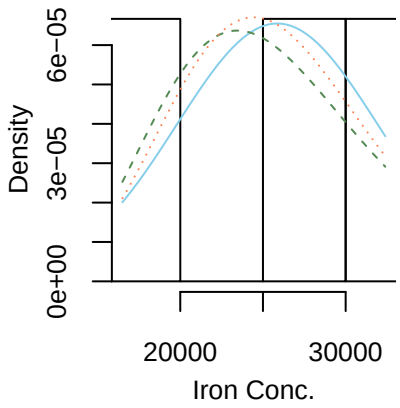


ECDF, Histogram & Q−Q (Detects Only)

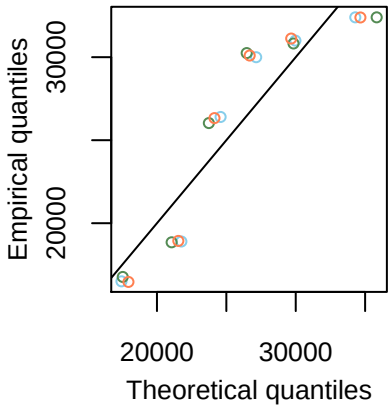
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 16,000 J	Arithmetic Mean = 26,000
N (detect) = 6	SD (log detect) = 0.28	Max (detect) = 32,000 J	Arithmetic SD = 6,700

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.24	0.39	–	–	–	–	125.604	125.188
Lognormal	0.16	0.35	–	–	–	–	126.339	125.922
Gamma	–	–	NA	NA	NA	NA	126.079	125.663

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Iron

Media:
Surface Sediment (0−15 cm)

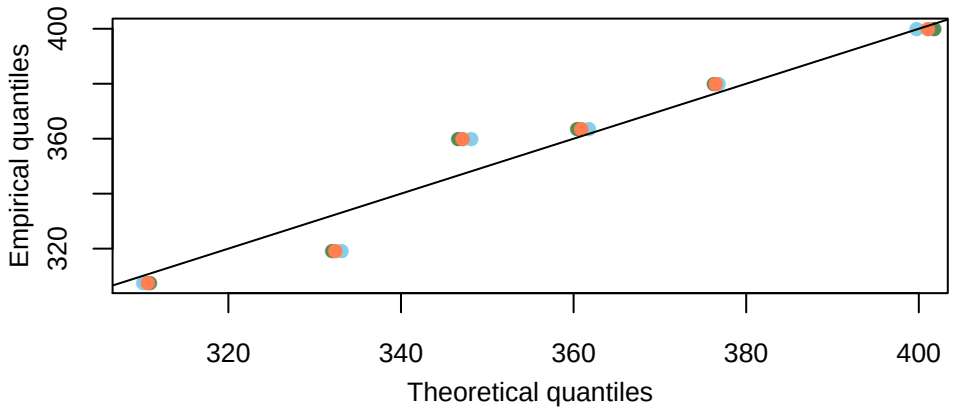
Exposure Unit:
BCC

Chemical (mg/kg):
Manganese

Legend

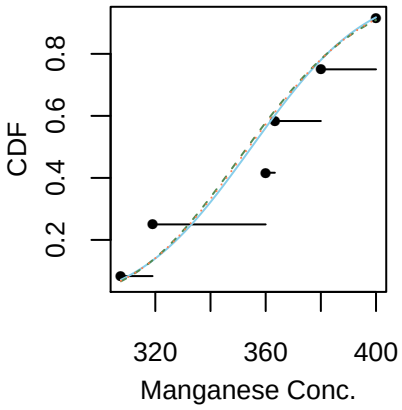
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

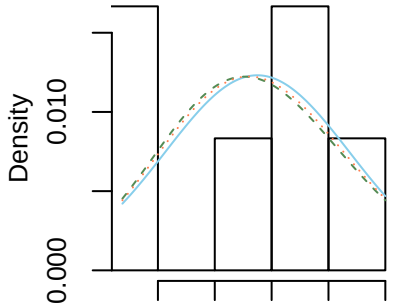


ECDF, Histogram & Q−Q (Detects Only)

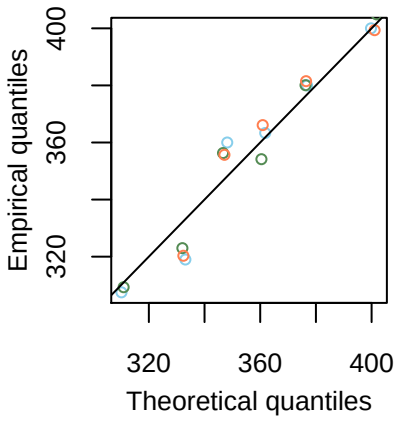
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 310 J	Arithmetic Mean = 350
N (detect) = 6	SD (log detect) = 0.1	Max (detect) = 400 J	Arithmetic SD = 35

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.65	0.46	–	–	–	–	62.7634	62.3469
Lognormal	0.58	0.35	–	–	–	–	62.9004	62.484
Gamma	–	–	NA	NA	NA	NA	62.8456	62.4291

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Manganese

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **45**

Media:
Surface Sediment (0−15 cm)

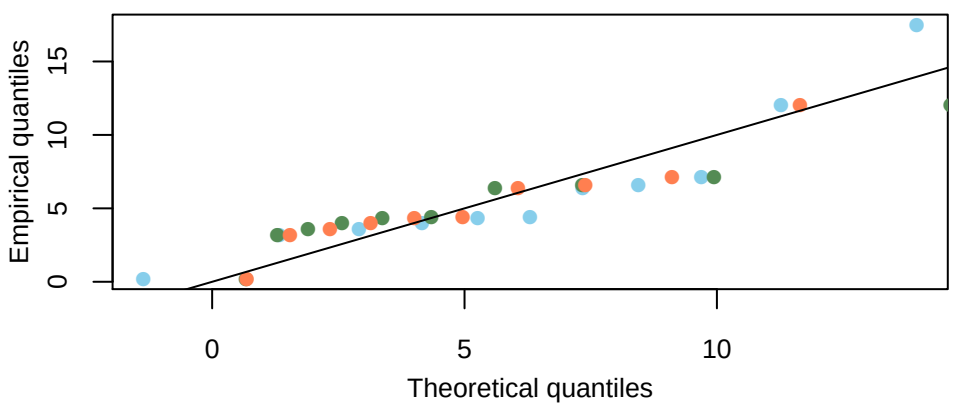
Exposure Unit:
BCC

Chemical (mg/kg):
Mercury

Legend

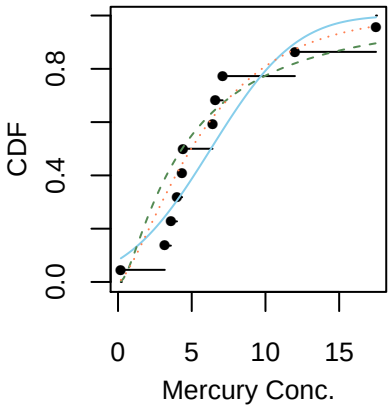
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

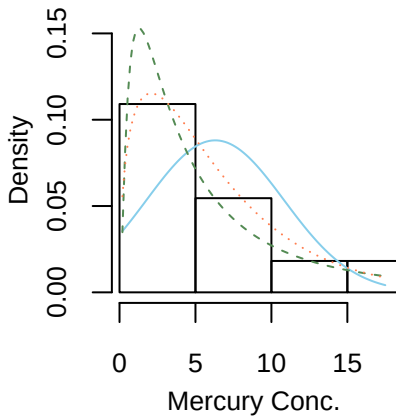


ECDF, Histogram & Q−Q (Detects Only)

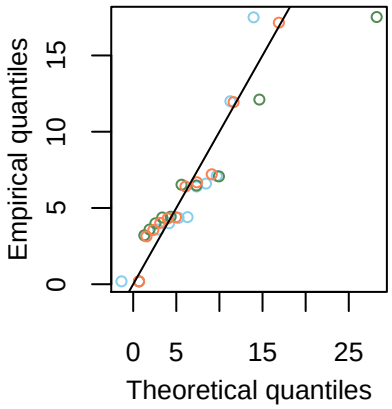
ECDF



Histogram



Q−Q



N = 11	FOD = 100%	Min (detect) = 0.19 J	Arithmetic Mean = 6
N (detect) = 11	SD (log detect) = 1.2	Max (detect) = 18 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.056	0.05	–	–	–	–	68.4581	69.2539
Lognormal	0.0041	0.0058	–	–	–	–	69.7744	70.5702
Gamma	–	–	0.2304	0.274	0.5584	0.748	65.5436	66.3394

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Mercury

Media:
Surface Sediment (0−15 cm)

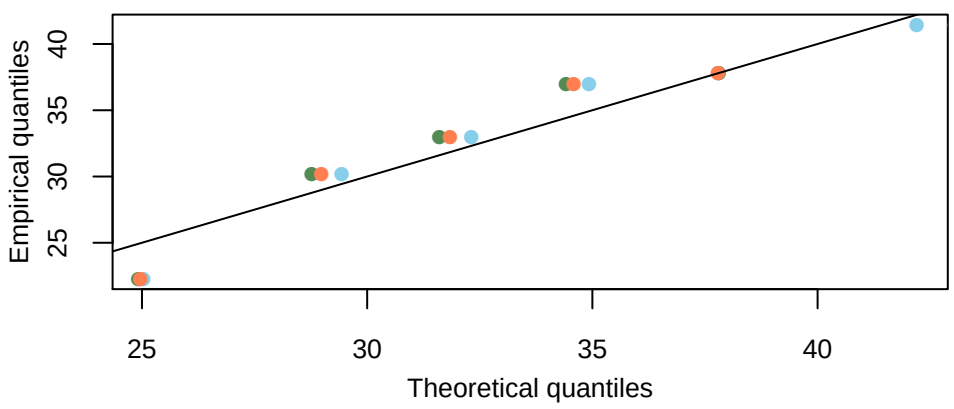
Exposure Unit:
BCC

Chemical (mg/kg):
Nickel

Legend

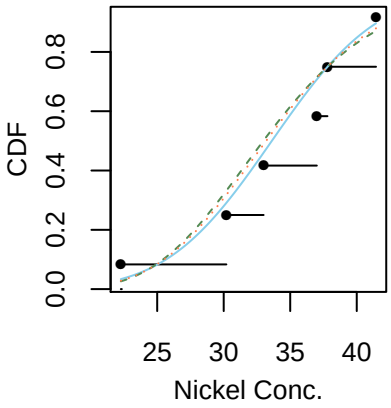
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

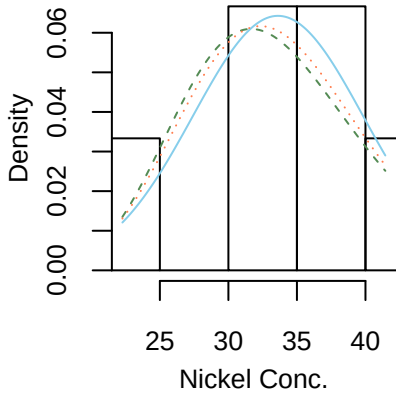


ECDF, Histogram & Q−Q (Detects Only)

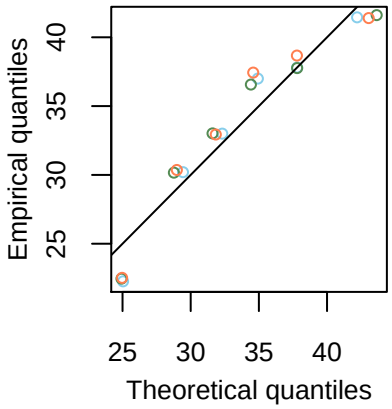
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 22 J	Arithmetic Mean = 34
N (detect) = 6	SD (log detect) = 0.22	Max (detect) = 41 J	Arithmetic SD = 6

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.74	0.71	–	–	–	–	42.936	42.5195
Lognormal	0.42	0.65	–	–	–	–	43.816	43.3995
Gamma	–	–	NA	NA	NA	NA	43.4719	43.0554

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Nickel

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **47**

Media:
Surface Sediment (0−15 cm)

Exposure Unit:
BCC

Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 17%	Min (detect) = 3 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 3 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Thallium

Media:
Surface Sediment (0−15 cm)

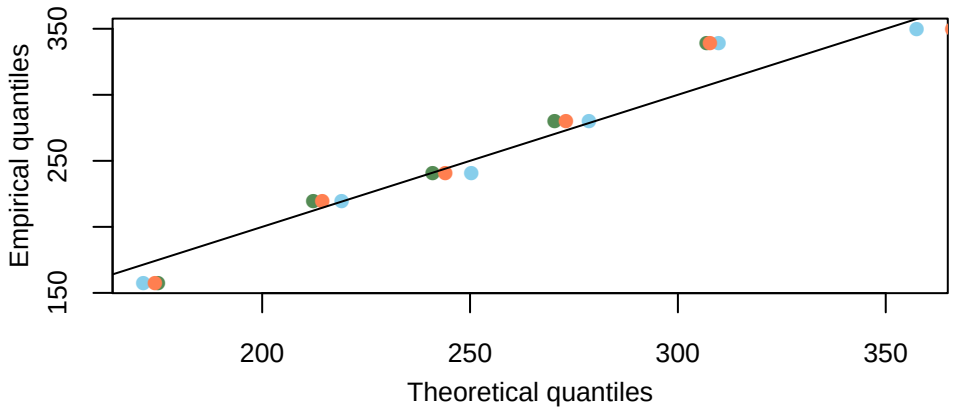
Exposure Unit:
BCC

Chemical (mg/kg):
Zinc

Legend

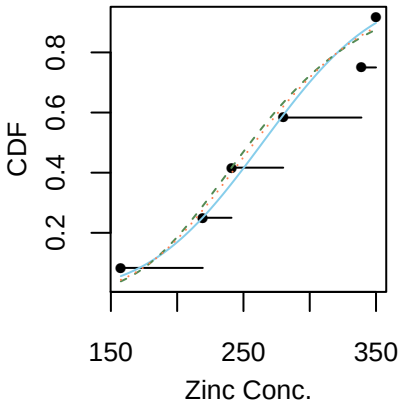
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

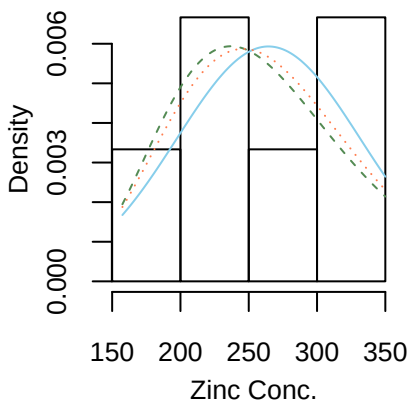


ECDF, Histogram & Q−Q (Detects Only)

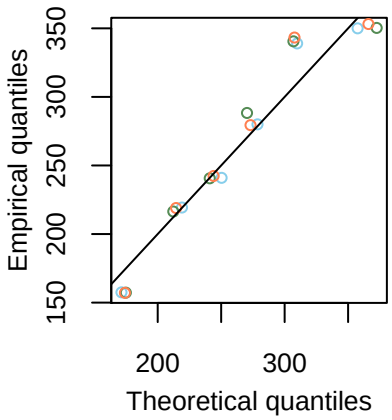
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 160 J	Arithmetic Mean = 260
N (detect) = 6	SD (log detect) = 0.3	Max (detect) = 350 J	Arithmetic SD = 74

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.76	0.8	–	–	–	–	71.5297	71.1133
Lognormal	0.66	0.89	–	–	–	–	71.9681	71.5516
Gamma	–	–	NA	NA	NA	NA	71.731	71.3145

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Zinc

Media:
Surface Sediment (0−15 cm)

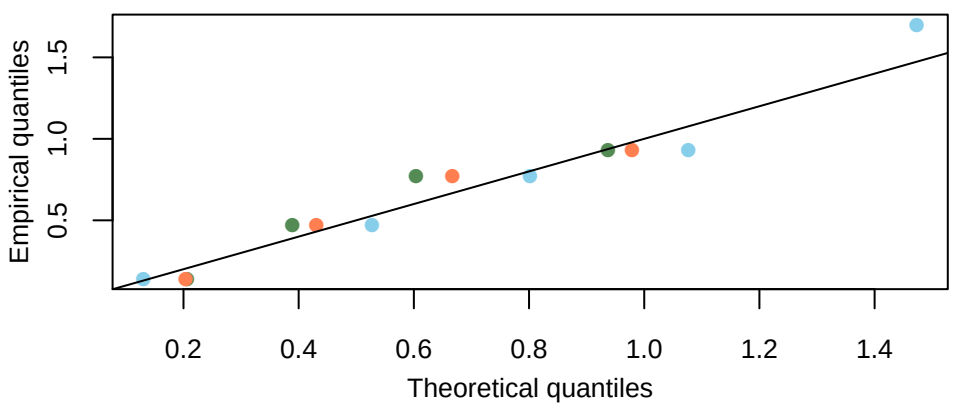
Exposure Unit:
BCC

Chemical (mg/kg):
Benz[a]anthracene

Legend

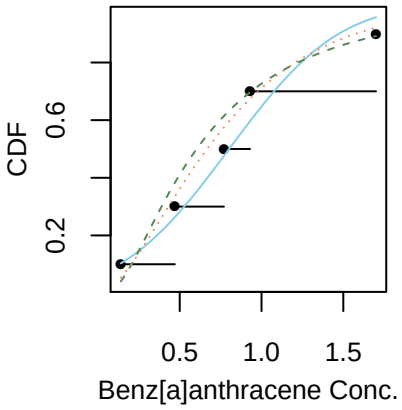
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

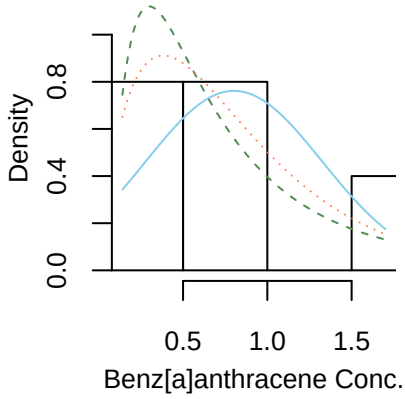


ECDF, Histogram & Q−Q (Detects Only)

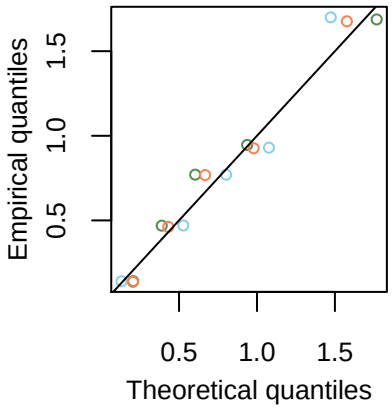
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.14 J	Arithmetic Mean = 0.8
N (detect) = 5	SD (log detect) = 0.94	Max (detect) = 1 J	Arithmetic SD = 0.59

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.81	N<5	–	–	–	–	11.7246	10.9434
Lognormal	0.71	N<5	–	–	–	–	11.3803	10.5991
Gamma	–	–	NA	NA	NA	NA	10.7666	9.98546

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Benz[a]anthracene

Media:
Surface Sediment (0−15 cm)

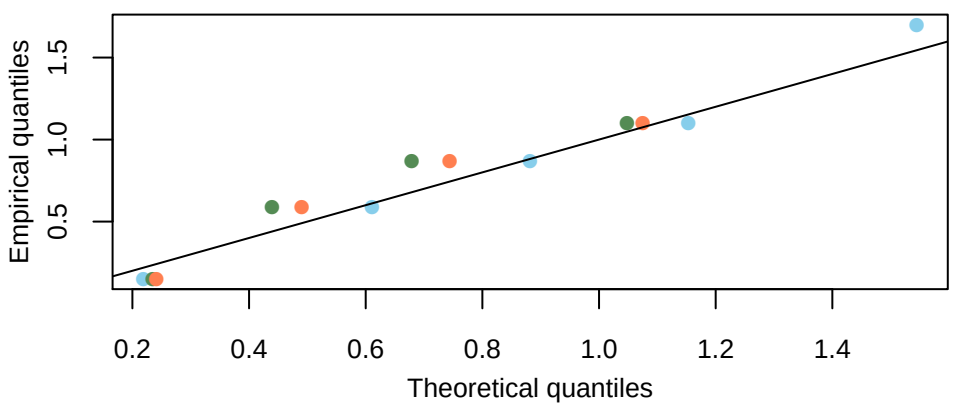
Exposure Unit:
BCC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

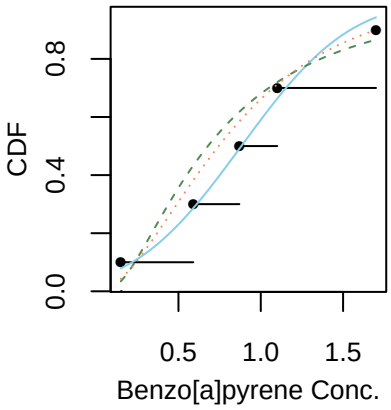
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

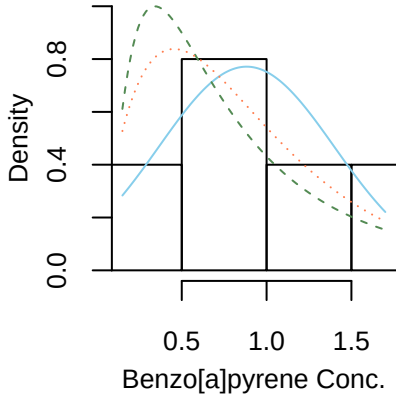


ECDF, Histogram & Q−Q (Detects Only)

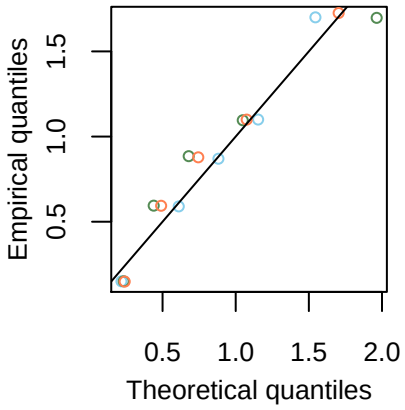
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.15 J	Arithmetic Mean = 0.88
N (detect) = 5	SD (log detect) = 0.93	Max (detect) = 1 J	Arithmetic SD = 0.58

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.99	N<5	–	–	–	–	11.5976	10.8165
Lognormal	0.44	N<5	–	–	–	–	12.438	11.6569
Gamma	–	–	NA	NA	NA	NA	11.4995	10.7184

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Benzo[a]pyrene

Media:
Surface Sediment (0−15 cm)

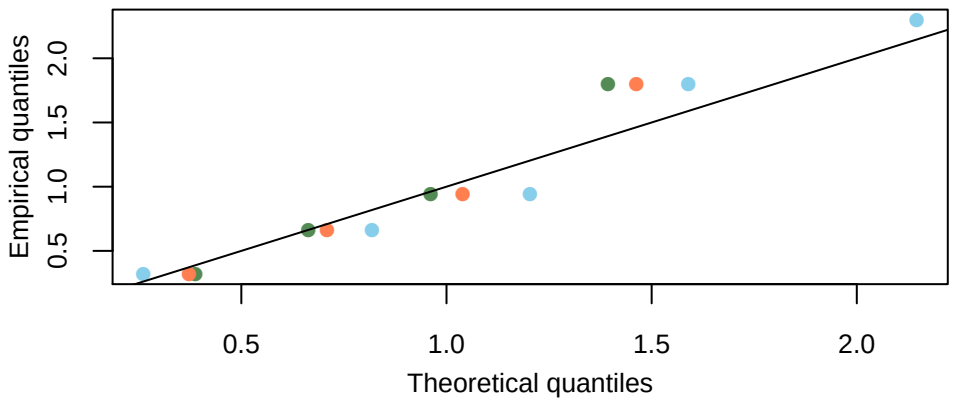
Exposure Unit:
BCC

Chemical (mg/kg):
Benzo[b]fluoranthene

Legend

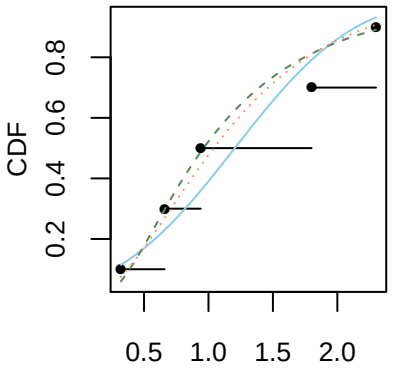
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

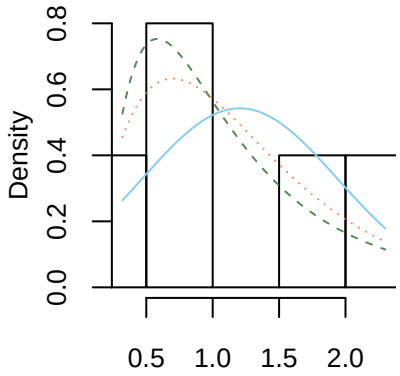


ECDF, Histogram & Q−Q (Detects Only)

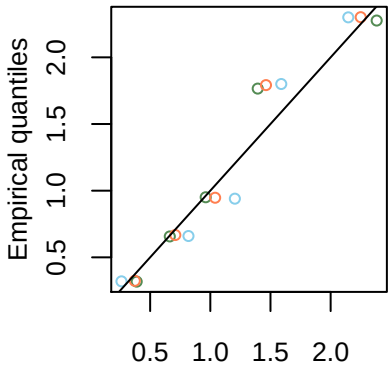
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.32 J	Arithmetic Mean = 1
N (detect) = 5	SD (log detect) = 0.79	Max (detect) = 2 J	Arithmetic SD = 0.82

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.64	N<5	–	–	–	–	15.115	14.3338
Lognormal	0.82	N<5	–	–	–	–	14.344	13.5629
Gamma	–	–	NA	NA	NA	NA	14.1618	13.3807

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Benzo[b]fluoranthene

Media:
Surface Sediment (0−15 cm)

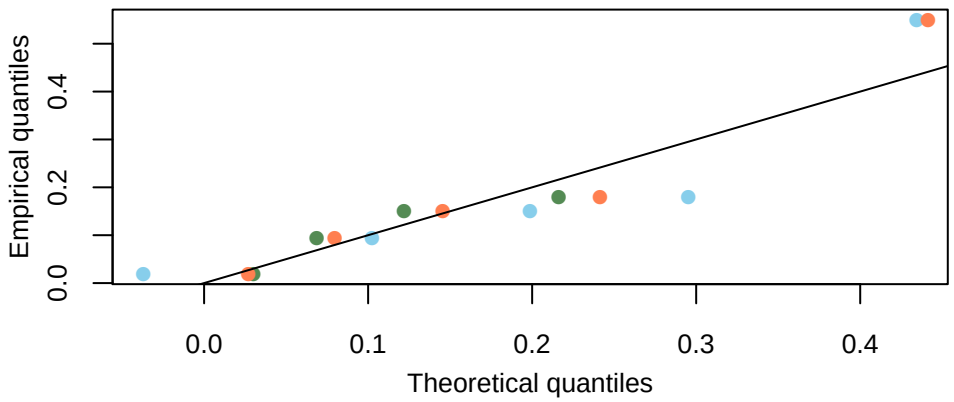
Exposure Unit:
BCC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

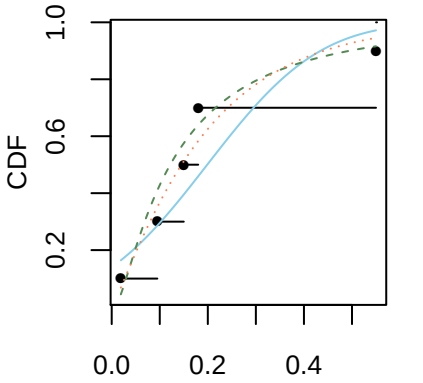
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

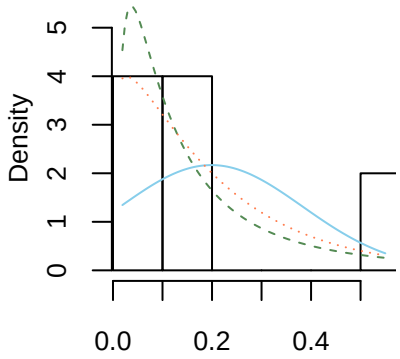


ECDF, Histogram & Q−Q (Detects Only)

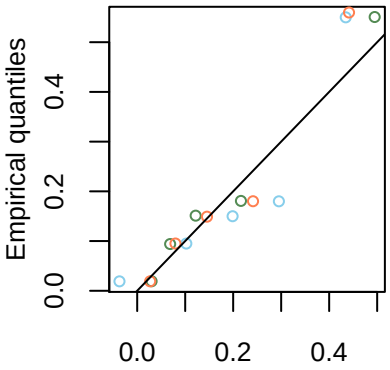
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.019 J	Arithmetic Mean = 0.2
N (detect) = 5	SD (log detect) = 1.2	Max (detect) = 0.55 J	Arithmetic SD = 0.21

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.13	N<5	–	–	–	–	1.2582	0.477076
Lognormal	0.78	N<5	–	–	–	–	−1.96769	−2.74881
Gamma	–	–	NA	NA	NA	NA	−2.22017	−3.00129

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Dibenz[a,h]anthracene

Media:
Surface Sediment (0−15 cm)

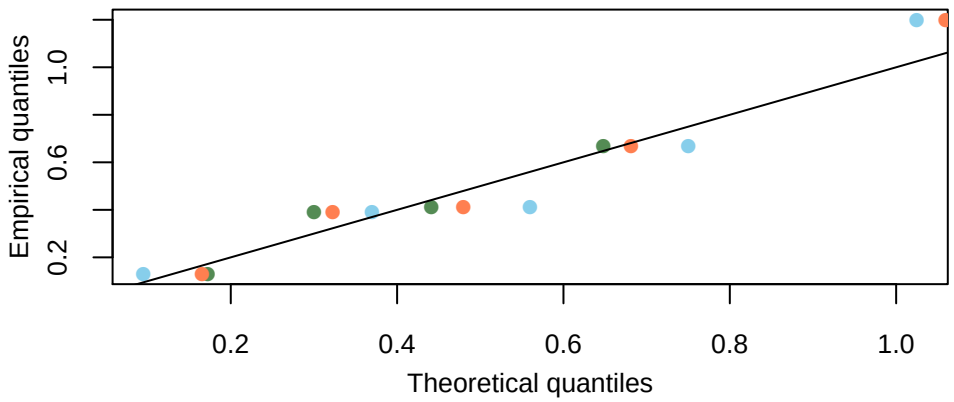
Exposure Unit:
BCC

Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

Legend

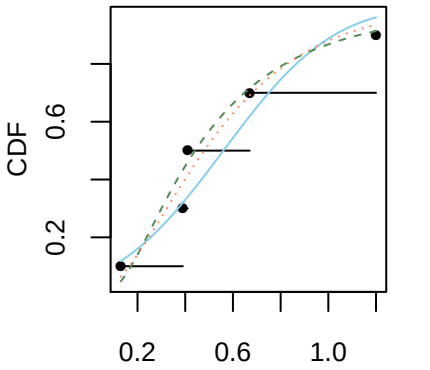
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

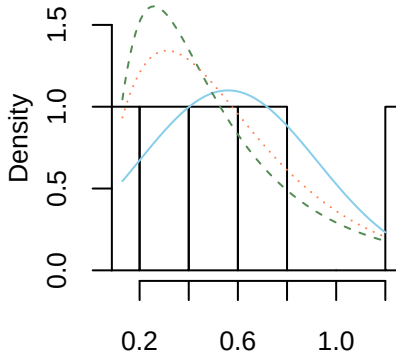


ECDF, Histogram & Q−Q (Detects Only)

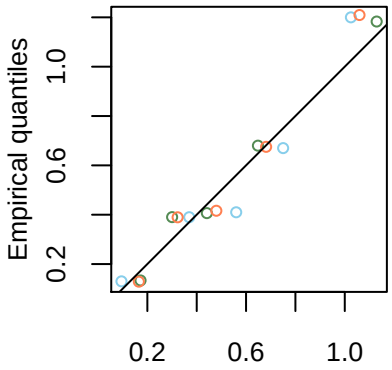
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.13 J	Arithmetic Mean = 0.56
N (detect) = 5	SD (log detect) = 0.82	Max (detect) = 1 J	Arithmetic SD = 0.41

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.54	N<5	–	–	–	–	8.04944	7.26832
Lognormal	0.82	N<5	–	–	–	–	6.90578	6.12466
Gamma	–	–	NA	NA	NA	NA	6.68583	5.90471

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Indeno[1,2,3−cd]pyrene

Media:
Surface Sediment (0−15 cm)

Exposure Unit:
BCC

Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 5	FOD = 60%	Min (detect) = 0.006 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.01 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Aldrin

Media:
Surface Sediment (0−15 cm)

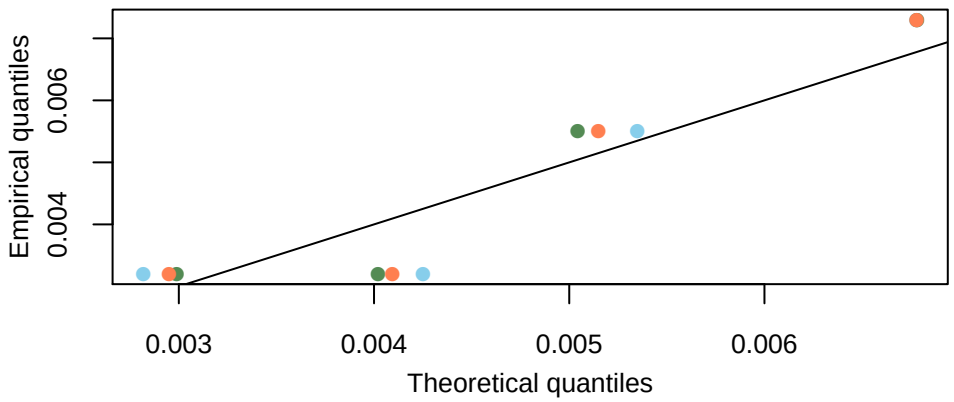
Exposure Unit:
BCC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

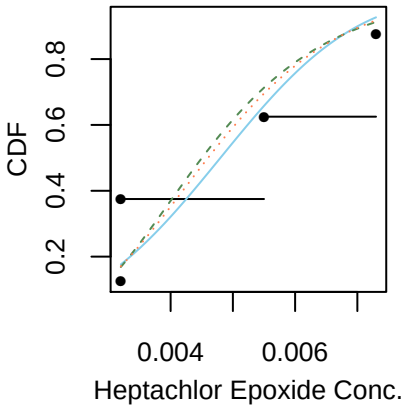
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

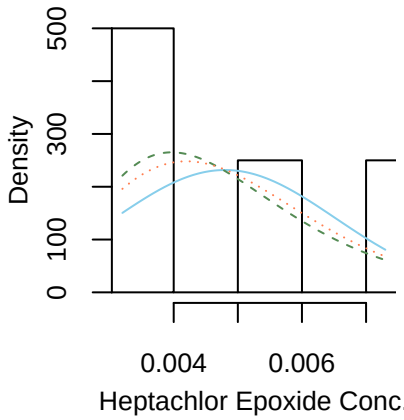


ECDF, Histogram & Q−Q (Detects Only)

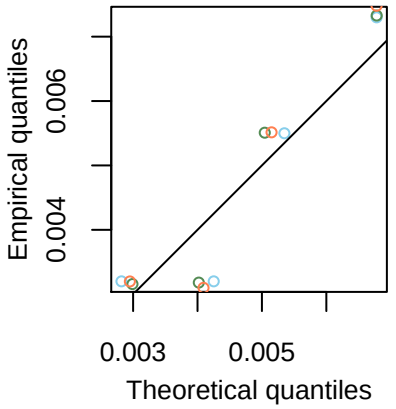
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 0.0032 J	Arithmetic Mean = 0.0048
N (detect) = 4	SD (log detect) = 0.41	Max (detect) = 0.0073 J	Arithmetic SD = 0.002

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.27	N<5	–	–	–	–	−35.563	−36.7904
Lognormal	0.23	N<5	–	–	–	–	−36.1365	−37.3639
Gamma	–	–	NA	NA	NA	NA	−36.0185	−37.2459

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−Heptachlor Epoxide

Media:
Surface Sediment (0−15 cm)

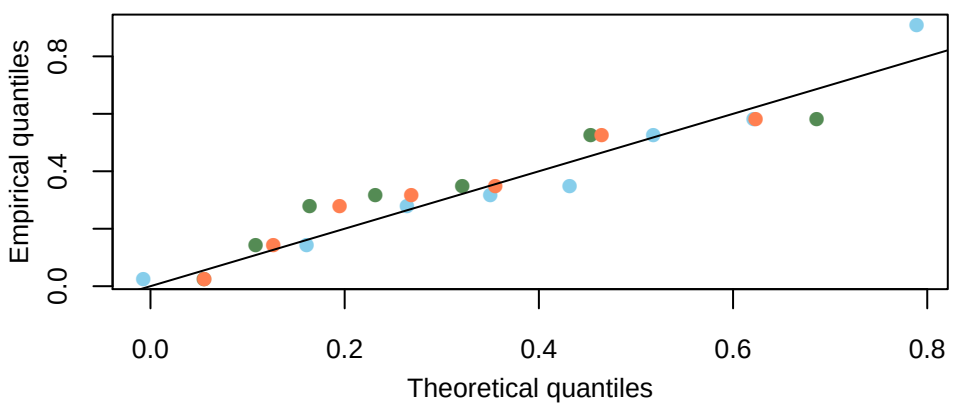
Exposure Unit:
BCC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

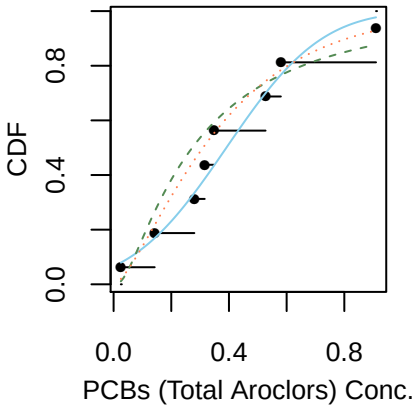
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

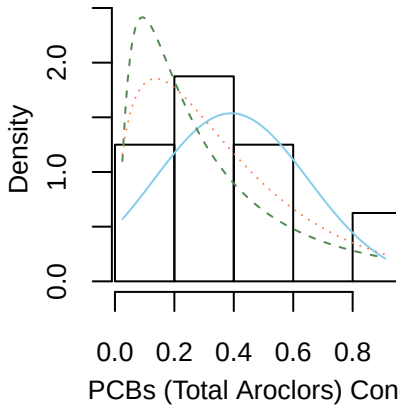


ECDF, Histogram & Q−Q (Detects Only)

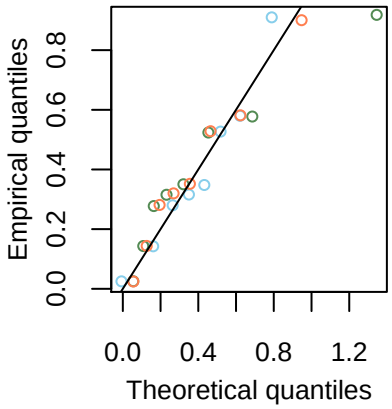
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 0.025 J	Arithmetic Mean = 0.39
N (detect) = 8	SD (log detect) = 1.1	Max (detect) = 0.91 J	Arithmetic SD = 0.28

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.8	0.57	–	–	–	–	5.12379	5.28267
Lognormal	0.13	0.12	–	–	–	–	6.54569	6.70458
Gamma	–	–	0.2049	0.301	0.2837	0.736	4.19683	4.35571

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−PCBs (Total Aroclors)

Media:
Surface Sediment (0−15 cm)

Exposure Unit:
LBC

Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 16	FOD = 6%	Min (detect) = 1 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 1 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Antimony

Media:
Surface Sediment (0−15 cm)

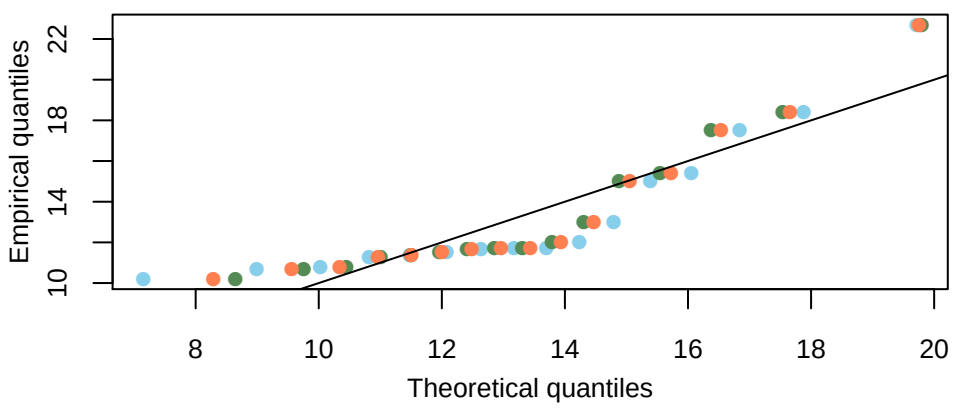
Exposure Unit:
LBC

Chemical (mg/kg):
Arsenic

Legend

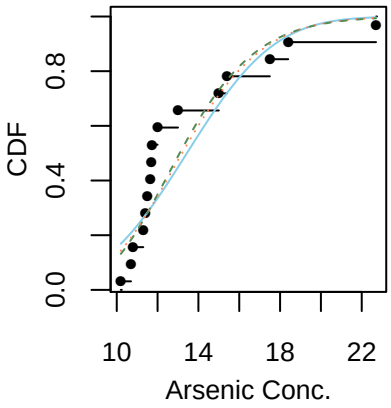
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

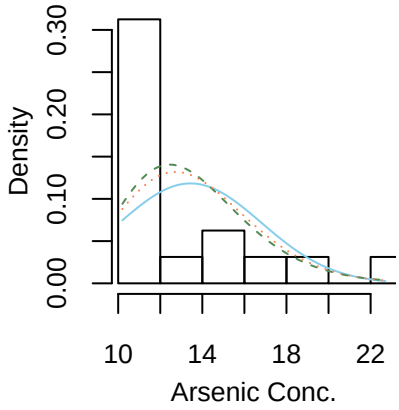


ECDF, Histogram & Q−Q (Detects Only)

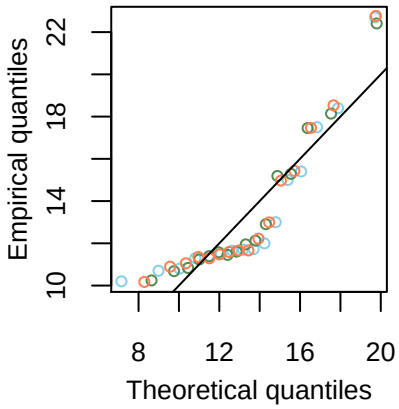
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 10 J	Arithmetic Mean = 13
N (detect) = 16	SD (log detect) = 0.23	Max (detect) = 23 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0023	0.0012	–	–	–	–	88.3111	89.8563
Lognormal	0.012	0.0026	–	–	–	–	83.5818	85.127
Gamma	–	–	0.2819	0.215	1.194	0.739	84.9831	86.5283

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Arsenic

Media:
Surface Sediment (0−15 cm)

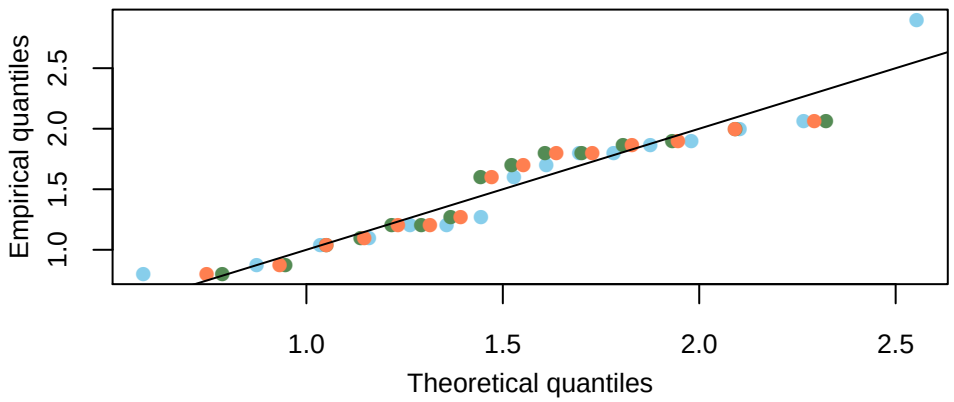
Exposure Unit:
LBC

Chemical (mg/kg):
Cadmium

Legend

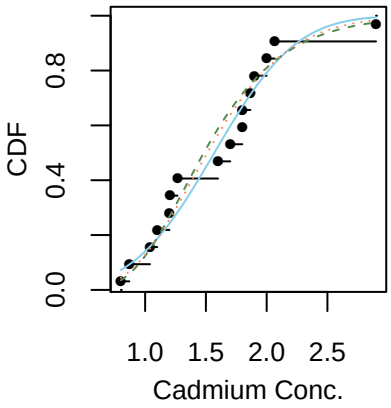
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

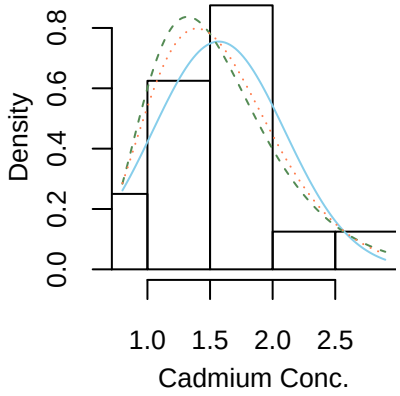


ECDF, Histogram & Q−Q (Detects Only)

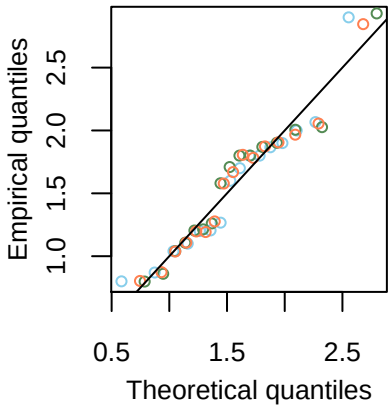
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 0.8 J	Arithmetic Mean = 1
N (detect) = 16	SD (log detect) = 0.35	Max (detect) = 2 J	Arithmetic SD = 0.55

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.28	0.46	–	–	–	–	28.995	30.5402
Lognormal	0.61	0.42	–	–	–	–	27.5504	29.0956
Gamma	–	–	0.1392	0.216	0.3747	0.741	27.5456	29.0908

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Cadmium

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **60**

Media:
Surface Sediment (0−15 cm)

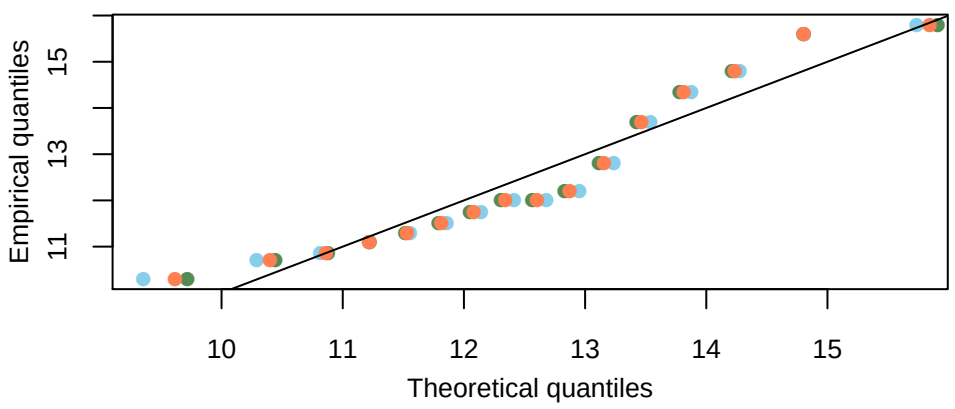
Exposure Unit:
LBC

Chemical (mg/kg):
Cobalt

Legend

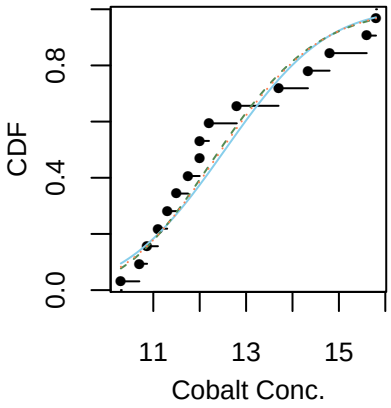
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

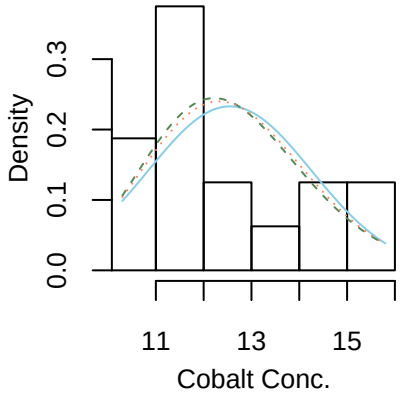


ECDF, Histogram & Q−Q (Detects Only)

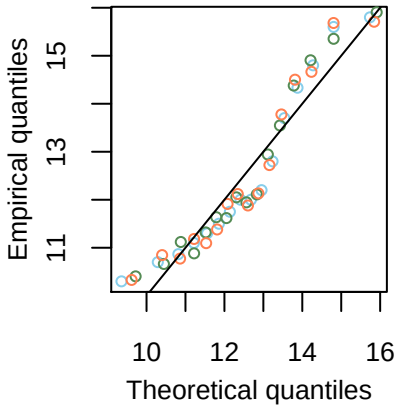
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 10 J	Arithmetic Mean = 13
N (detect) = 16	SD (log detect) = 0.14	Max (detect) = 16 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.095	0.078	–	–	–	–	66.6287	68.1738
Lognormal	0.2	0.18	–	–	–	–	65.3355	66.8806
Gamma	–	–	0.1903	0.214	0.5571	0.735	65.7127	67.2579

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Cobalt

Media:
Surface Sediment (0−15 cm)

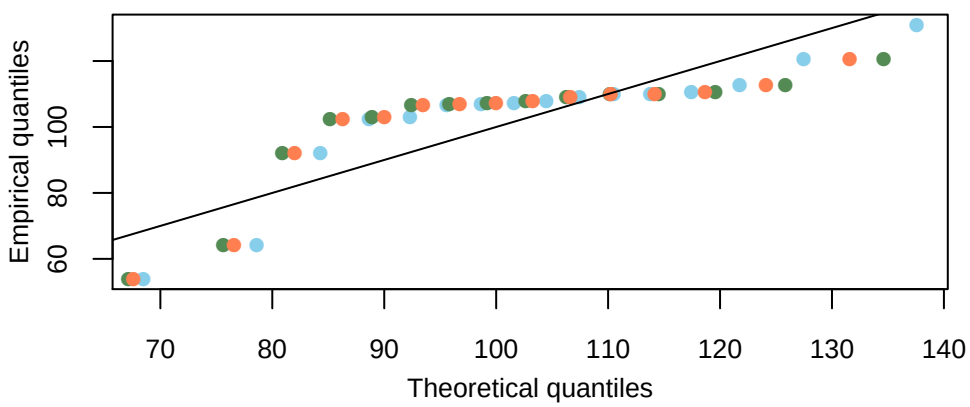
Exposure Unit:
LBC

Chemical (mg/kg):
Copper

Legend

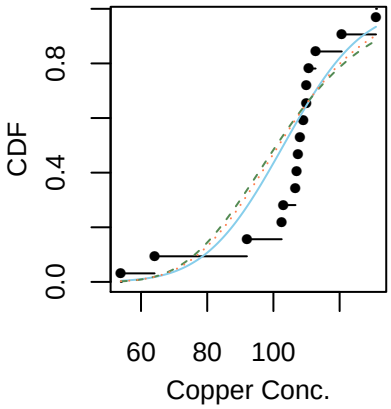
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

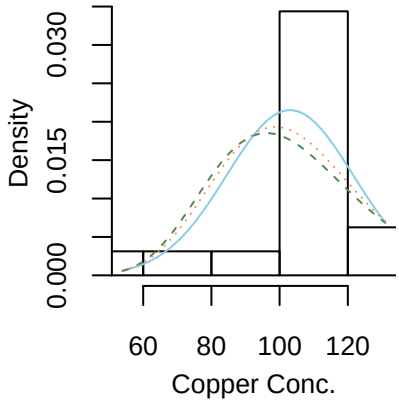


ECDF, Histogram & Q−Q (Detects Only)

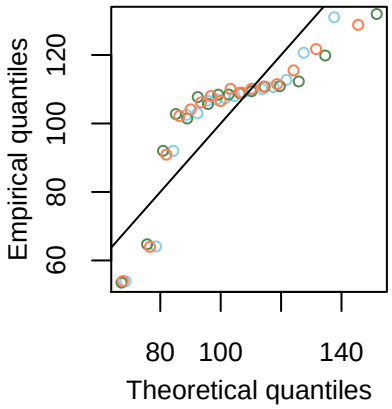
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 54	Arithmetic Mean = 100
N (detect) = 16	SD (log detect) = 0.23	Max (detect) = 130 J	Arithmetic SD = 19

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.002	4e−04	–	–	–	–	142.852	144.397
Lognormal	0.00022	2.5e−05	–	–	–	–	148.415	149.96
Gamma	–	–	0.3295	0.215	1.941	0.737	146.38	147.925

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Copper

Media:
Surface Sediment (0−15 cm)

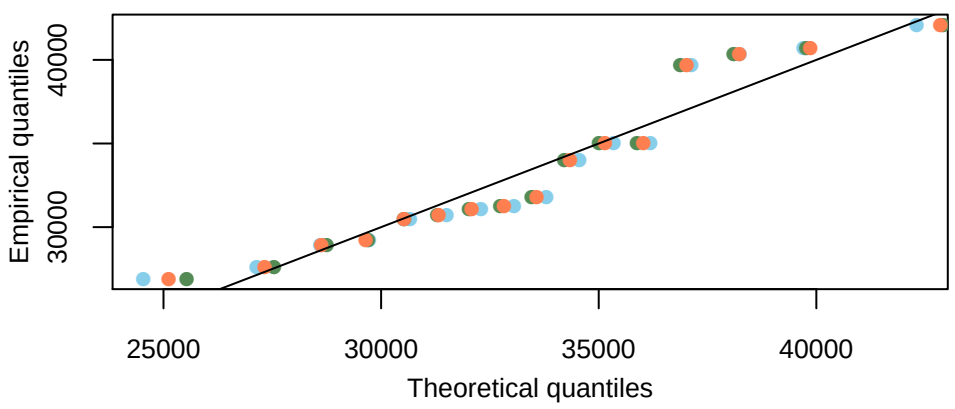
Exposure Unit:
LBC

Chemical (mg/kg):
Iron

Legend

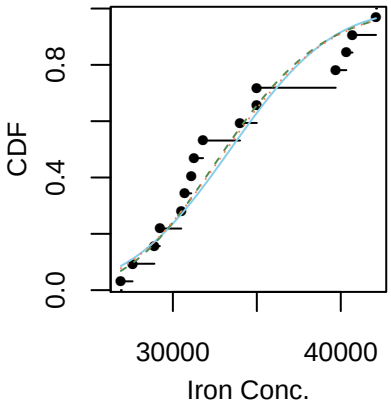
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

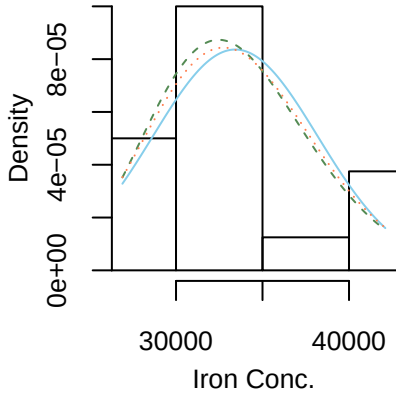


ECDF, Histogram & Q−Q (Detects Only)

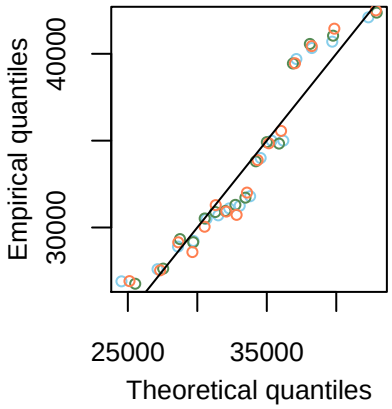
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 27,000 J	Arithmetic Mean = 33,000
N (detect) = 16	SD (log detect) = 0.14	Max (detect) = 42,000 J	Arithmetic SD = 4,900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.11	0.12	–	–	–	–	320.445	321.99
Lognormal	0.21	0.23	–	–	–	–	319.375	320.92
Gamma	–	–	0.1799	0.215	0.529	0.737	319.682	321.227

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Iron

Media:
Surface Sediment (0−15 cm)

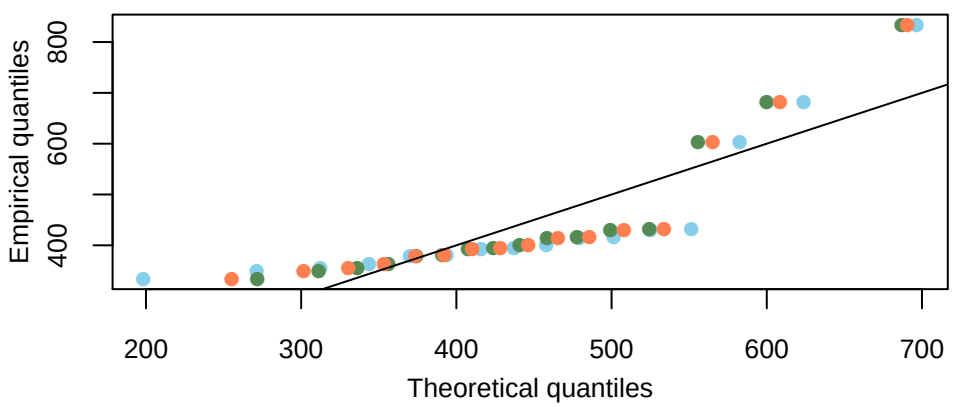
Exposure Unit:
LBC

Chemical (mg/kg):
Manganese

Legend

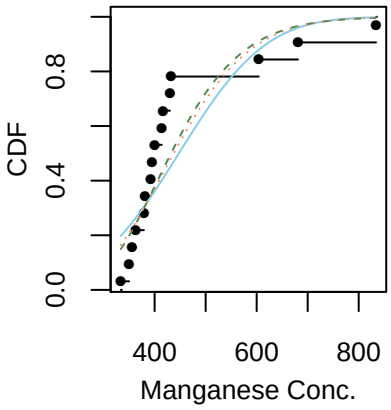
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

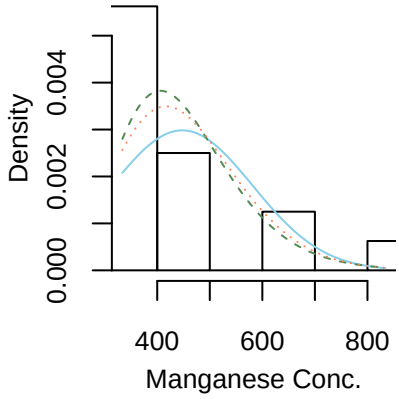


ECDF, Histogram & Q−Q (Detects Only)

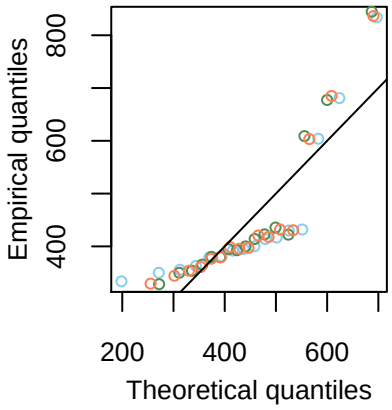
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 330 J	Arithmetic Mean = 450
N (detect) = 16	SD (log detect) = 0.26	Max (detect) = 830 J	Arithmetic SD = 140

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00021	6.4e−06	–	–	–	–	206.078	207.623
Lognormal	0.0016	0.00018	–	–	–	–	199.098	200.643
Gamma	–	–	0.3309	0.215	1.7	0.739	201.215	202.76

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Manganese

Media:
Surface Sediment (0−15 cm)

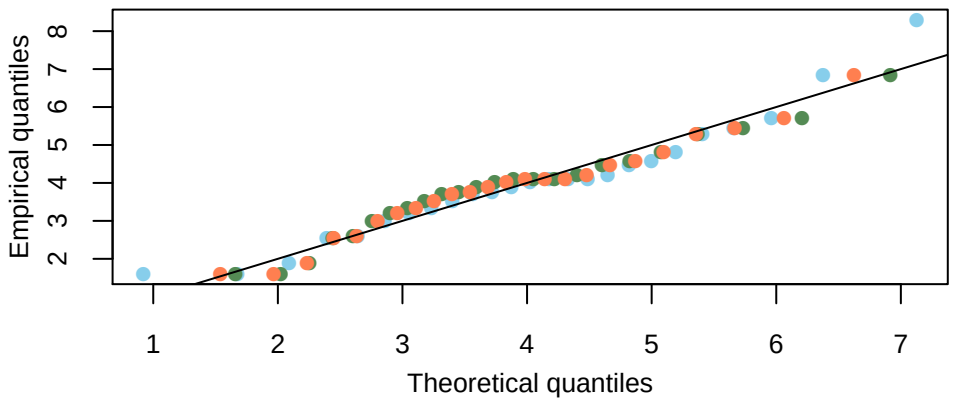
Exposure Unit:
LBC

Chemical (mg/kg):
Mercury

Legend

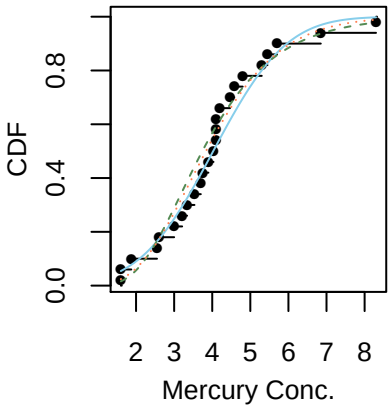
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

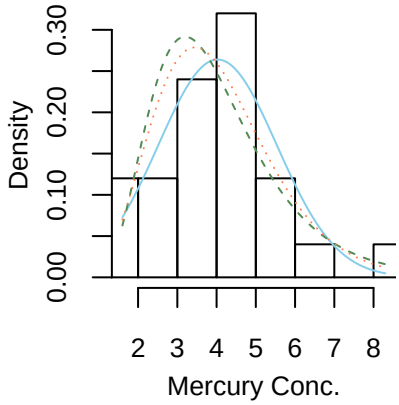


ECDF, Histogram & Q−Q (Detects Only)

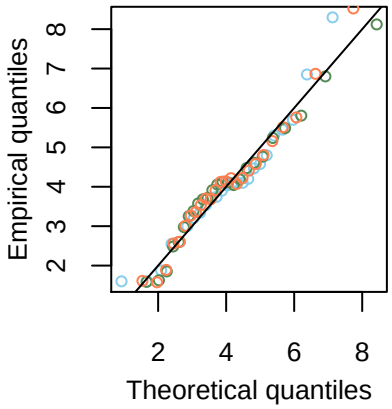
ECDF



Histogram



Q−Q



N = 25	FOD = 100%	Min (detect) = 1	Arithmetic Mean = 4
N (detect) = 25	SD (log detect) = 0.4	Max (detect) = 8 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.21	0.28	–	–	–	–	95.5869	98.0247
Lognormal	0.28	0.35	–	–	–	–	94.5099	96.9477
Gamma	–	–	0.1035	0.175	0.367	0.747	93.5806	96.0183

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Mercury

Media:
Surface Sediment (0−15 cm)

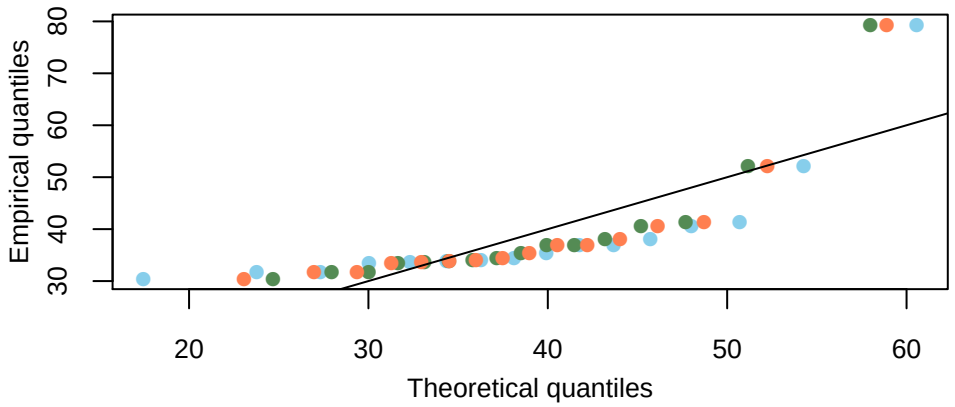
Exposure Unit:
LBC

Chemical (mg/kg):
Nickel

Legend

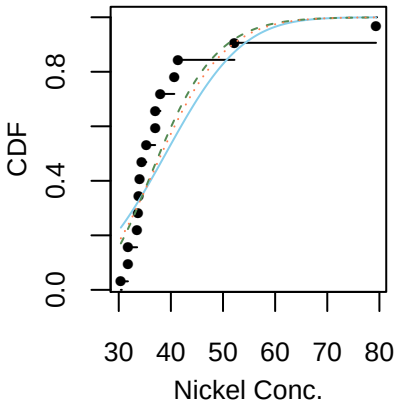
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

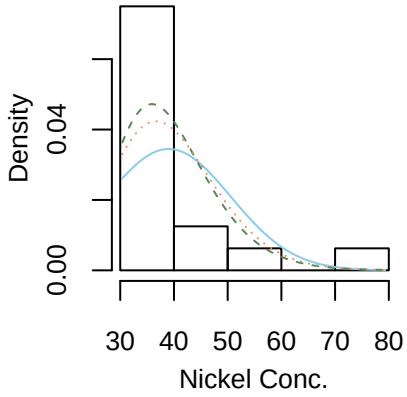


ECDF, Histogram & Q−Q (Detects Only)

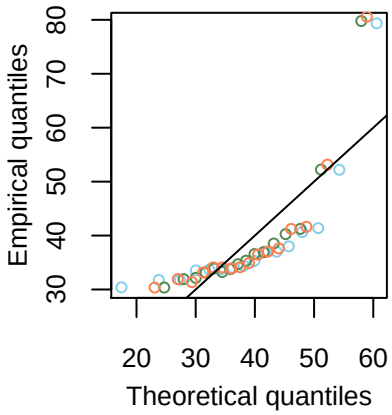
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 30 J	Arithmetic Mean = 39
N (detect) = 16	SD (log detect) = 0.24	Max (detect) = 79 J	Arithmetic SD = 12

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−05	0.00054	–	–	–	–	127.762	129.307
Lognormal	0.00038	0.013	–	–	–	–	118.528	120.073
Gamma	–	–	0.2593	0.215	1.766	0.739	121.364	122.91

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Nickel

Media:
Surface Sediment (0−15 cm)

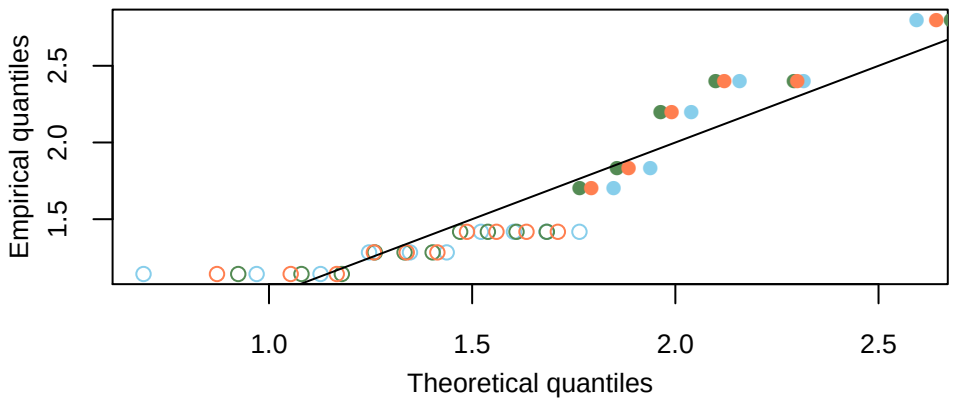
Exposure Unit:
LBC

Chemical (mg/kg):
Thallium

Legend

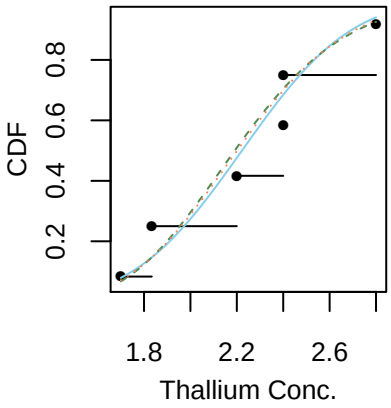
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

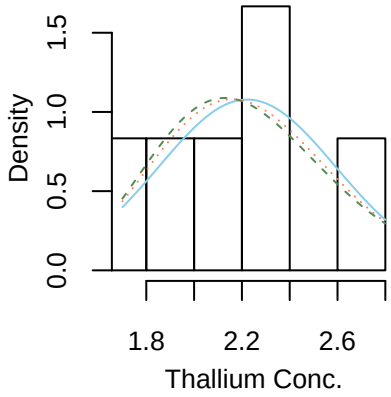


ECDF, Histogram & Q−Q (Detects Only)

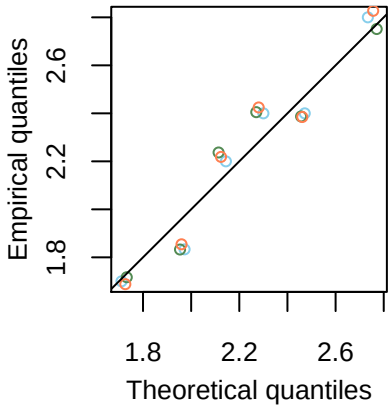
ECDF



Histogram



Q−Q



N = 16	FOD = 38%	Min (detect) = 1 J	Kaplan Meier Mean = 1
N (detect) = 6	SD (log detect) = 0.19	Max (detect) = 2 J	Kaplan Meier SD = 0.59

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0083	0.00084	–	–	–	–	27.9101	29.4552
Lognormal	0.032	0.0043	–	–	–	–	23.8058	25.351
Gamma	–	–	0.2781	0.215	0.9558	0.739	24.9315	26.4767

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.75	0.85	–	–	–	–	9.09683	8.68035
Lognormal	0.7	0.73	–	–	–	–	9.1585	8.74202
Gamma	–	–	NA	NA	NA	NA	9.10375	8.68727

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Thallium

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **67**

Media:
Surface Sediment (0−15 cm)

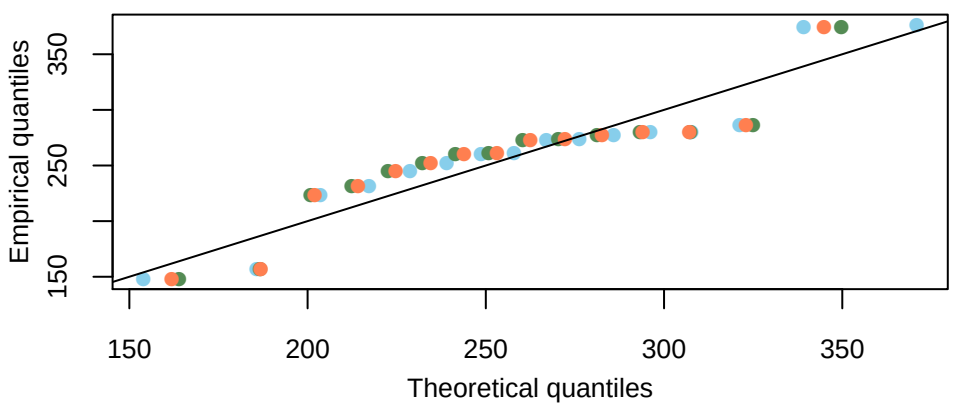
Exposure Unit:
LBC

Chemical (mg/kg):
Zinc

Legend

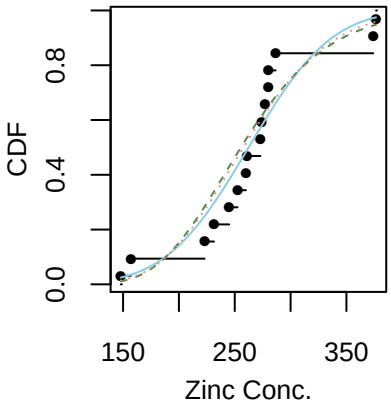
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

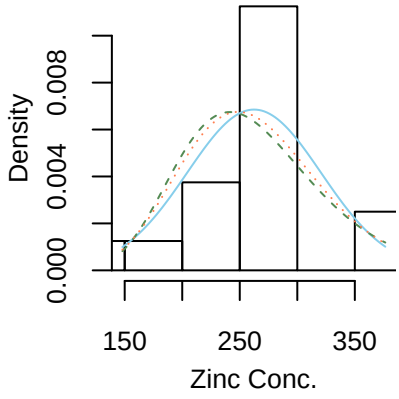


ECDF, Histogram & Q−Q (Detects Only)

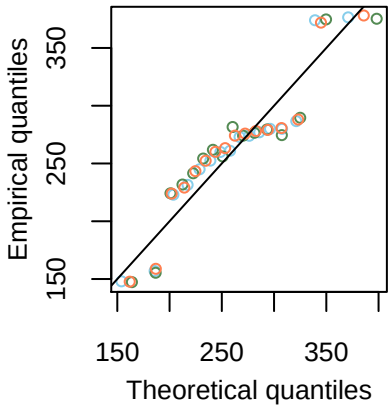
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 150 J	Arithmetic Mean = 260
N (detect) = 16	SD (log detect) = 0.25	Max (detect) = 380 J	Arithmetic SD = 60

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.082	0.04	–	–	–	–	179.468	181.013
Lognormal	0.032	0.11	–	–	–	–	180.877	182.422
Gamma	–	–	0.1958	0.215	0.8441	0.739	180.087	181.632

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Zinc

Media:
Surface Sediment (0−15 cm)

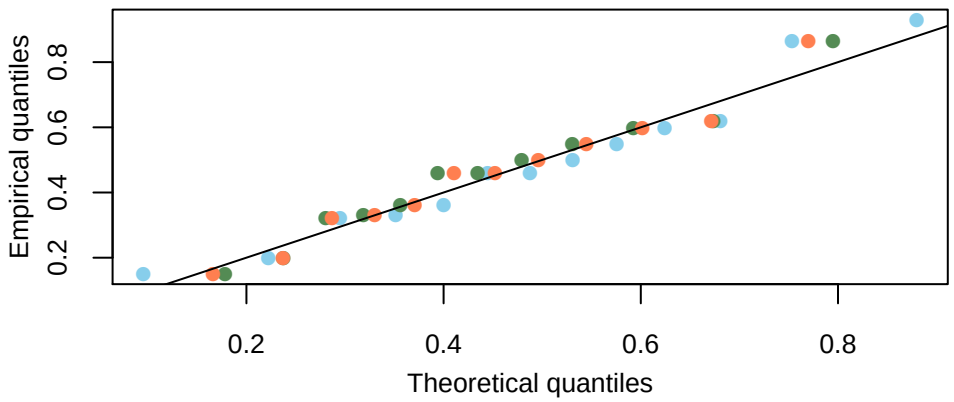
Exposure Unit:
LBC

Chemical (mg/kg):
Benz[a]anthracene

Legend

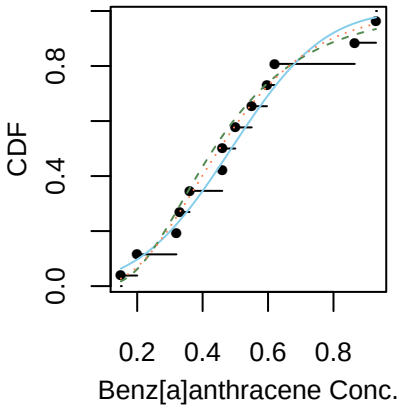
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

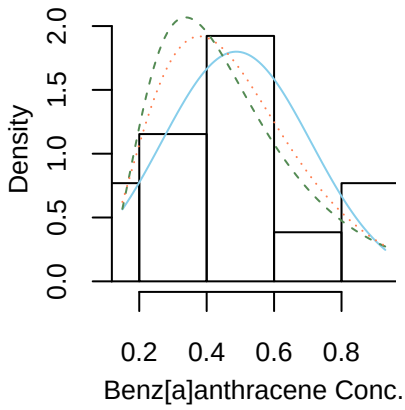


ECDF, Histogram & Q−Q (Detects Only)

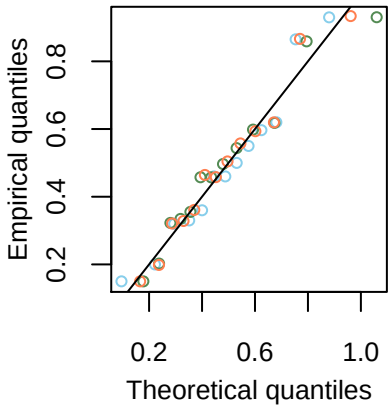
ECDF



Histogram



Q−Q



N = 13	FOD = 100%	Min (detect) = 0.15 J	Arithmetic Mean = 0.49
N (detect) = 13	SD (log detect) = 0.52	Max (detect) = 0.93 J	Arithmetic SD = 0.23

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.63	0.8	–	–	–	–	1.72684	2.85673
Lognormal	0.7	0.5	–	–	–	–	1.40321	2.53311
Gamma	–	–	0.1296	0.27	0.1979	0.736	0.663199	1.7931

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Benz[a]anthracene

Media:
Surface Sediment (0−15 cm)

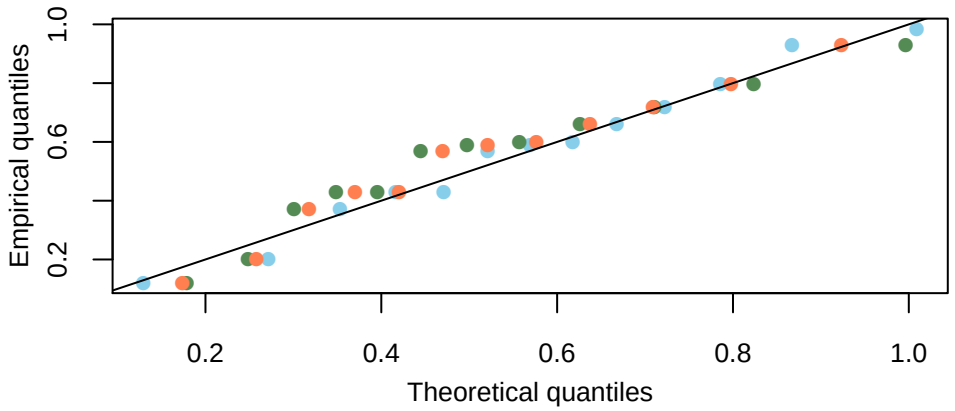
Exposure Unit:
LBC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

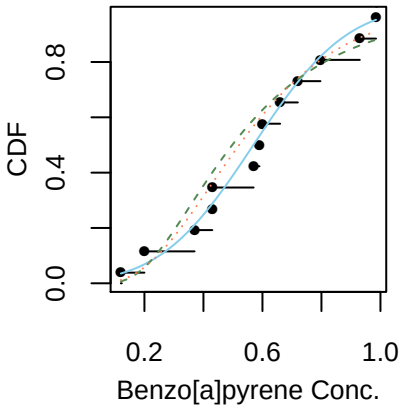
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

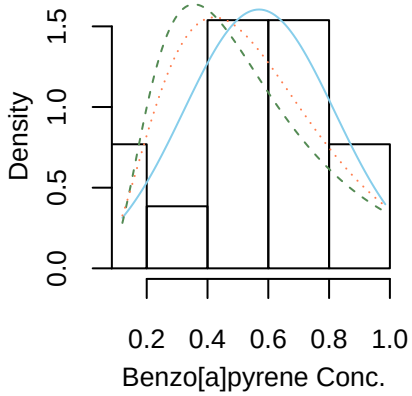


ECDF, Histogram & Q−Q (Detects Only)

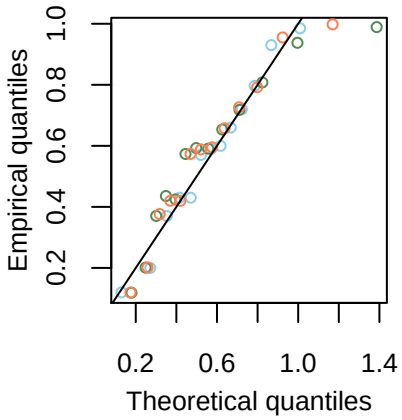
ECDF



Histogram



Q−Q



N = 13	FOD = 100%	Min (detect) = 0.12 J	Arithmetic Mean = 0.57
N (detect) = 13	SD (log detect) = 0.6	Max (detect) = 0.99 J	Arithmetic SD = 0.26

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.95	0.9	–	–	–	–	4.70714	5.83704
Lognormal	0.077	0.14	–	–	–	–	8.55262	9.68252
Gamma	–	–	0.1838	0.27	0.3873	0.736	6.25547	7.38537

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Benzo[a]pyrene

Media:
Surface Sediment (0−15 cm)

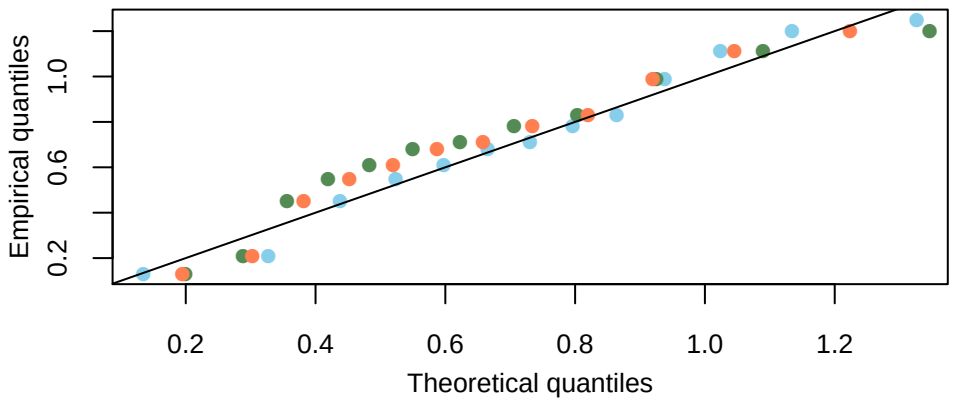
Exposure Unit:
LBC

Chemical (mg/kg):
Benzo[b]fluoranthene

Legend

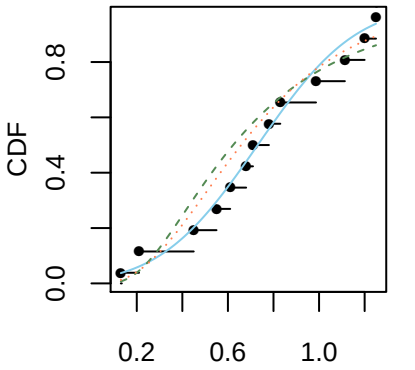
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

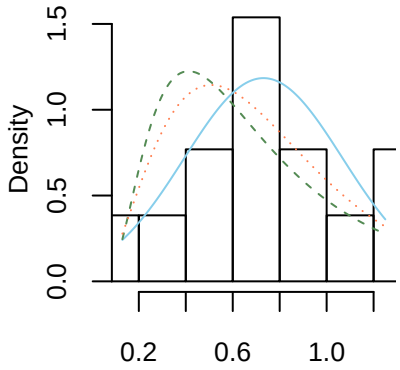


ECDF, Histogram & Q−Q (Detects Only)

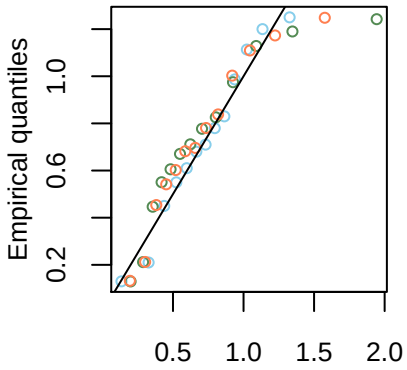
ECDF



Histogram



Q−Q



N = 13	FOD = 100%	Min (detect) = 0.13 J	Arithmetic Mean = 0.73
N (detect) = 13	SD (log detect) = 0.67	Max (detect) = 1 J	Arithmetic SD = 0.35

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.84	0.99	–	–	–	–	12.6016	13.7315
Lognormal	0.039	0.19	–	–	–	–	17.1141	18.244
Gamma	–	–	0.1503	0.27	0.4427	0.736	14.4273	15.5572

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Benzo[b]fluoranthene

Media:
Surface Sediment (0−15 cm)

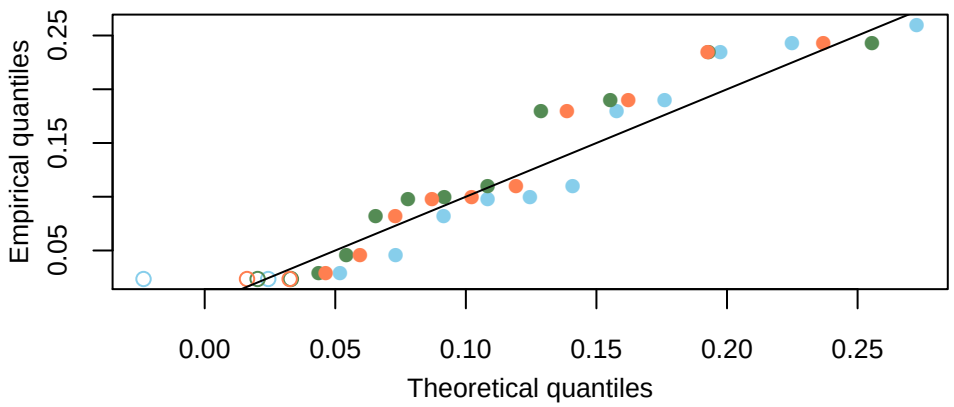
Exposure Unit:
LBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

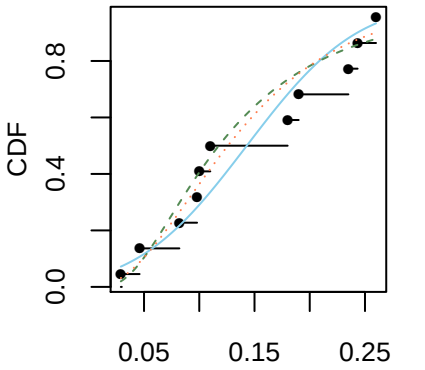
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

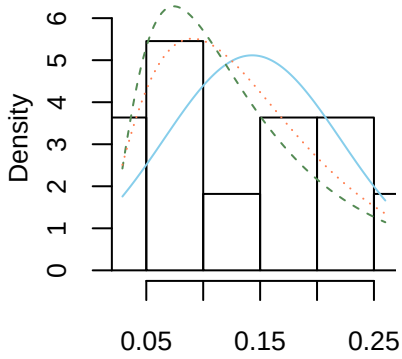


ECDF, Histogram & Q−Q (Detects Only)

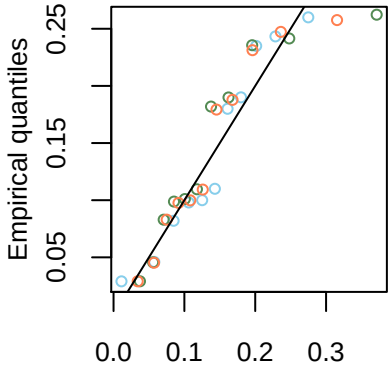
ECDF



Histogram



Q−Q



N = 13	FOD = 85%	Min (detect) = 0.029 J	Kaplan Meier Mean = 0.12
N (detect) = 11	SD (log detect) = 0.71	Max (detect) = 0.26 J	Kaplan Meier SD = 0.084

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.11	0.28	–	–	–	–	−23.6009	−22.471
Lognormal	0.099	0.48	–	–	–	–	−25.2926	−24.1627
Gamma	–	–	0.1632	0.274	0.4524	0.748	−26.3456	−25.2157

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.32	0.24	–	–	–	–	−20.9125	−20.1167
Lognormal	0.26	0.42	–	–	–	–	−20.3481	−19.5523
Gamma	–	–	0.1783	0.27	0.3588	0.736	−21.5215	−20.7257

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

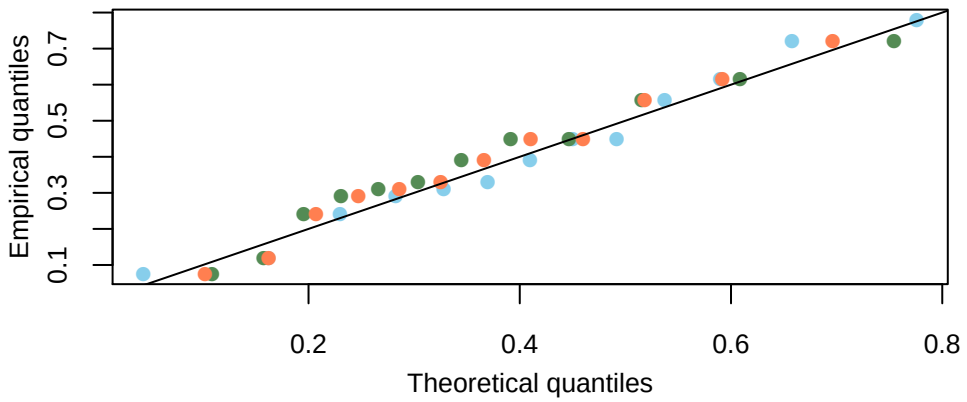
DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Dibenz[a,h]anthracene

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
LBC
Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

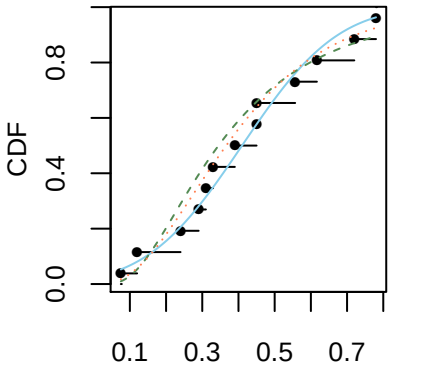
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

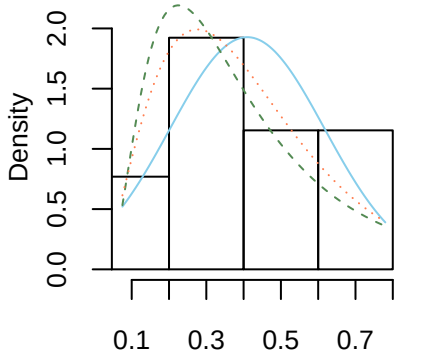


ECDF, Histogram & Q−Q (Detects Only)

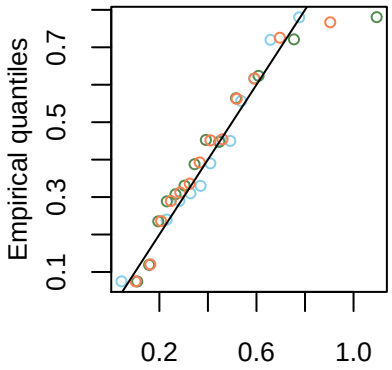
ECDF



Histogram



Q−Q



N = 13	FOD = 100%	Min (detect) = 0.075 J	Arithmetic Mean = 0.41
N (detect) = 13	SD (log detect) = 0.68	Max (detect) = 0.78 J	Arithmetic SD = 0.22

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.91	0.89	–	–	–	–	−0.0629803	1.06692
Lognormal	0.18	0.4	–	–	–	–	2.1436	3.2735
Gamma	–	–	0.1232	0.27	0.2579	0.736	0.119643	1.24954

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Indeno[1,2,3−cd]pyrene

Media:
Surface Sediment (0−15 cm)

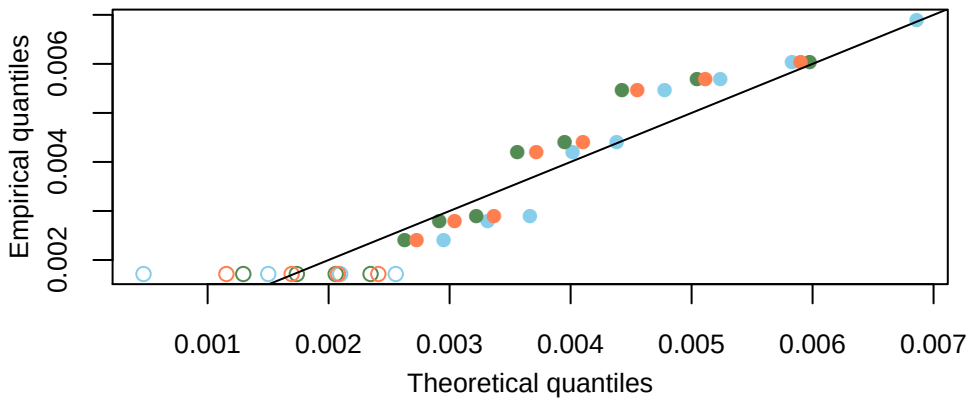
Exposure Unit:
LBC

Chemical (mg/kg):
Aldrin

Legend

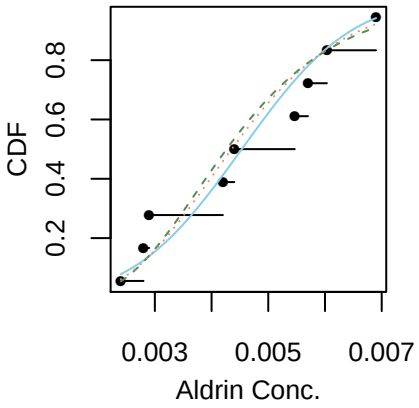
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

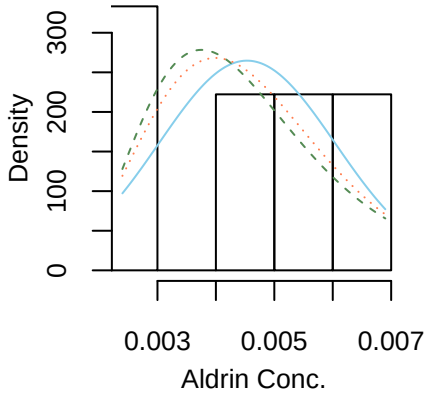


ECDF, Histogram & Q−Q (Detects Only)

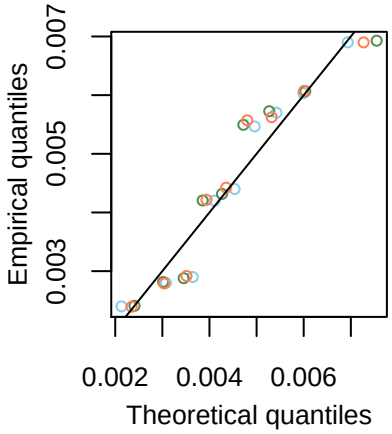
ECDF



Histogram



Q−Q



N = 13	FOD = 69%	Min (detect) = 0.0024 J	Kaplan Meier Mean = 0.0032
N (detect) = 9	SD (log detect) = 0.38	Max (detect) = 0.0069 J	Kaplan Meier SD = 0.0024

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.072	0.18	–	–	–	–	−123.33	−122.2
Lognormal	0.065	0.24	–	–	–	–	−125.514	−124.384
Gamma	–	–	0.1887	0.27	0.6268	0.736	−125.351	−124.221

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.54	0.55	–	–	–	–	−87.4182	−87.0238
Lognormal	0.37	0.48	–	–	–	–	−87.1667	−86.7722
Gamma	–	–	0.194	0.28	0.3775	0.723	−87.4478	−87.0533

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Aldrin

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **74**

Media:
Surface Sediment (0−15 cm)

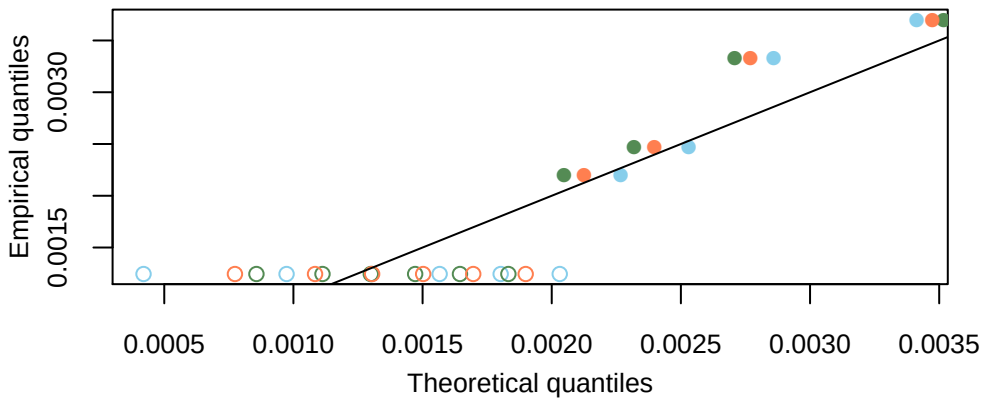
Exposure Unit:
LBC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

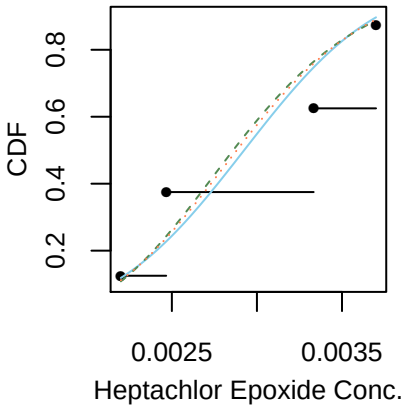
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

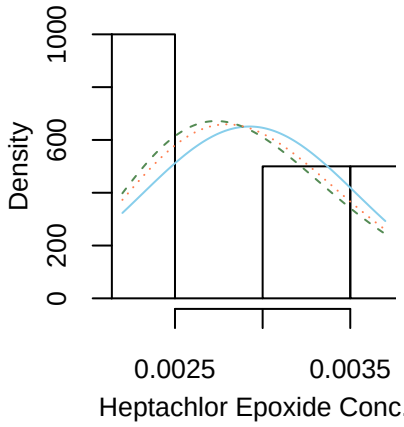


ECDF, Histogram & Q−Q (Detects Only)

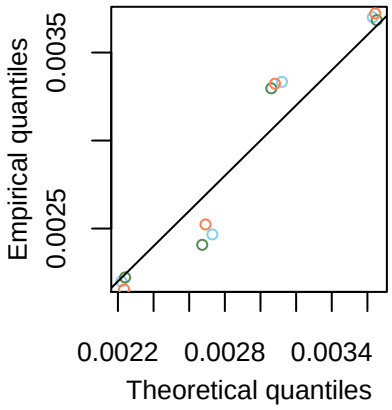
ECDF



Histogram



Q−Q



N = 10	FOD = 40%	Min (detect) = 0.0022 J	Kaplan Meier Mean = 0.0013
N (detect) = 4	SD (log detect) = 0.25	Max (detect) = 0.0037 J	Kaplan Meier SD = 0.0014

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0027	0.00067	–	–	–	–	−107.662	−107.057
Lognormal	0.0025	0.00037	–	–	–	–	−111.658	−111.053
Gamma	–	–	NA	NA	NA	NA	−110.614	−110.009

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.53	N<5	–	–	–	–	−43.8257	−45.0531
Lognormal	0.53	N<5	–	–	–	–	−43.8967	−45.1241
Gamma	–	–	NA	NA	NA	NA	−43.8981	−45.1255

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−Heptachlor Epoxide

Media:
Surface Sediment (0−15 cm)

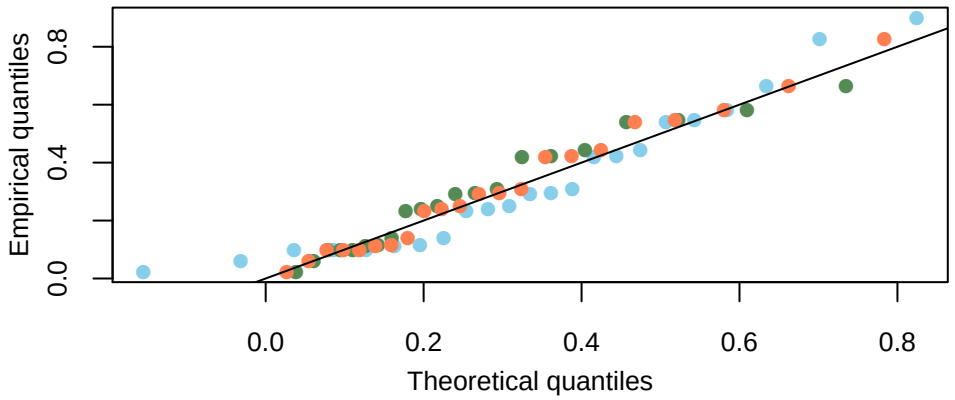
Exposure Unit:
LBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

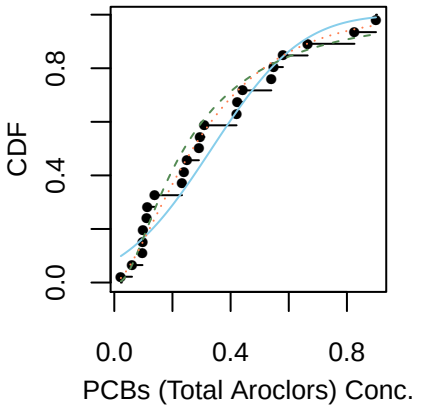
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

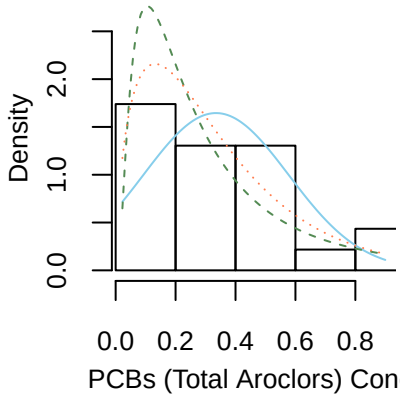


ECDF, Histogram & Q−Q (Detects Only)

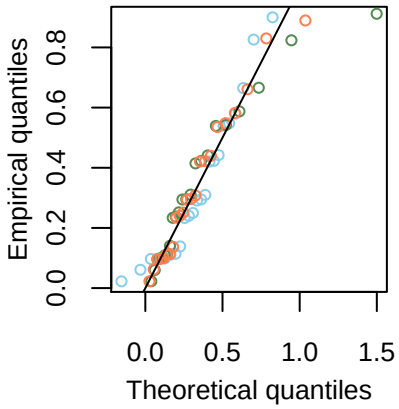
ECDF



Histogram



Q−Q



N = 23	FOD = 100%	Min (detect) = 0.023 J	Arithmetic Mean = 0.33
N (detect) = 23	SD (log detect) = 0.93	Max (detect) = 0.9 J	Arithmetic SD = 0.25

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.057	0.21	–	–	–	–	4.10233	6.37332
Lognormal	0.22	0.29	–	–	–	–	−0.842865	1.42812
Gamma	–	–	0.1191	0.187	0.2954	0.769	−3.30724	−1.03625

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−PCBs (Total Aroclors)

Media:
Surface Sediment (0−15 cm)

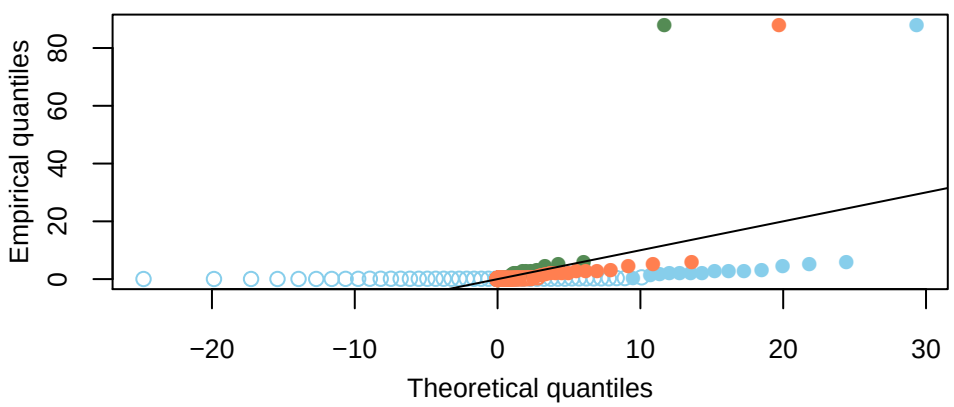
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Antimony

Legend

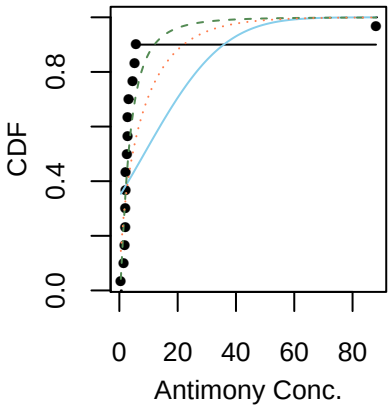
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

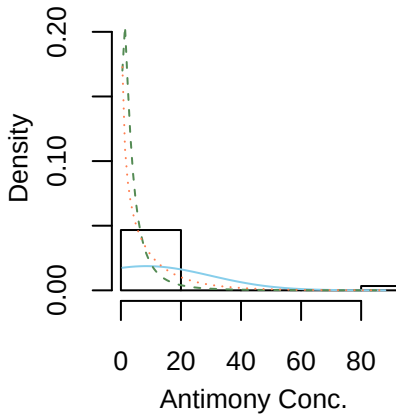


ECDF, Histogram & Q−Q (Detects Only)

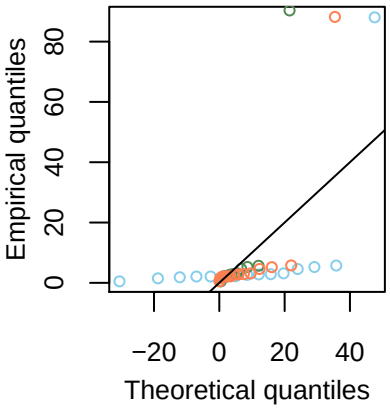
ECDF



Histogram



Q−Q



N = 59	FOD = 25%	Min (detect) = 0.5 J	Kaplan Meier Mean = 2
N (detect) = 15	SD (log detect) = 1.1	Max (detect) = 88 J	Kaplan Meier SD = 11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.9e−30	–	–	–	–	457.965	462.121
Lognormal	0	2.7e−09	–	–	–	–	83.0689	87.224
Gamma	–	–	0.3183	0.139	8.797	0.9121	143.567	147.722

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.3e−10	–	–	–	–	138.335	139.752
Lognormal	0.0019	0.036	–	–	–	–	82.1514	83.5675
Gamma	–	–	0.3721	0.234	2.78	0.793	95.2323	96.6484

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Antimony

Media:
Surface Sediment (0−15 cm)

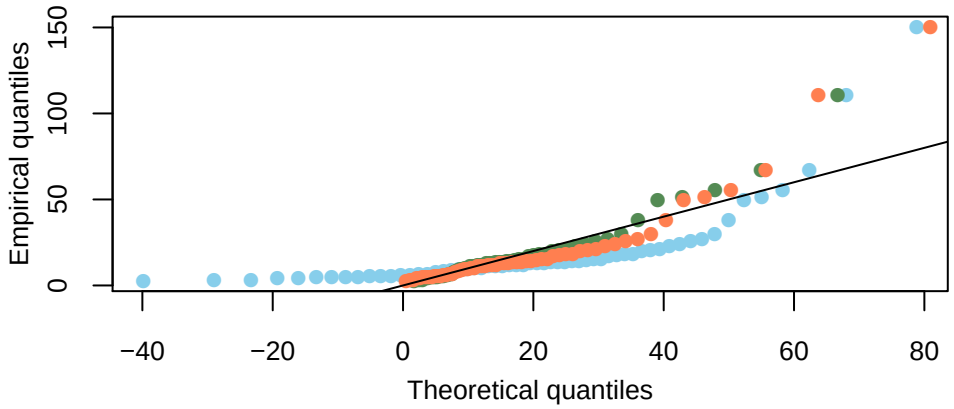
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Arsenic

Legend

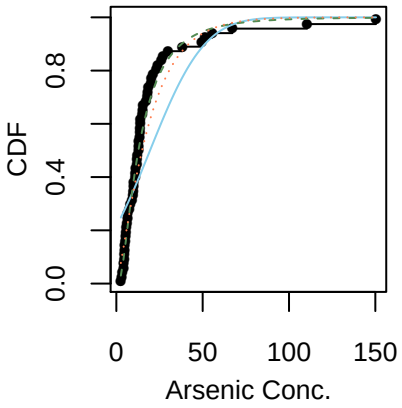
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

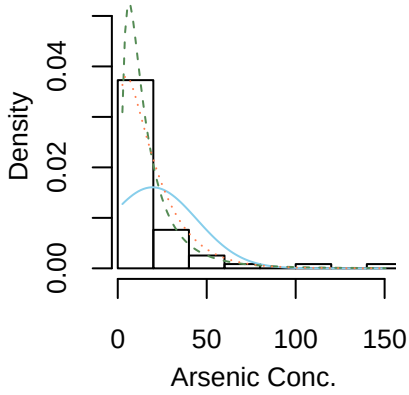


ECDF, Histogram & Q−Q (Detects Only)

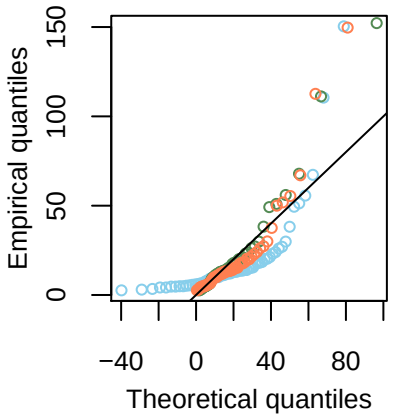
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 20
N (detect) = 59	SD (log detect) = 0.85	Max (detect) = 150 J	Arithmetic SD = 25

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−11	–	–	–	–	550.552	554.707
Lognormal	0.1	0.28	–	–	–	–	452.358	456.513
Gamma	–	–	0.1622	0.129	2.157	0.78	469.967	474.122

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Arsenic

Media:
Surface Sediment (0−15 cm)

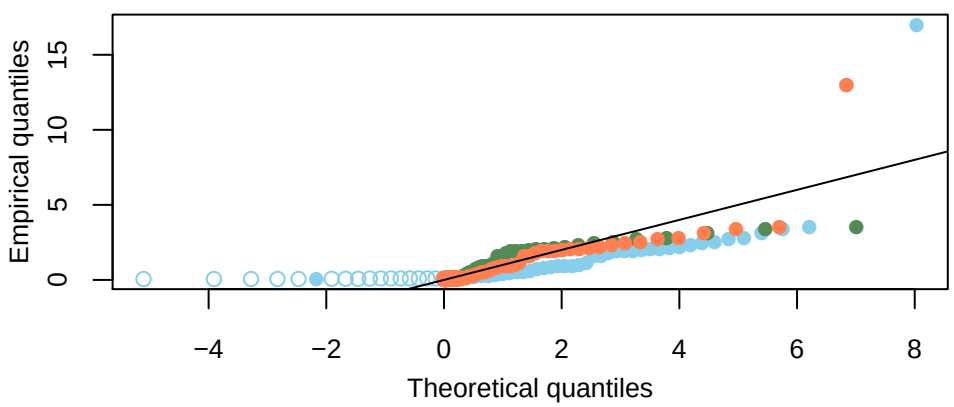
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Cadmium

Legend

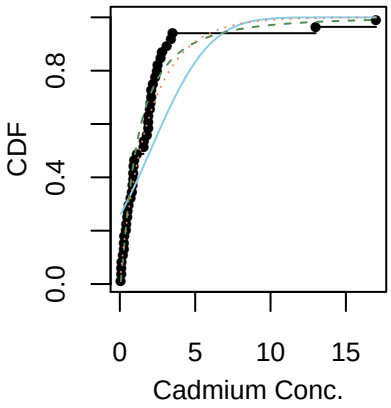
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

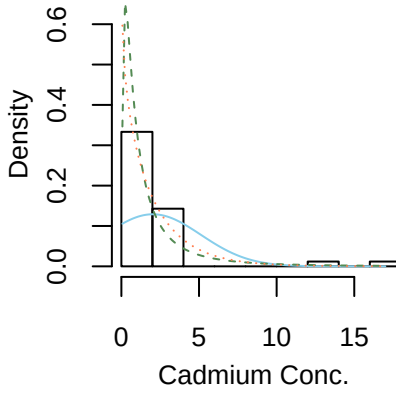


ECDF, Histogram & Q−Q (Detects Only)

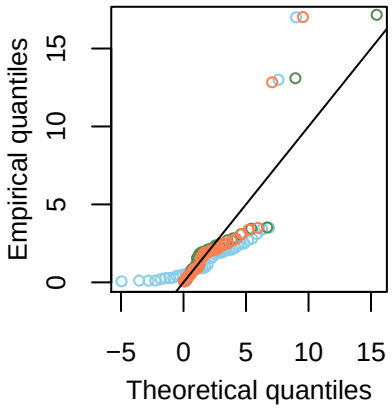
ECDF



Histogram



Q−Q



N = 59	FOD = 71%	Min (detect) = 0.065 J	Kaplan Meier Mean = 1
N (detect) = 42	SD (log detect) = 1.2	Max (detect) = 17 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.9e−15	–	–	–	–	290.89	295.045
Lognormal	4e−04	6.4e−05	–	–	–	–	140.258	144.413
Gamma	–	–	0.1674	0.132	2.01	0.814	152.427	156.582

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.7e−09	–	–	–	–	217.99	221.465
Lognormal	0.13	0.055	–	–	–	–	141.382	144.858
Gamma	–	–	0.1339	0.148	1.009	0.813	146.761	150.237

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Cadmium

Media:
Surface Sediment (0−15 cm)

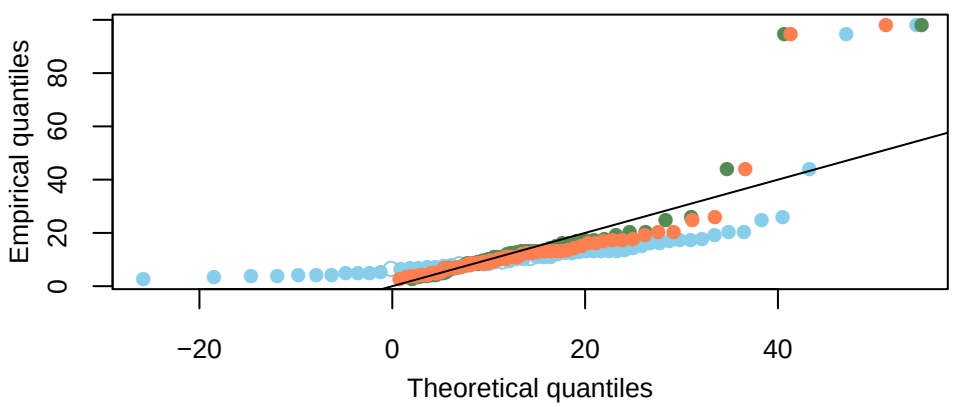
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Cobalt

Legend

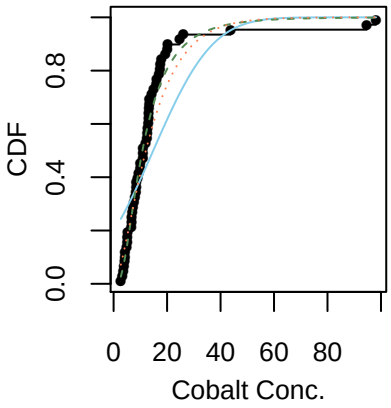
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

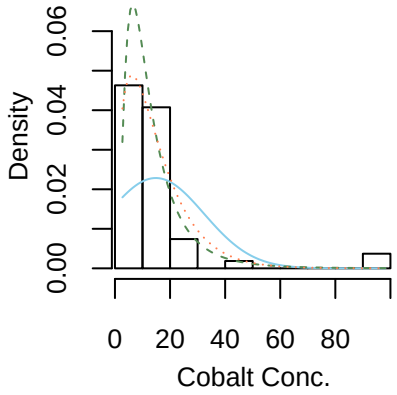


ECDF, Histogram & Q−Q (Detects Only)

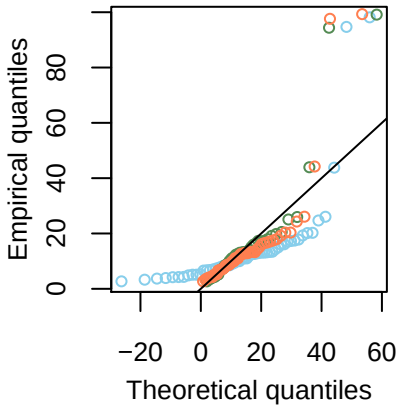
ECDF



Histogram



Q−Q



N = 59	FOD = 92%	Min (detect) = 2 J	Kaplan Meier Mean = 14
N (detect) = 54	SD (log detect) = 0.72	Max (detect) = 98 J	Kaplan Meier SD = 17

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.5e−13	–	–	–	–	504.323	508.478
Lognormal	0.0066	0.2	–	–	–	–	405.881	410.037
Gamma	–	–	0.1631	0.129	2.454	0.78	425.706	429.861

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.3e−12	–	–	–	–	466.109	470.087
Lognormal	0.014	0.21	–	–	–	–	377.994	381.972
Gamma	–	–	0.1603	0.129	2.149	0.78	395.173	399.151

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Cobalt

Media:
Surface Sediment (0−15 cm)

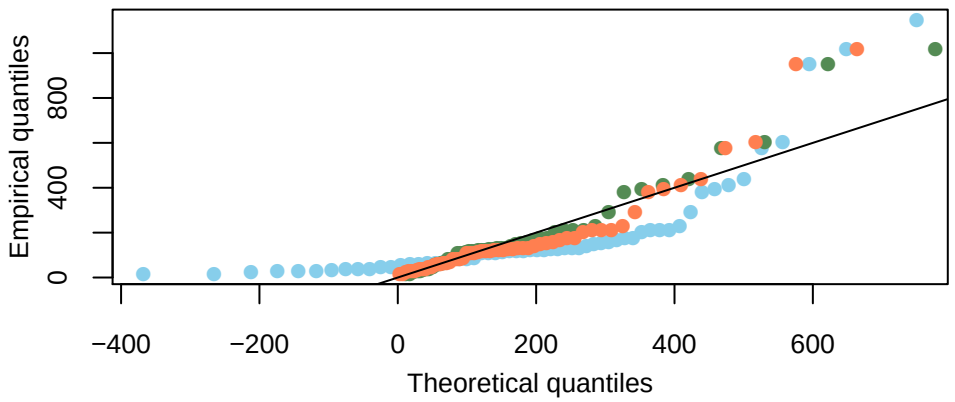
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Copper

Legend

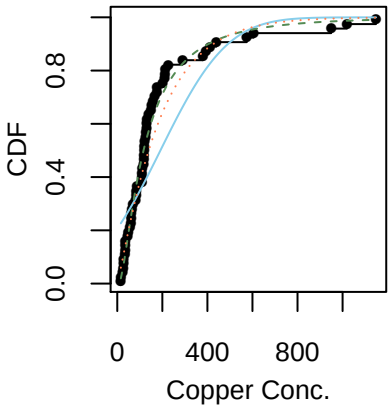
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

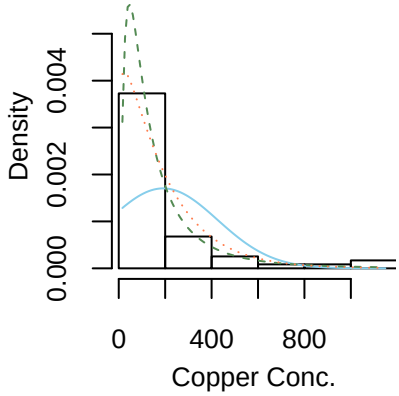


ECDF, Histogram & Q−Q (Detects Only)

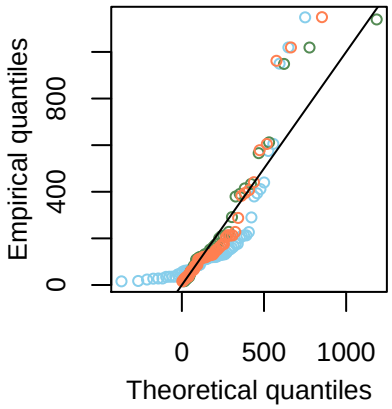
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 16	Arithmetic Mean = 190
N (detect) = 59	SD (log detect) = 0.98	Max (detect) = 1,100 J	Arithmetic SD = 240

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.5e−12	–	–	–	–	815.205	819.36
Lognormal	0.29	0.12	–	–	–	–	729.455	733.61
Gamma	–	–	0.1538	0.129	1.719	0.78	741.366	745.521

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Copper

Media:
Surface Sediment (0−15 cm)

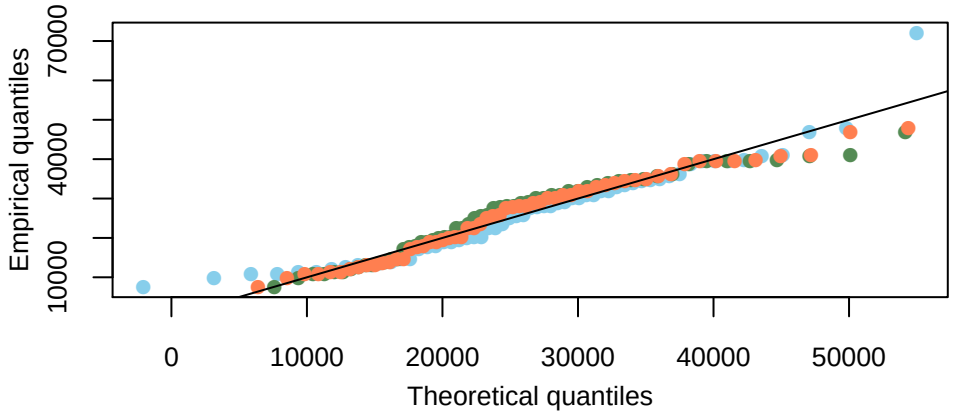
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Iron

Legend

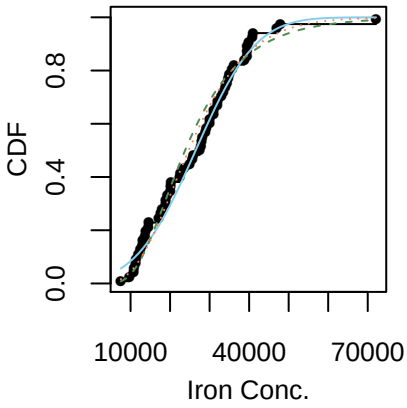
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

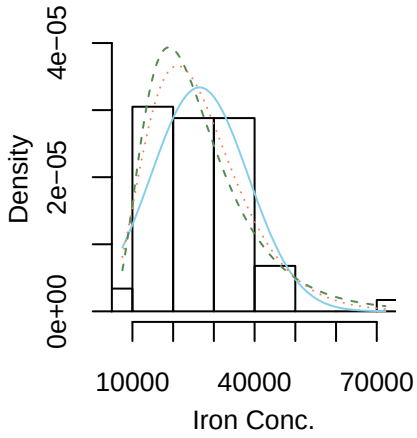


ECDF, Histogram & Q−Q (Detects Only)

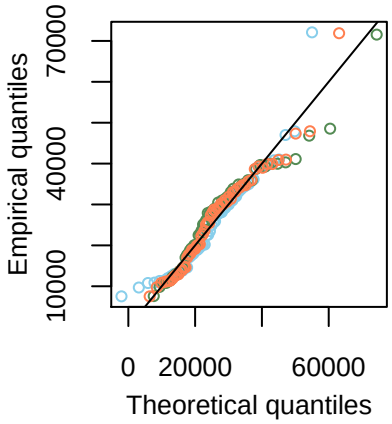
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 7,500 J	Arithmetic Mean = 26,000
N (detect) = 59	SD (log detect) = 0.48	Max (detect) = 72,000 J	Arithmetic SD = 12,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0041	0.3	–	–	–	–	1279.26	1283.41
Lognormal	0.076	0.019	–	–	–	–	1273.25	1277.4
Gamma	–	–	0.1015	0.127	0.6674	0.763	1271.58	1275.73

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Iron

Media:
Surface Sediment (0−15 cm)

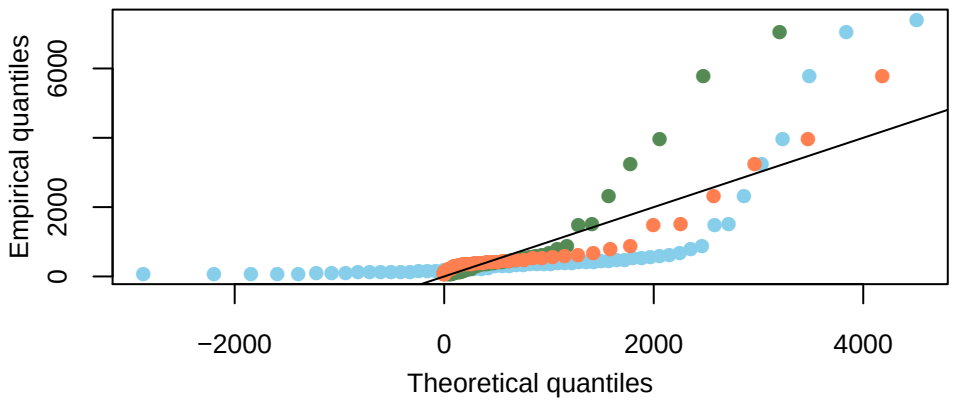
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Manganese

Legend

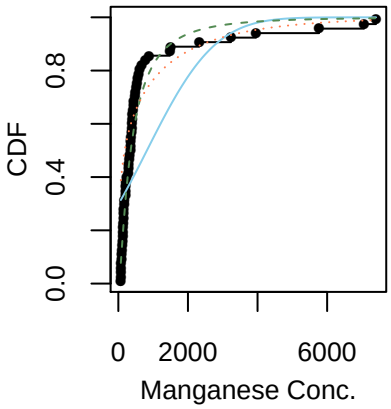
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

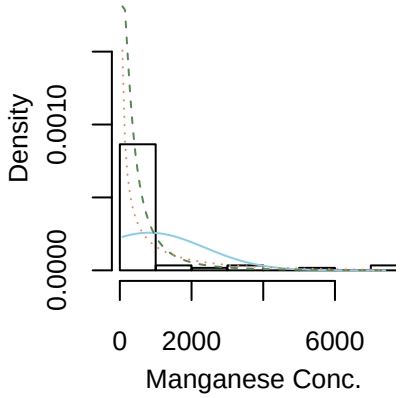


ECDF, Histogram & Q−Q (Detects Only)

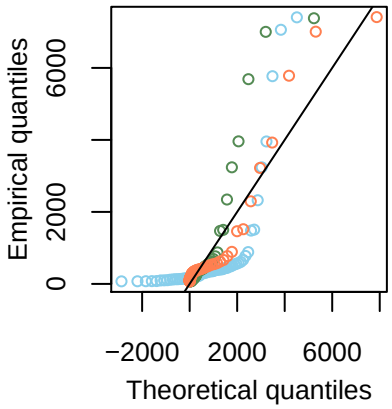
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 71 J	Arithmetic Mean = 820
N (detect) = 59	SD (log detect) = 1.1	Max (detect) = 7,400 J	Arithmetic SD = 1,600

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.3e−22	–	–	–	–	1037.94	1042.1
Lognormal	0.00053	0.017	–	–	–	–	878.132	882.287
Gamma	–	–	0.3881	0.139	9.421	0.9121	936.879	941.035

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Manganese

Media:
Surface Sediment (0−15 cm)

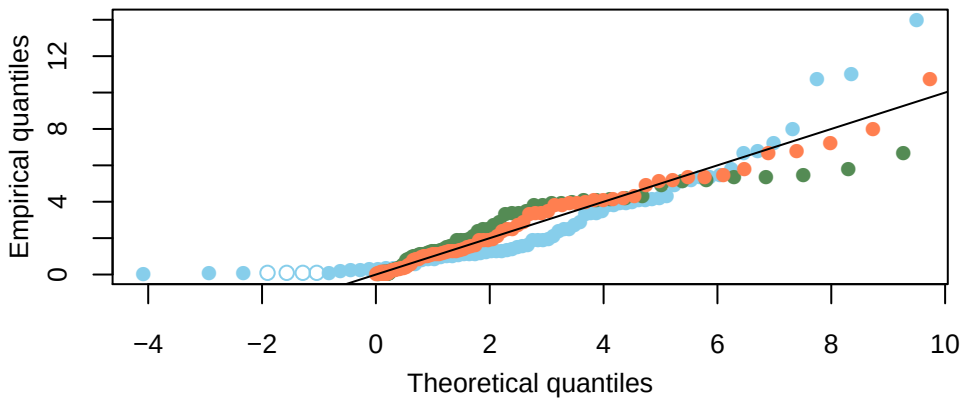
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Mercury

Legend

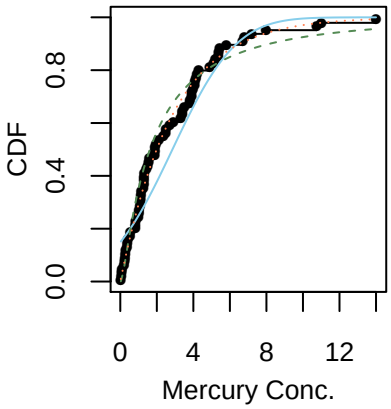
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

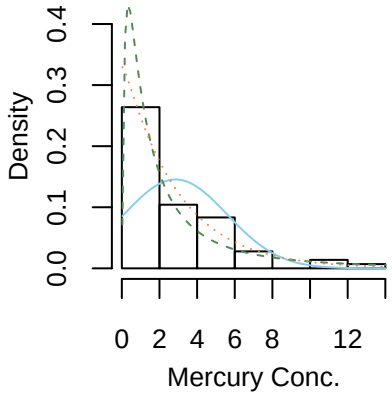


ECDF, Histogram & Q−Q (Detects Only)

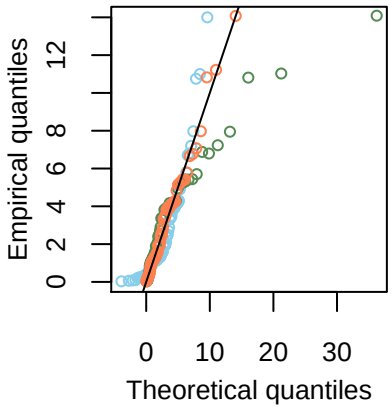
ECDF



Histogram



Q−Q



N = 76	FOD = 95%	Min (detect) = 0.03 J	Kaplan Meier Mean = 2
N (detect) = 72	SD (log detect) = 1.3	Max (detect) = 14 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.2e−05	–	–	–	–	372.867	377.528
Lognormal	6e−04	0.006	–	–	–	–	319.656	324.317
Gamma	–	–	0.07563	0.113	0.4203	0.817	306.766	311.428

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00016	–	–	–	–	353.603	358.157
Lognormal	0.0016	0.03	–	–	–	–	311.476	316.029
Gamma	–	–	0.07347	0.11	0.2953	0.78	299.102	303.655

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Mercury

Media:
Surface Sediment (0−15 cm)

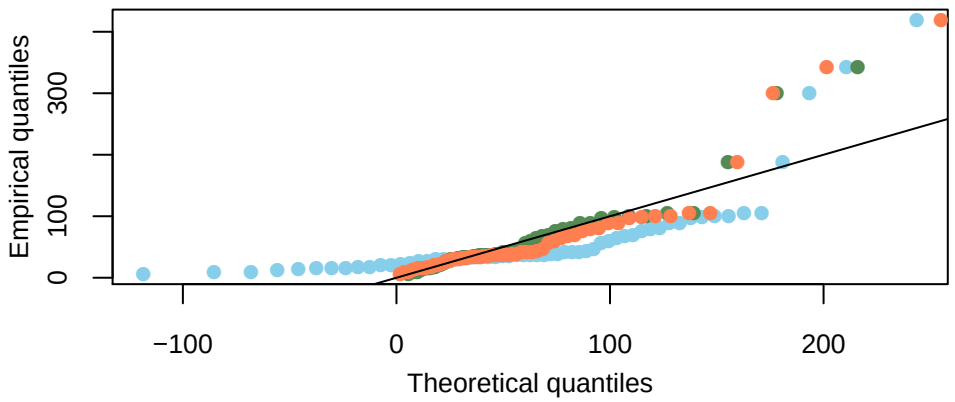
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Nickel

Legend

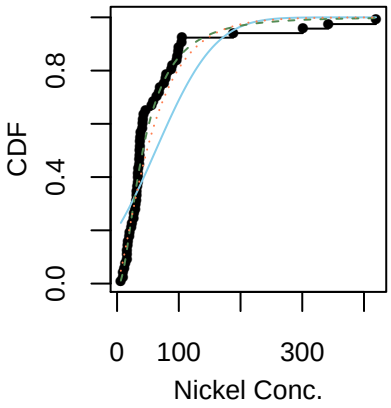
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

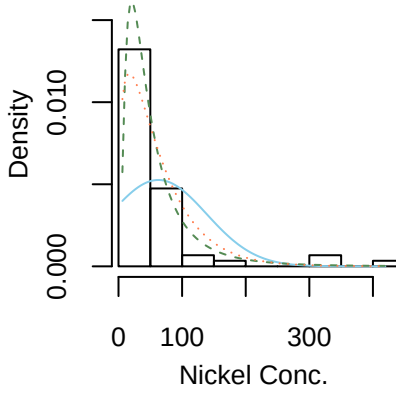


ECDF, Histogram & Q−Q (Detects Only)

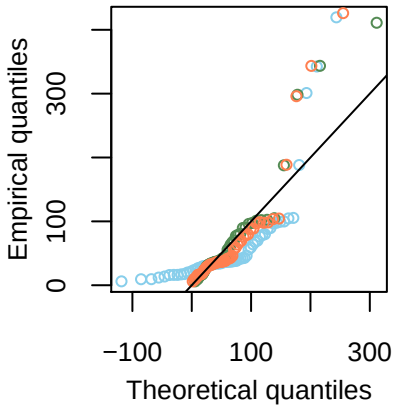
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 6 J	Arithmetic Mean = 63
N (detect) = 59	SD (log detect) = 0.85	Max (detect) = 420 J	Arithmetic SD = 76

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−09	–	–	–	–	682.186	686.341
Lognormal	0.11	0.014	–	–	–	–	591.386	595.541
Gamma	–	–	0.1927	0.129	2.208	0.78	606.868	611.023

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Nickel

Media:
Surface Sediment (0−15 cm)

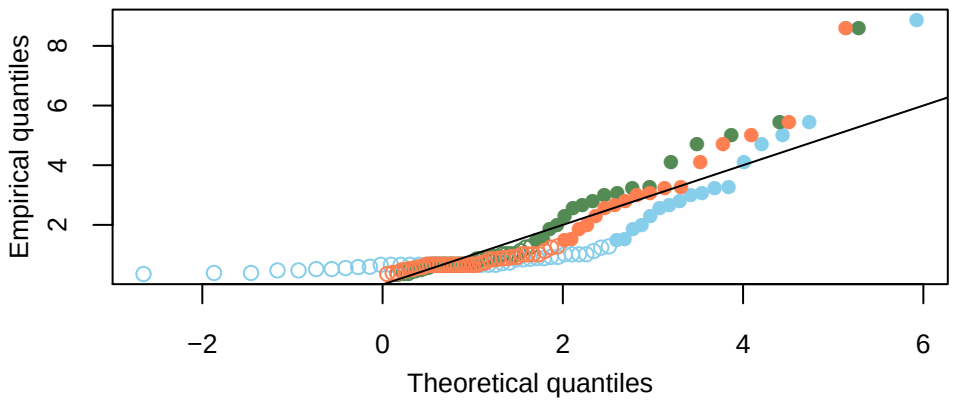
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Thallium

Legend

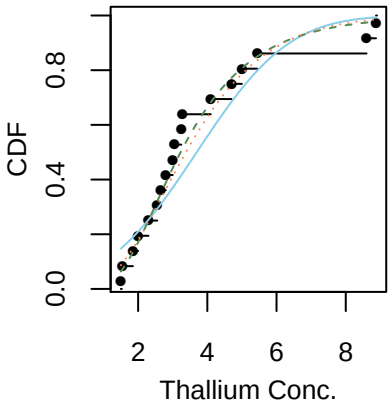
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

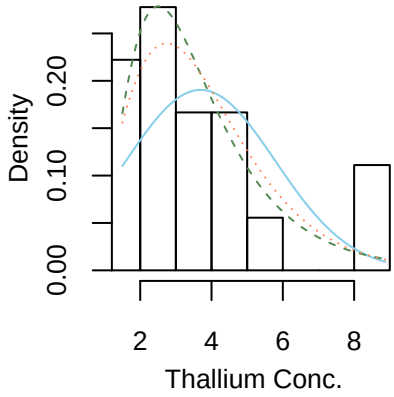


ECDF, Histogram & Q−Q (Detects Only)

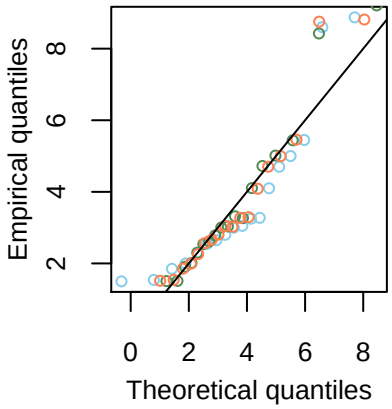
ECDF



Histogram



Q−Q



N = 59	FOD = 31%	Min (detect) = 1	Kaplan Meier Mean = 1
N (detect) = 18	SD (log detect) = 0.52	Max (detect) = 8 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2e−12	–	–	–	–	240.574	244.729
Lognormal	7e−05	1.1e−05	–	–	–	–	157.657	161.812
Gamma	–	–	0.2414	0.129	4.046	0.78	175.591	179.746

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0034	0.0059	–	–	–	–	81.7077	83.4884
Lognormal	0.49	0.3	–	–	–	–	72.5584	74.3391
Gamma	–	–	0.1906	0.206	0.4962	0.753	74.4518	76.2325

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Thallium

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **86**

Media:
Surface Sediment (0−15 cm)

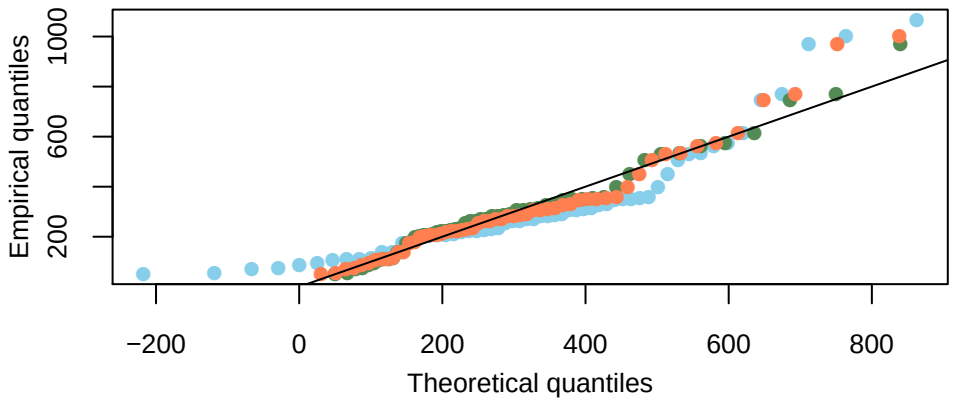
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Zinc

Legend

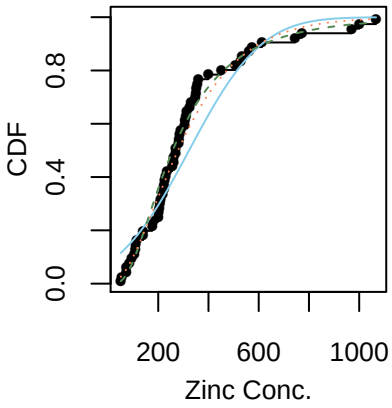
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

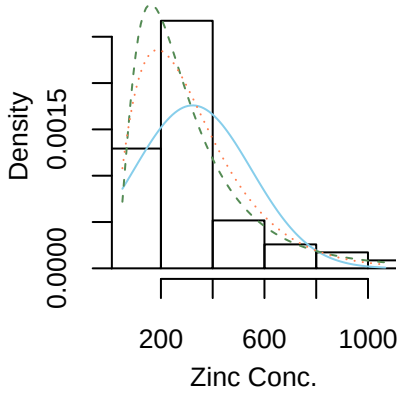


ECDF, Histogram & Q−Q (Detects Only)

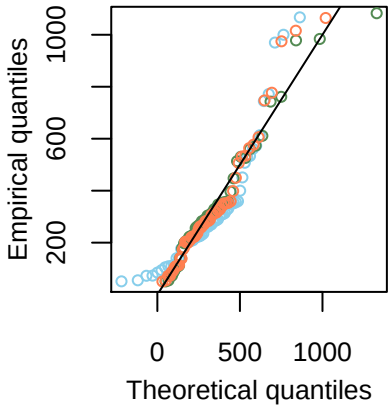
ECDF



Histogram



Q−Q



N = 58	FOD = 100%	Min (detect) = 51 J	Arithmetic Mean = 320
N (detect) = 58	SD (log detect) = 0.69	Max (detect) = 1,100 J	Arithmetic SD = 230

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7e−07	–	–	–	–	797.796	801.917
Lognormal	0.28	0.049	–	–	–	–	769.302	773.423
Gamma	–	–	0.1258	0.127	0.6447	0.763	770.527	774.648

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

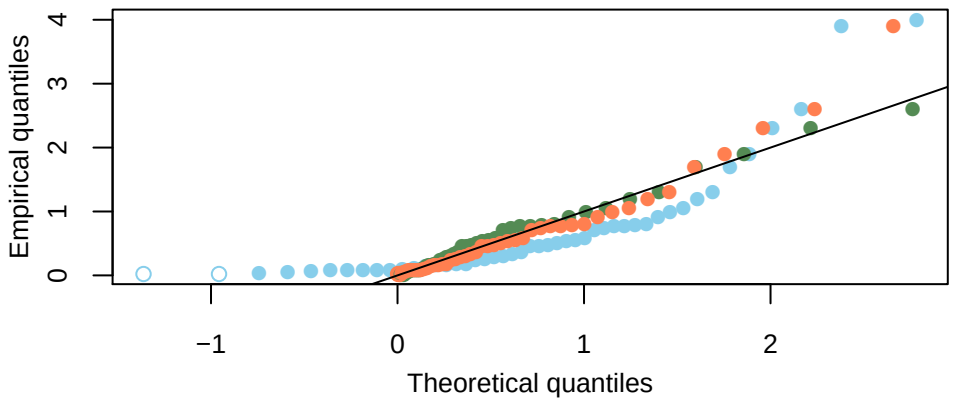
DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Zinc

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Benz[a]anthracene

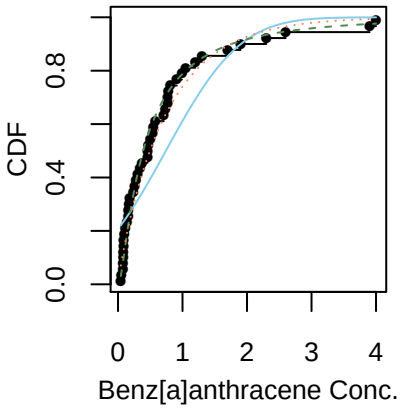
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

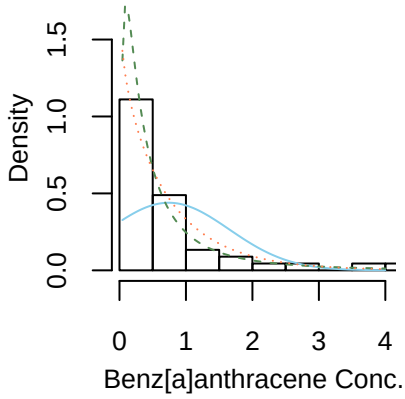


ECDF, Histogram & Q−Q (Detects Only)

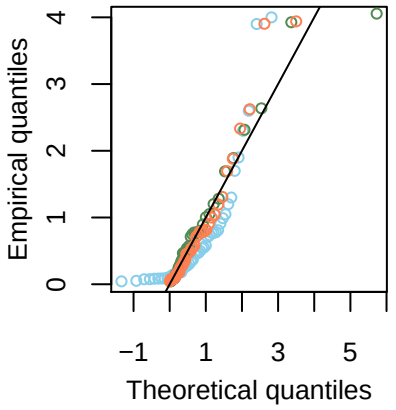
ECDF



Histogram



Q−Q



N = 47	FOD = 96%	Min (detect) = 0.044 J	Kaplan Meier Mean = 0.71
N (detect) = 45	SD (log detect) = 1.2	Max (detect) = 4	Kaplan Meier SD = 0.9

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.8e−06	–	–	–	–	127.495	131.195
Lognormal	0.56	0.32	–	–	–	–	61.2496	64.9499
Gamma	–	–	0.09334	0.139	0.5443	0.813	64.6709	68.3712

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.2e−06	–	–	–	–	123.008	126.621
Lognormal	0.35	0.51	–	–	–	–	61.5574	65.1707
Gamma	–	–	0.09687	0.139	0.6878	0.813	66.8747	70.488

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Benz[a]anthracene

Media:
Surface Sediment (0−15 cm)

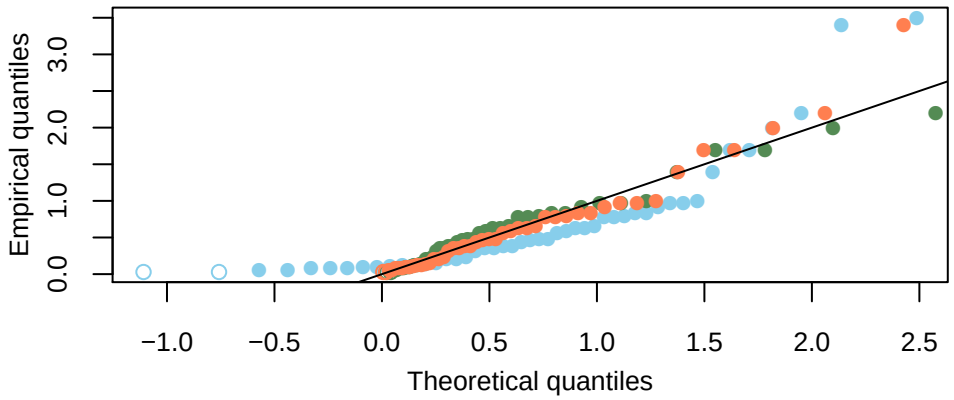
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Benzo[a]pyrene

Legend

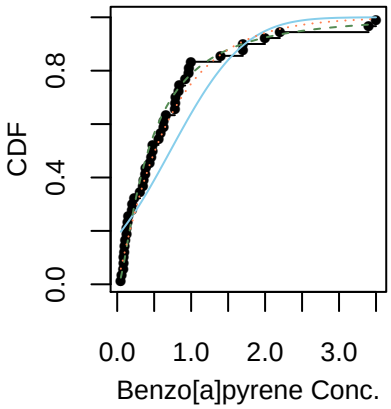
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

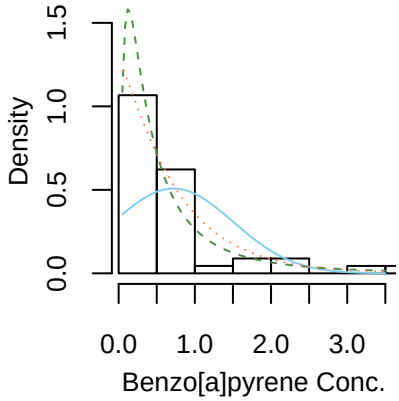


ECDF, Histogram & Q−Q (Detects Only)

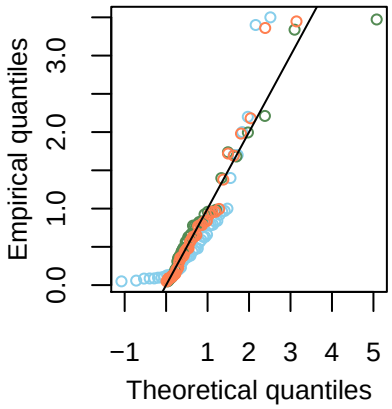
ECDF



Histogram



Q−Q



N = 47	FOD = 96%	Min (detect) = 0.049 J	Kaplan Meier Mean = 0.69
N (detect) = 45	SD (log detect) = 1.1	Max (detect) = 3 J	Kaplan Meier SD = 0.78

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.3e−05	–	–	–	–	114.147	117.848
Lognormal	0.34	0.35	–	–	–	–	61.6545	65.3548
Gamma	–	–	0.09071	0.139	0.4344	0.813	62.9808	66.6811

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.9e−05	–	–	–	–	109.964	113.577
Lognormal	0.3	0.47	–	–	–	–	61.1988	64.8121
Gamma	–	–	0.09307	0.136	0.5353	0.777	64.2122	67.8255

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

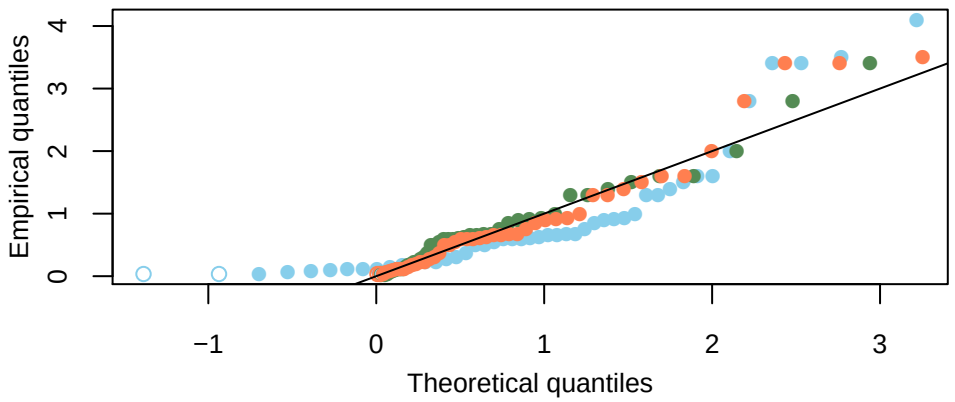
DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Benzo[a]pyrene

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Benzo[b]fluoranthene

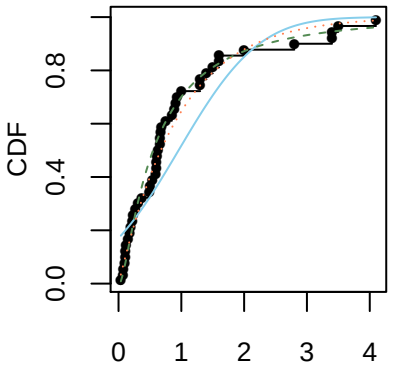
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

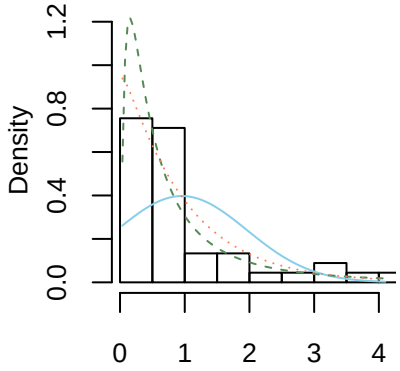


ECDF, Histogram & Q−Q (Detects Only)

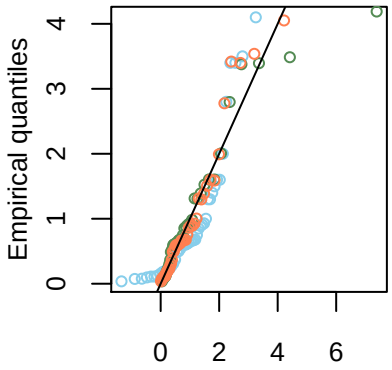
ECDF



Histogram



Q−Q



N = 47	FOD = 96%	Min (detect) = 0.037 J	Kaplan Meier Mean = 0.92
N (detect) = 45	SD (log detect) = 1.1	Max (detect) = 4	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.5e−06	–	–	–	–	137.356	141.057
Lognormal	0.11	0.024	–	–	–	–	90.6067	94.307
Gamma	–	–	0.08395	0.139	0.4509	0.813	89.6484	93.3487

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.8e−06	–	–	–	–	132.056	135.669
Lognormal	0.3	0.069	–	–	–	–	89.3838	92.9972
Gamma	–	–	0.09619	0.136	0.5107	0.777	89.8923	93.5056

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Benzo[b]fluoranthene

Media:
Surface Sediment (0−15 cm)

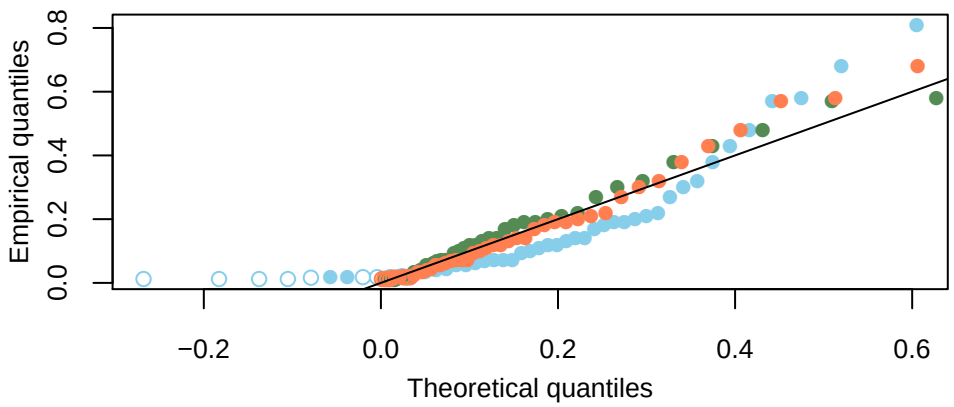
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

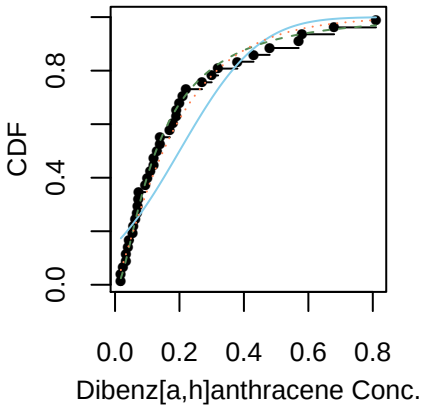
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

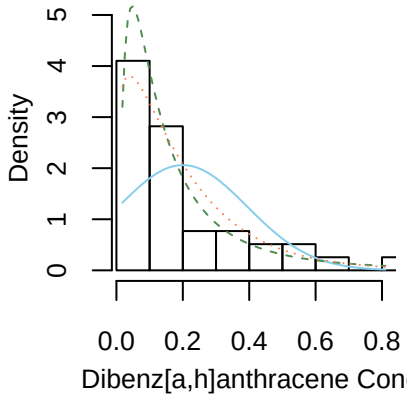


ECDF, Histogram & Q−Q (Detects Only)

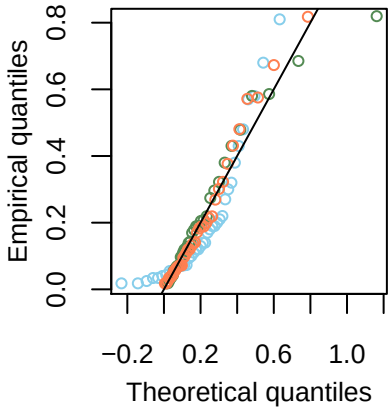
ECDF



Histogram



Q−Q



N = 47	FOD = 83%	Min (detect) = 0.018 J	Kaplan Meier Mean = 0.17
N (detect) = 39	SD (log detect) = 1	Max (detect) = 0.81 J	Kaplan Meier SD = 0.19

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.6e−05	–	–	–	–	−18.9216	−15.2213
Lognormal	0.071	0.14	–	–	–	–	−72.6235	−68.9232
Gamma	–	–	0.09547	0.139	0.6227	0.813	−69.6891	−65.9888

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.00031	–	–	–	–	−13.3868	−10.0597
Lognormal	0.74	0.92	–	–	–	–	−46.8657	−43.5385
Gamma	–	–	0.09889	0.153	0.4264	0.776	−44.5611	−41.234

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

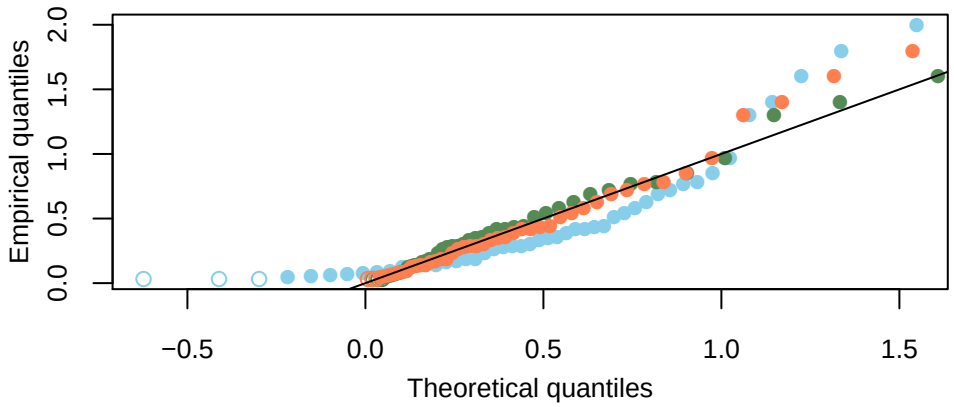
DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Dibenz[a,h]anthracene

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

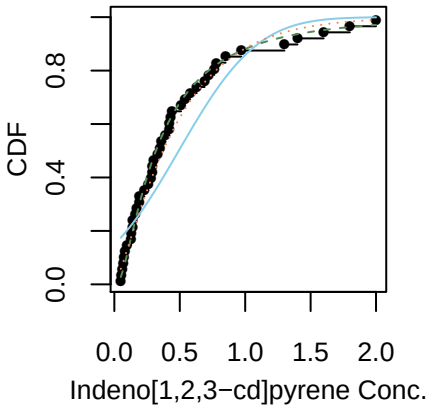
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

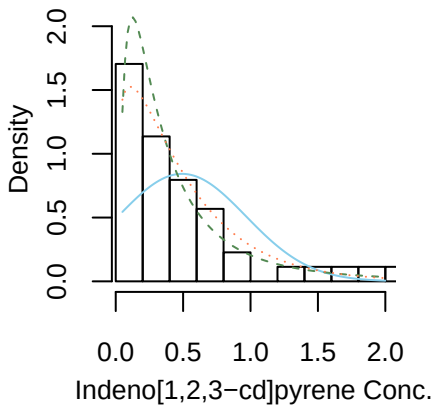


ECDF, Histogram & Q−Q (Detects Only)

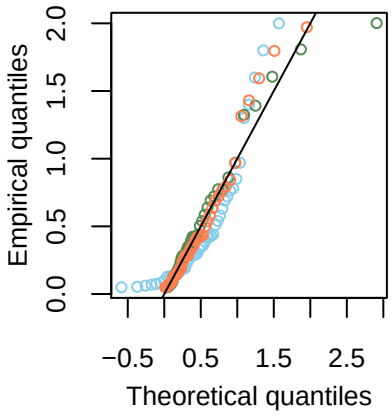
ECDF



Histogram



Q−Q



N = 47	FOD = 94%	Min (detect) = 0.049 J	Kaplan Meier Mean = 0.46
N (detect) = 44	SD (log detect) = 0.98	Max (detect) = 2 J	Kaplan Meier SD = 0.47

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.2e−05	–	–	–	–	66.7352	70.4355
Lognormal	0.36	0.61	–	–	–	–	24.4047	28.105
Gamma	–	–	0.07399	0.136	0.3138	0.777	25.3628	29.0631

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	9.6e−05	–	–	–	–	63.0553	66.6237
Lognormal	0.58	0.94	–	–	–	–	25.4987	29.0671
Gamma	–	–	0.08963	0.144	0.4002	0.779	28.0414	31.6098

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Indeno[1,2,3−cd]pyrene

Media:
Surface Sediment (0−15 cm)

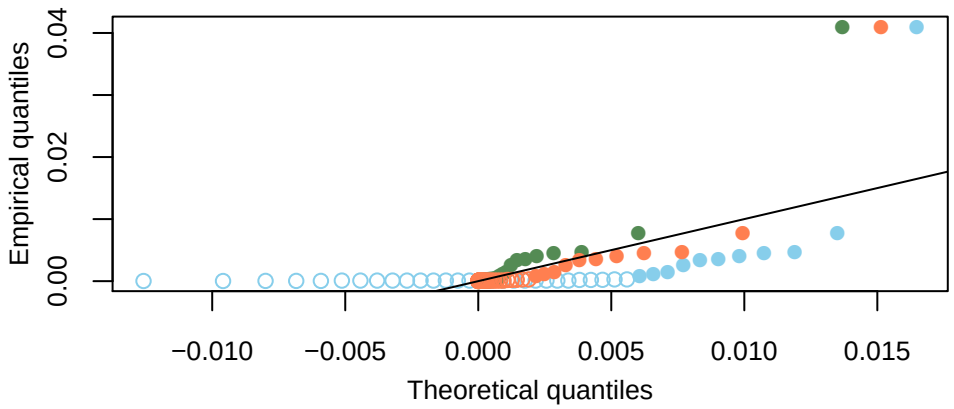
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Aldrin

Legend

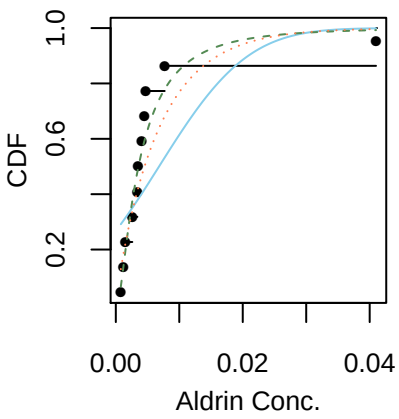
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

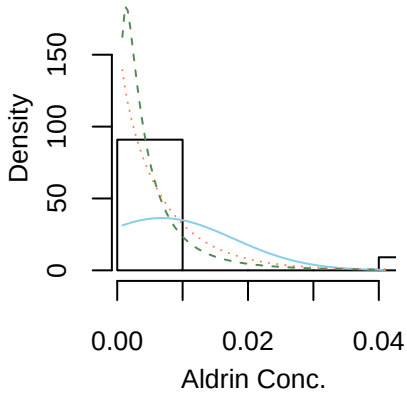


ECDF, Histogram & Q−Q (Detects Only)

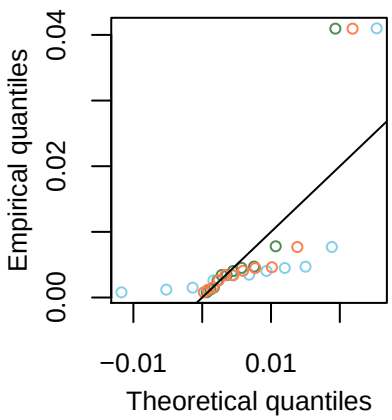
ECDF



Histogram



Q−Q



N = 40	FOD = 28%	Min (detect) = 0.00079 J	Kaplan Meier Mean = 0.0019
N (detect) = 11	SD (log detect) = 1	Max (detect) = 0.041 J	Kaplan Meier SD = 0.0065

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.1e−16	–	–	–	–	−285.555	−282.177
Lognormal	2e−05	2.2e−10	–	–	–	–	−498.842	−495.465
Gamma	–	–	0.3213	0.1547	5.217	0.9096	−469.232	−465.854

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.1e−05	–	–	–	–	−64.0624	−63.2666
Lognormal	0.29	0.17	–	–	–	–	−88.7735	−87.9777
Gamma	–	–	0.3056	0.281	1.016	0.777	−83.8408	−83.045

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Aldrin

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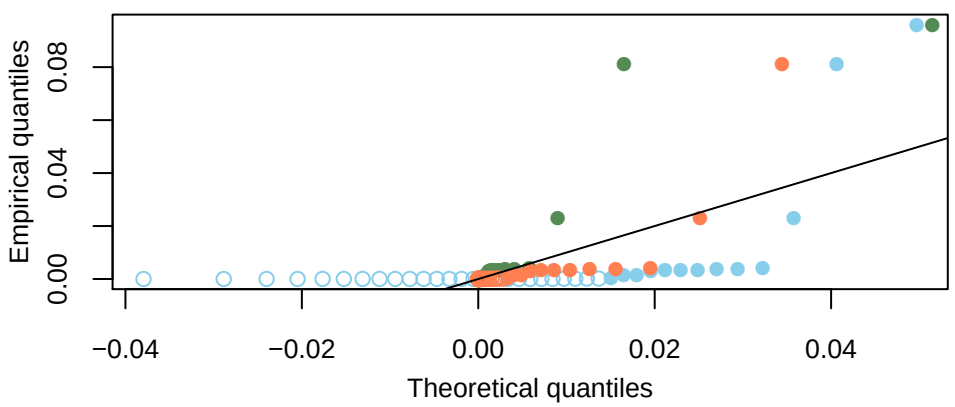
Figure **93**

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Heptachlor Epoxide

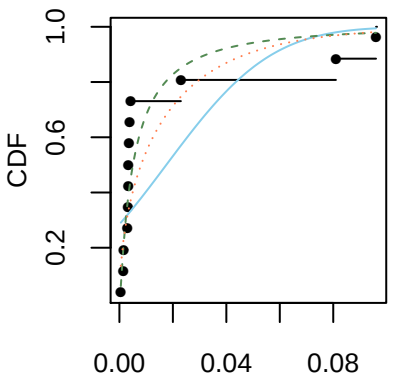
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

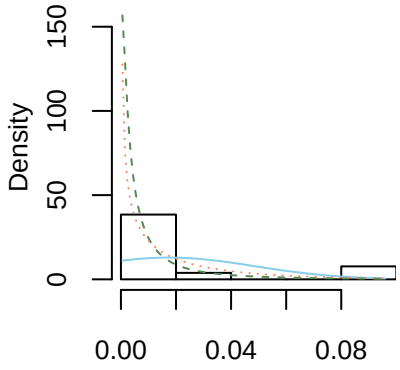


ECDF, Histogram & Q−Q (Detects Only)

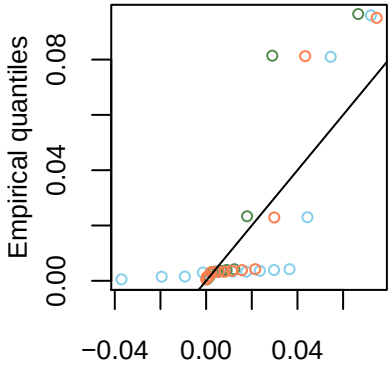
ECDF



Histogram



Q−Q



N = 39	FOD = 33%	Min (detect) = 0.00053 J	Kaplan Meier Mean = 0.0059
N (detect) = 13	SD (log detect) = 1.5	Max (detect) = 0.096 J	Kaplan Meier SD = 0.02

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.1e−23	–	–	–	–	−191.869	−188.542
Lognormal	6e−05	2.1e−08	–	–	–	–	−473.843	−470.516
Gamma	–	–	0.3039	0.1651	5.21	0.9073	−443.63	−440.303

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	3e−05	2.8e−07	–	–	–	–	−49.5265	−48.3966
Lognormal	0.027	0.00085	–	–	–	–	−86.828	−85.6981
Gamma	–	–	0.3977	0.281	1.718	0.777	−80.4437	−79.3138

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−Heptachlor Epoxide

Media:
Surface Sediment (0−15 cm)

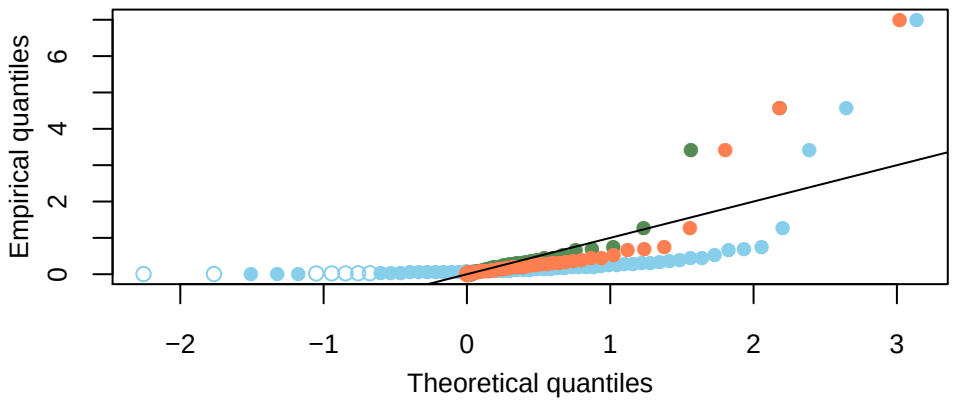
Exposure Unit:
Reference Sites

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

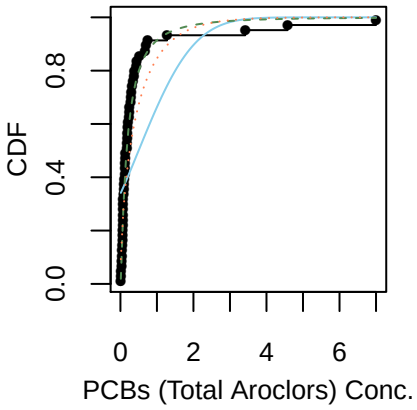
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

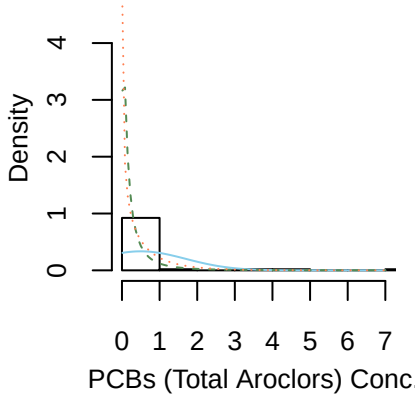


ECDF, Histogram & Q−Q (Detects Only)

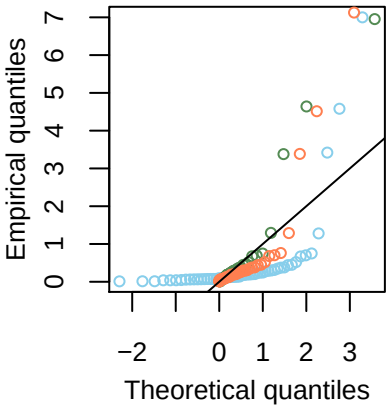
ECDF



Histogram



Q−Q



N = 59	FOD = 88%	Min (detect) = 0.011 J	Kaplan Meier Mean = 0.44
N (detect) = 52	SD (log detect) = 1.3	Max (detect) = 7 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−21	–	–	–	–	185.842	189.997
Lognormal	0.41	0.86	–	–	–	–	−27.0813	−22.9263
Gamma	–	–	0.1863	0.132	3.513	0.814	1.89904	6.05411

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.3e−19	–	–	–	–	169.848	173.75
Lognormal	0.082	0.63	–	–	–	–	−5.91866	−2.01617
Gamma	–	–	0.2071	0.132	3.763	0.814	22.1117	26.0142

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−PCBs (Total Aroclors)

Media:
Surface Sediment (0−15 cm)

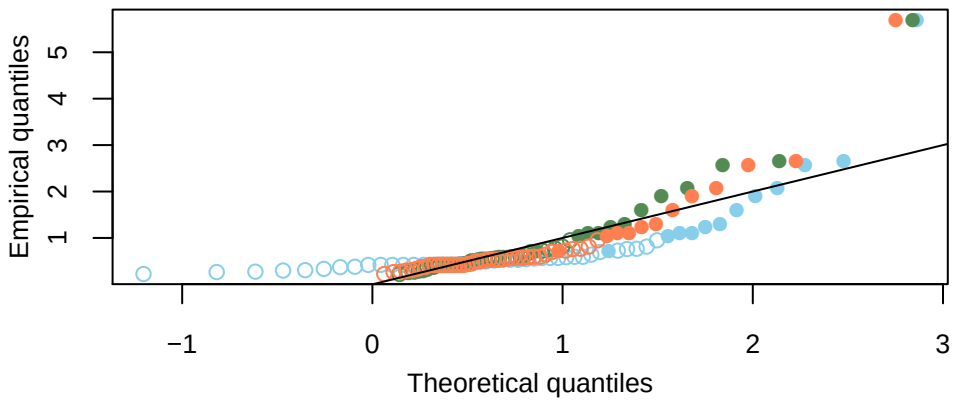
Exposure Unit:
UBC

Chemical (mg/kg):
Antimony

Legend

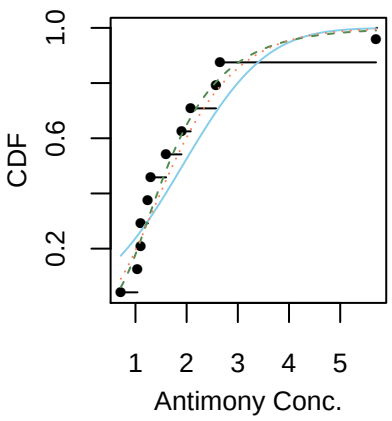
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

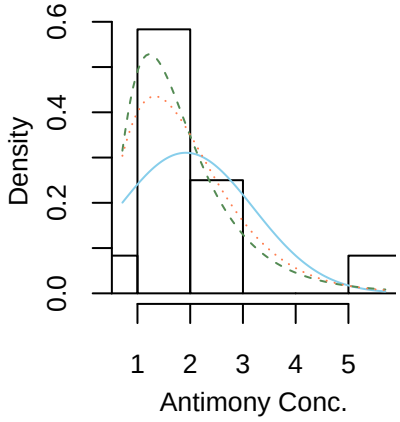


ECDF, Histogram & Q−Q (Detects Only)

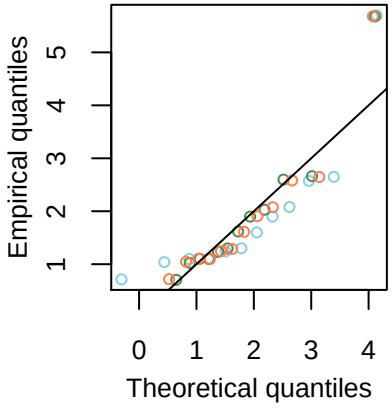
ECDF



Histogram



Q−Q



N = 52	FOD = 23%	Min (detect) = 0.71 J	Kaplan Meier Mean = 1
N (detect) = 12	SD (log detect) = 0.56	Max (detect) = 5 J	Kaplan Meier SD = 0.81

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.8e−11	–	–	–	–	136.89	140.793
Lognormal	0.00055	0.00034	–	–	–	–	57.9799	61.8824
Gamma	–	–	0.2173	0.127	3.213	0.763	75.9991	79.9016

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0023	0.16	–	–	–	–	44.0608	45.0306
Lognormal	0.54	0.56	–	–	–	–	34.7206	35.6904
Gamma	–	–	NA	NA	NA	NA	36.8244	37.7942

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Antimony

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Figure **96**

Media:
Surface Sediment (0−15 cm)

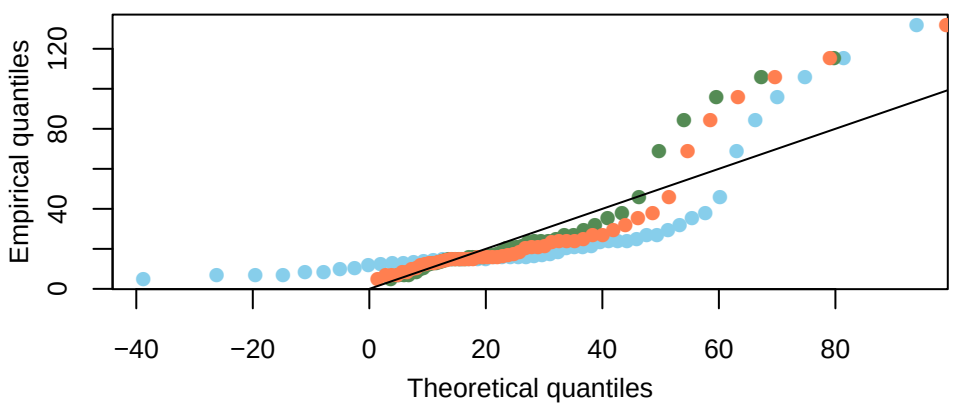
Exposure Unit:
UBC

Chemical (mg/kg):
Arsenic

Legend

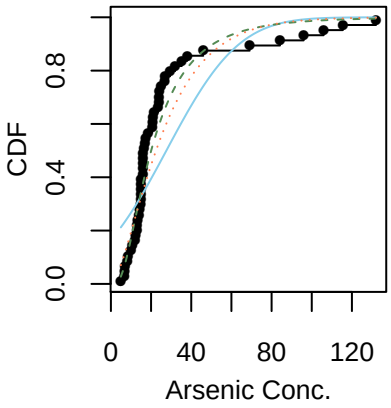
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

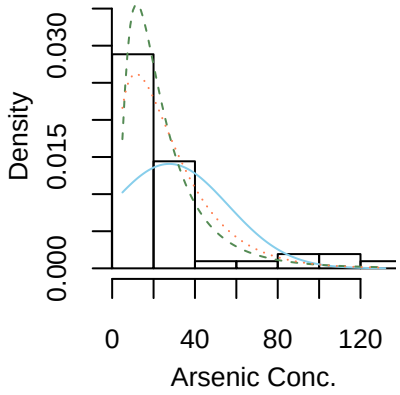


ECDF, Histogram & Q−Q (Detects Only)

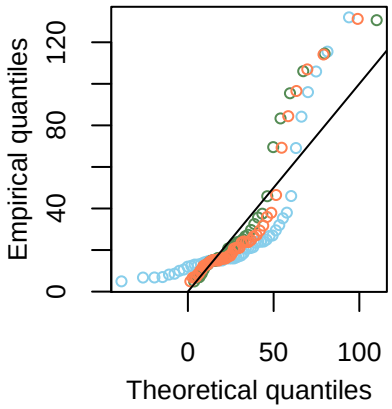
ECDF



Histogram



Q−Q



N = 52	FOD = 100%	Min (detect) = 4	Arithmetic Mean = 28
N (detect) = 52	SD (log detect) = 0.73	Max (detect) = 130 J	Arithmetic SD = 29

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.5e−12	–	–	–	–	499.412	503.315
Lognormal	0.0018	0.02	–	–	–	–	430.304	434.206
Gamma	–	–	0.1981	0.129	3.325	0.78	445.437	449.34

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Arsenic

Media:
Surface Sediment (0−15 cm)

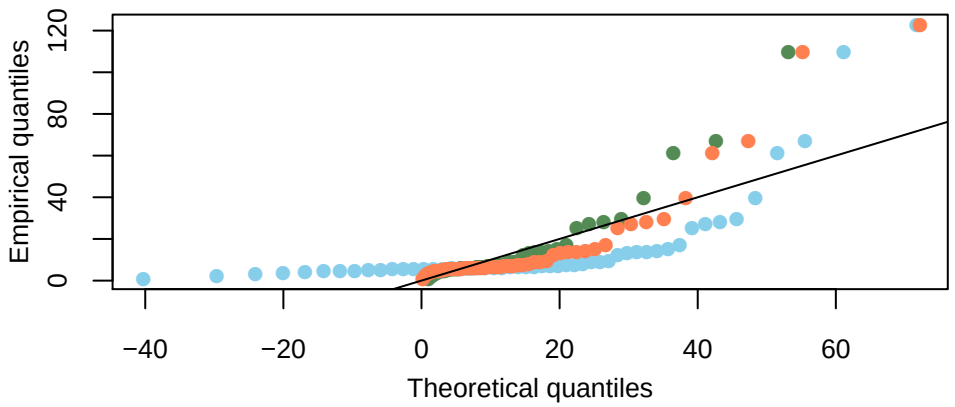
Exposure Unit:
UBC

Chemical (mg/kg):
Cadmium

Legend

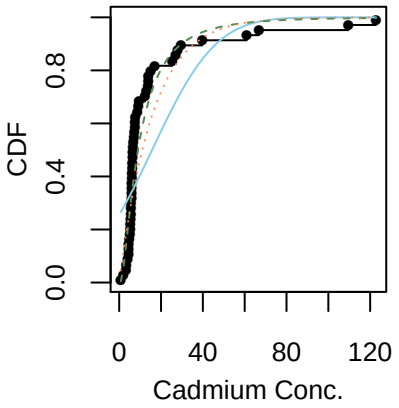
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

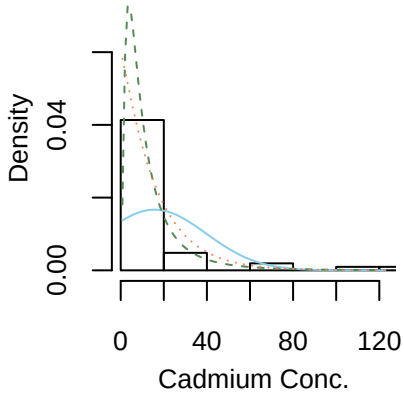


ECDF, Histogram & Q−Q (Detects Only)

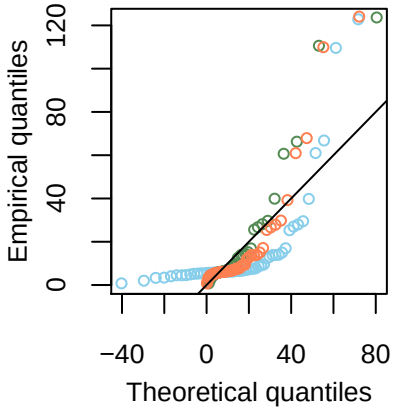
ECDF



Histogram



Q−Q



N = 52	FOD = 100%	Min (detect) = 0.78 J	Arithmetic Mean = 16
N (detect) = 52	SD (log detect) = 0.95	Max (detect) = 120 J	Arithmetic SD = 24

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.1e−14	–	–	–	–	481.729	485.632
Lognormal	0.00026	4.1e−05	–	–	–	–	373.04	376.943
Gamma	–	–	0.2486	0.129	4.586	0.78	394.633	398.535

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Cadmium

Media:
Surface Sediment (0−15 cm)

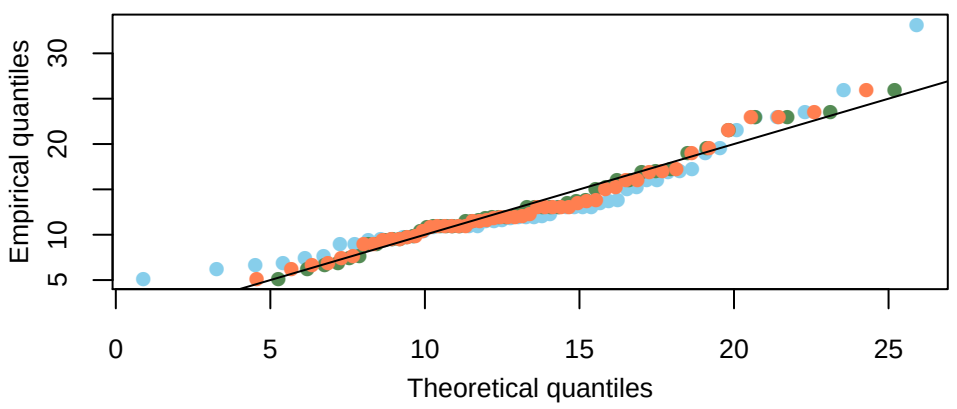
Exposure Unit:
UBC

Chemical (mg/kg):
Cobalt

Legend

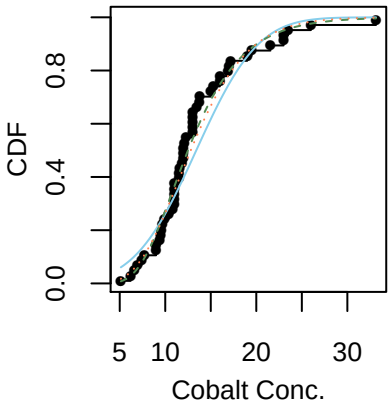
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

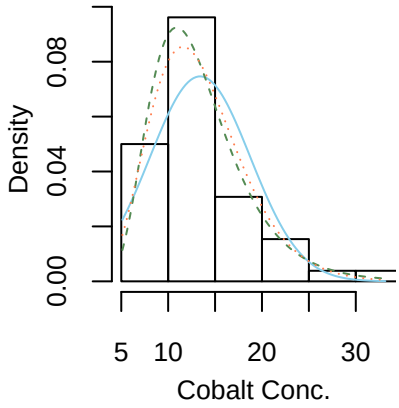


ECDF, Histogram & Q−Q (Detects Only)

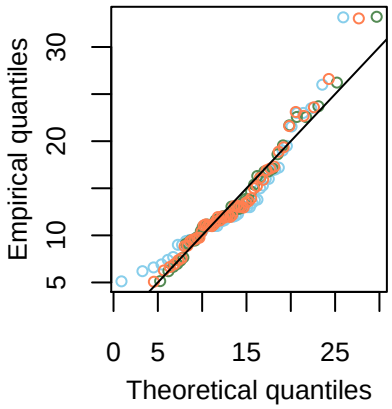
ECDF



Histogram



Q−Q



N = 52	FOD = 100%	Min (detect) = 5 J	Arithmetic Mean = 13
N (detect) = 52	SD (log detect) = 0.37	Max (detect) = 33 J	Arithmetic SD = 5

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00015	0.00014	–	–	–	–	325.863	329.765
Lognormal	0.57	0.11	–	–	–	–	310.697	314.599
Gamma	–	–	0.1373	0.126	0.7773	0.754	313.268	317.171

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Cobalt

Media:
Surface Sediment (0−15 cm)

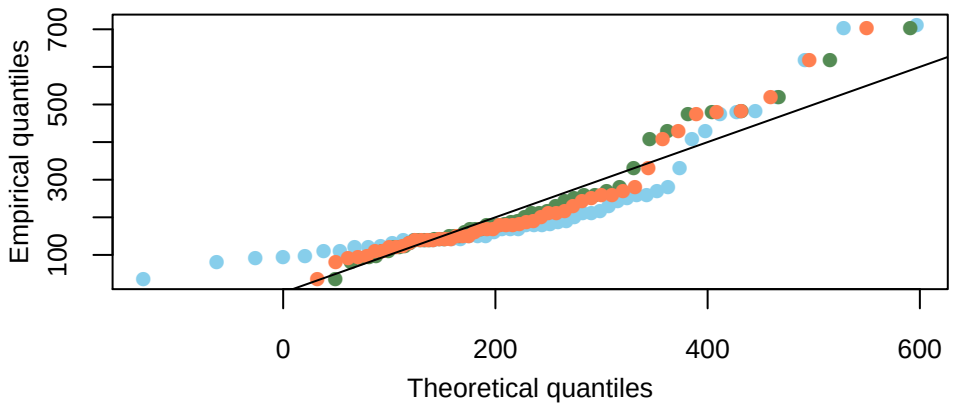
Exposure Unit:
UBC

Chemical (mg/kg):
Copper

Legend

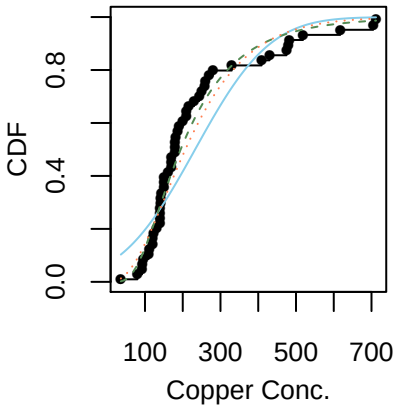
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

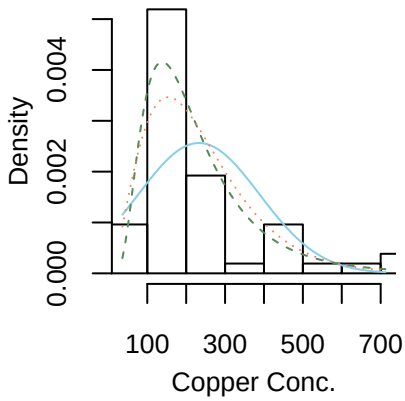


ECDF, Histogram & Q−Q (Detects Only)

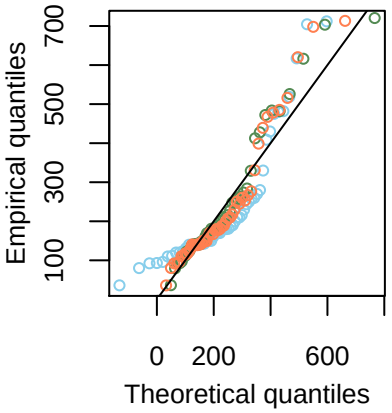
ECDF



Histogram



Q−Q



N = 52	FOD = 100%	Min (detect) = 36 J	Arithmetic Mean = 230
N (detect) = 52	SD (log detect) = 0.59	Max (detect) = 710 J	Arithmetic SD = 160

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.2e−06	–	–	–	–	676.52	680.423
Lognormal	0.046	0.11	–	–	–	–	644.033	647.936
Gamma	–	–	0.1509	0.127	1.752	0.763	649.549	653.451

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Copper

Exhibit 2: EPC Program and Results
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Figure **100**

Media:
Surface Sediment (0−15 cm)

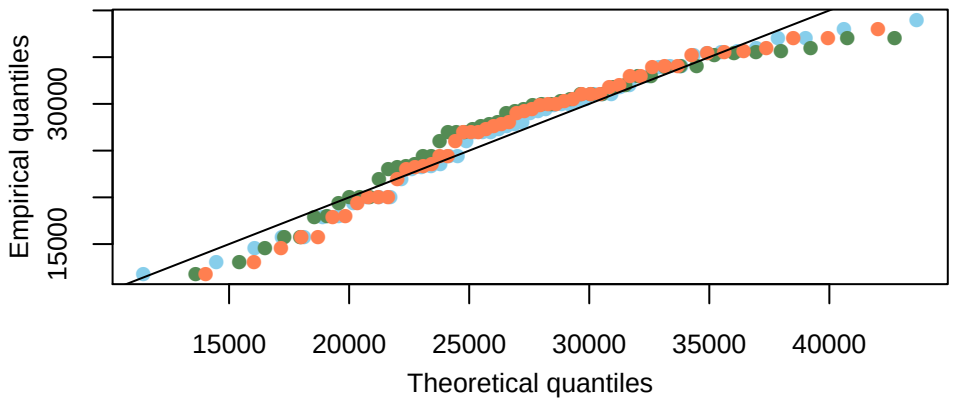
Exposure Unit:
UBC

Chemical (mg/kg):
Iron

Legend

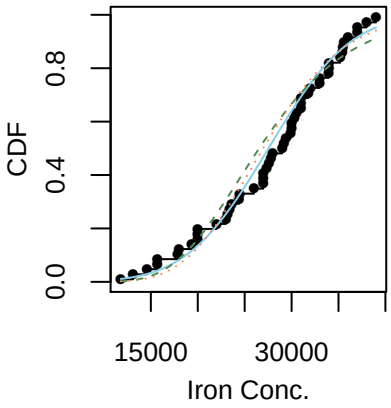
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

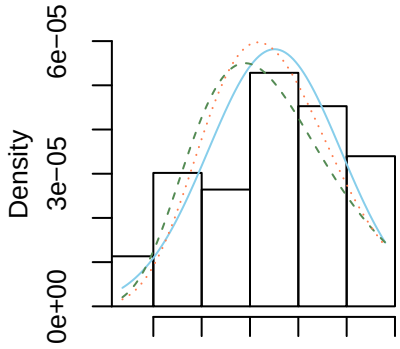


ECDF, Histogram & Q−Q (Detects Only)

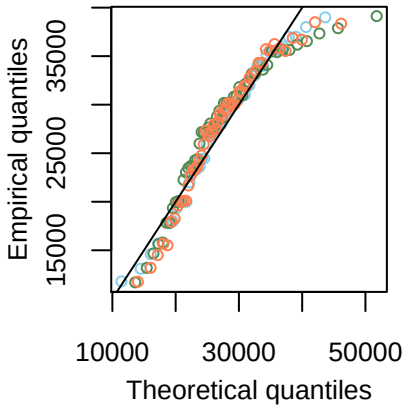
ECDF



Histogram



Q−Q



N = 53	FOD = 100%	Min (detect) = 12,000	Arithmetic Mean = 28,000
N (detect) = 53	SD (log detect) = 0.29	Max (detect) = 39,000 J	Arithmetic SD = 6,900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.088	0.11	–	–	–	–	1090.73	1094.67
Lognormal	0.00077	0.00099	–	–	–	–	1100.94	1104.88
Gamma	–	–	0.1431	0.125	1.317	0.75	1097.2	1101.14

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Iron

Media:
Surface Sediment (0−15 cm)

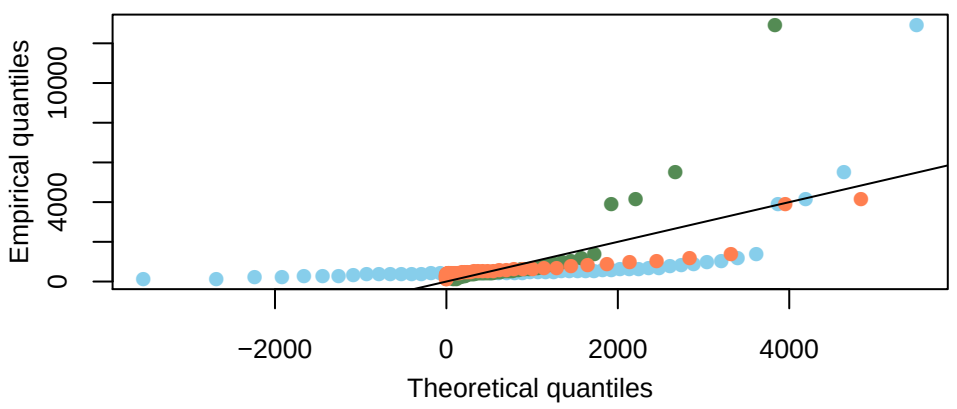
Exposure Unit:
UBC

Chemical (mg/kg):
Manganese

Legend

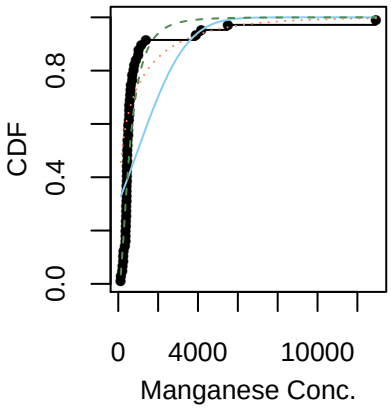
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

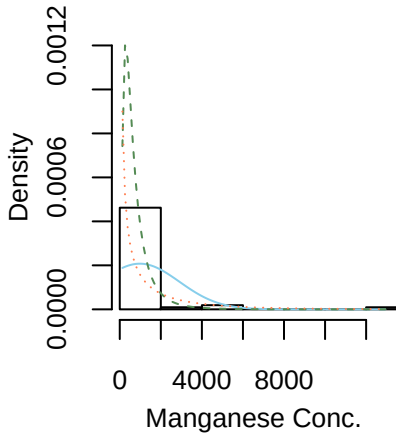


ECDF, Histogram & Q−Q (Detects Only)

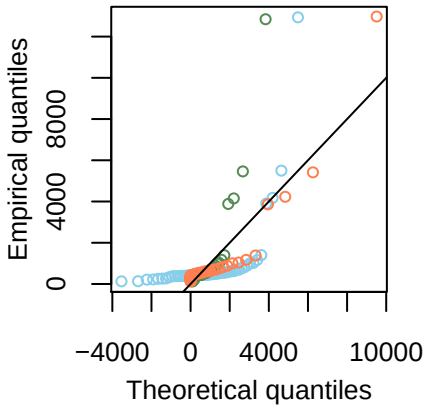
ECDF



Histogram



Q−Q



N = 53	FOD = 100%	Min (detect) = 130	Arithmetic Mean = 980
N (detect) = 53	SD (log detect) = 0.83	Max (detect) = 13,000 J	Arithmetic SD = 1,900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.8e−21	–	–	–	–	955.84	959.78
Lognormal	0	1.7e−05	–	–	–	–	804.196	808.137
Gamma	–	–	0.4802	0.139	15.41	0.9121	887.453	891.394

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Manganese

Media:
Surface Sediment (0−15 cm)

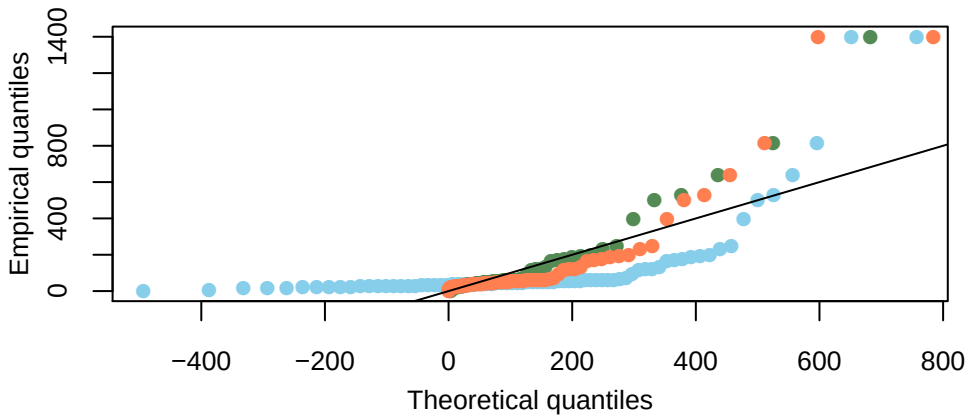
Exposure Unit:
UBC

Chemical (mg/kg):
Mercury

Legend

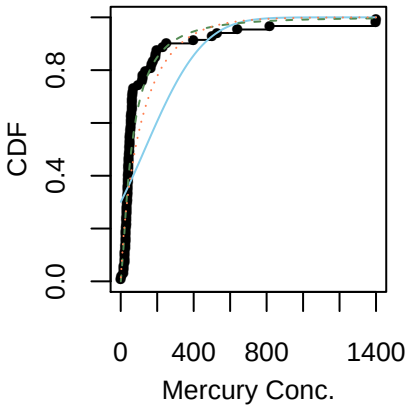
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

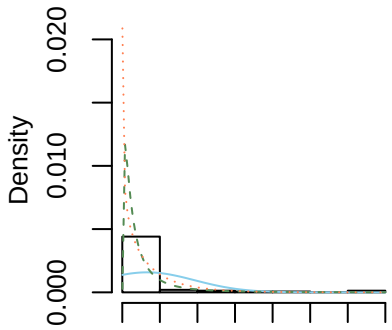


ECDF, Histogram & Q−Q (Detects Only)

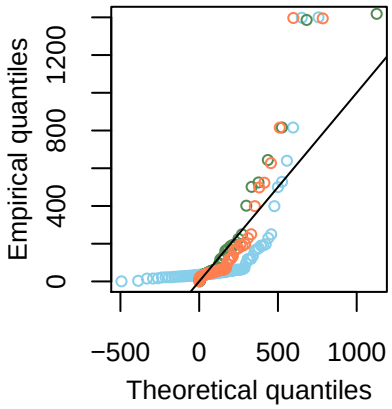
ECDF



Histogram



Q−Q



N = 76	FOD = 100%	Min (detect) = 0.53 J	Arithmetic Mean = 130
N (detect) = 76	SD (log detect) = 1.2	Max (detect) = 1,400 J	Arithmetic SD = 250

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.6e−23	–	–	–	–	1060.31	1064.97
Lognormal	1e−05	8.6e−07	–	–	–	–	864.69	869.351
Gamma	–	–	0.2733	0.113	6.276	0.817	892.861	897.523

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Mercury

Media:
Surface Sediment (0−15 cm)

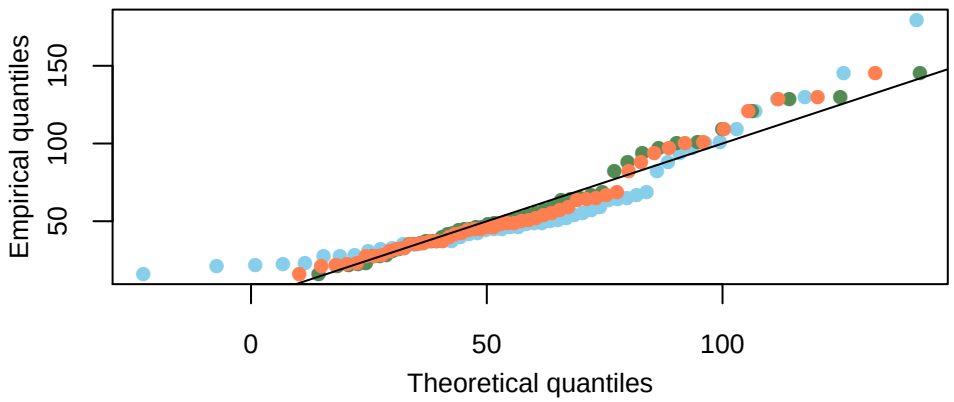
Exposure Unit:
UBC

Chemical (mg/kg):
Nickel

Legend

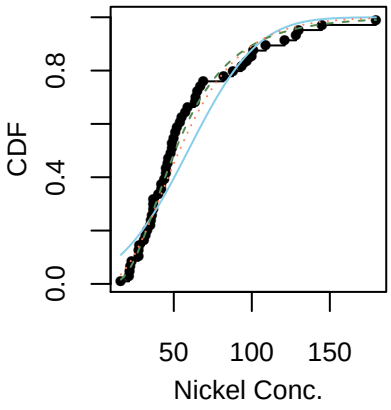
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

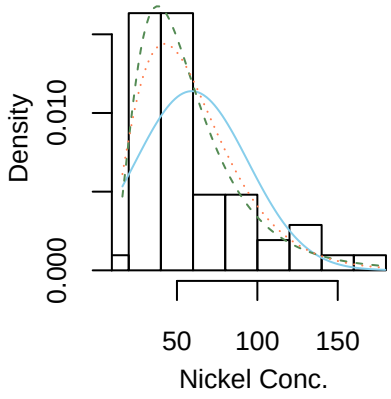


ECDF, Histogram & Q−Q (Detects Only)

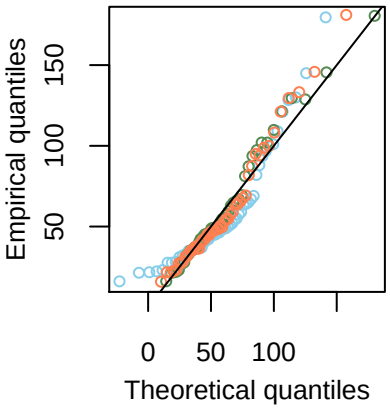
ECDF



Histogram



Q−Q



N = 52	FOD = 100%	Min (detect) = 16	Arithmetic Mean = 59
N (detect) = 52	SD (log detect) = 0.55	Max (detect) = 180 J	Arithmetic SD = 35

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−05	0.00019	–	–	–	–	521.418	525.32
Lognormal	0.6	0.54	–	–	–	–	496.199	500.101
Gamma	–	–	0.118	0.127	0.8561	0.763	500.52	504.423

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Nickel

Media:
Surface Sediment (0−15 cm)

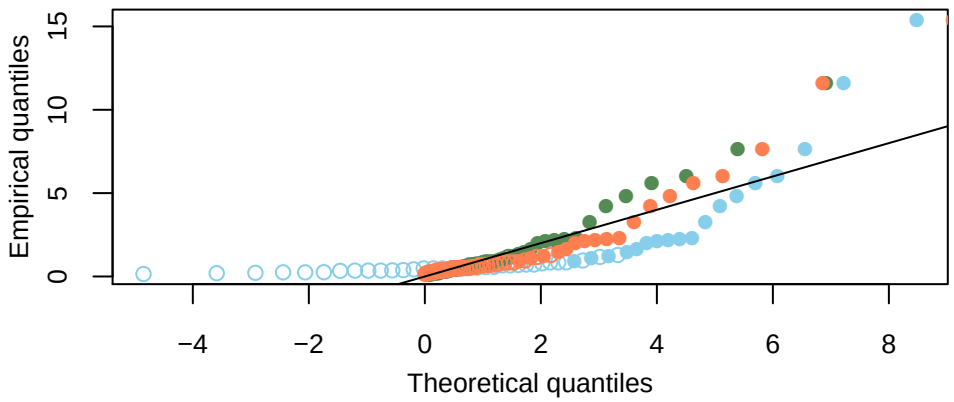
Exposure Unit:
UBC

Chemical (mg/kg):
Thallium

Legend

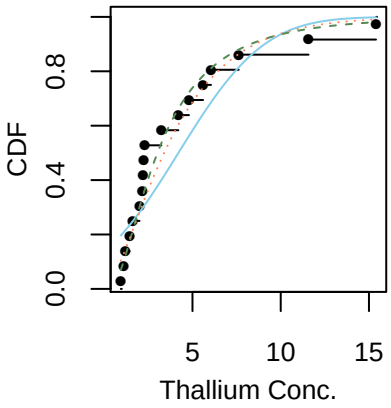
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

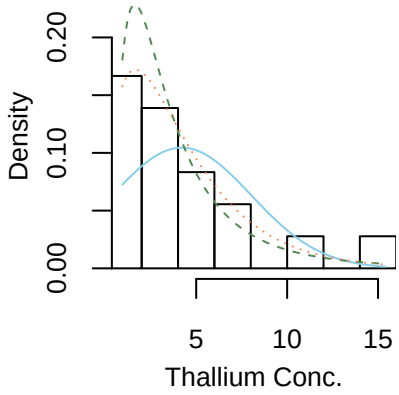


ECDF, Histogram & Q−Q (Detects Only)

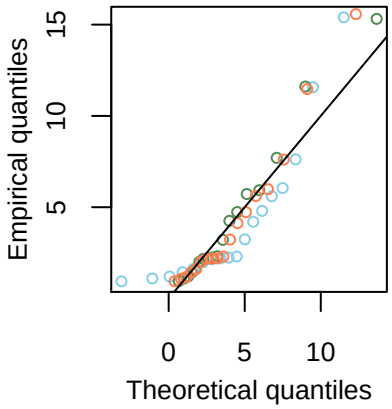
ECDF



Histogram



Q−Q



N = 52	FOD = 35%	Min (detect) = 0.94 J	Kaplan Meier Mean = 2
N (detect) = 18	SD (log detect) = 0.81	Max (detect) = 15 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2e−11	–	–	–	–	260.398	264.3
Lognormal	0.02	0.038	–	–	–	–	149.132	153.034
Gamma	–	–	0.1973	0.132	2.953	0.814	169.265	173.167

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00065	0.0067	–	–	–	–	103.297	105.078
Lognormal	0.48	0.1	–	–	–	–	86.3138	88.0945
Gamma	–	–	0.2227	0.209	0.6085	0.767	89.3424	91.1231

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Thallium

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **105**

Media:
Surface Sediment (0−15 cm)

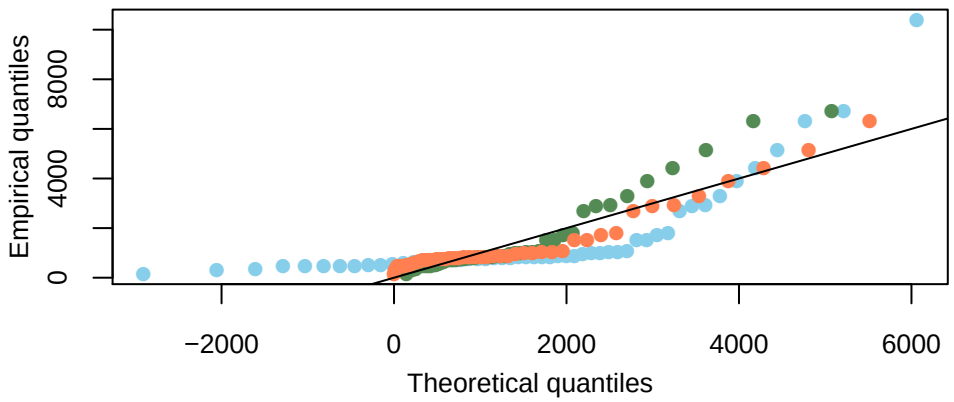
Exposure Unit:
UBC

Chemical (mg/kg):
Zinc

Legend

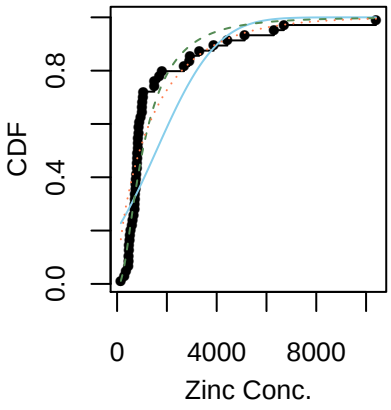
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

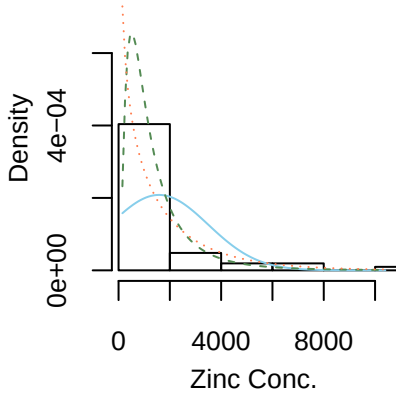


ECDF, Histogram & Q−Q (Detects Only)

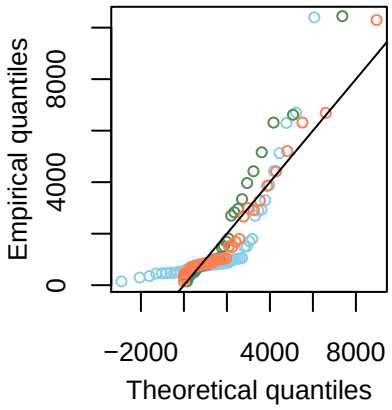
ECDF



Histogram



Q−Q



N = 52	FOD = 100%	Min (detect) = 150 J	Arithmetic Mean = 1,600
N (detect) = 52	SD (log detect) = 0.85	Max (detect) = 10,000 J	Arithmetic SD = 1,900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.9e−16	–	–	–	–	937.56	941.462
Lognormal	0.00099	1.6e−06	–	–	–	–	854.837	858.74
Gamma	–	–	0.2786	0.132	4.801	0.814	883.332	887.234

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Zinc

Media:
Surface Sediment (0−15 cm)

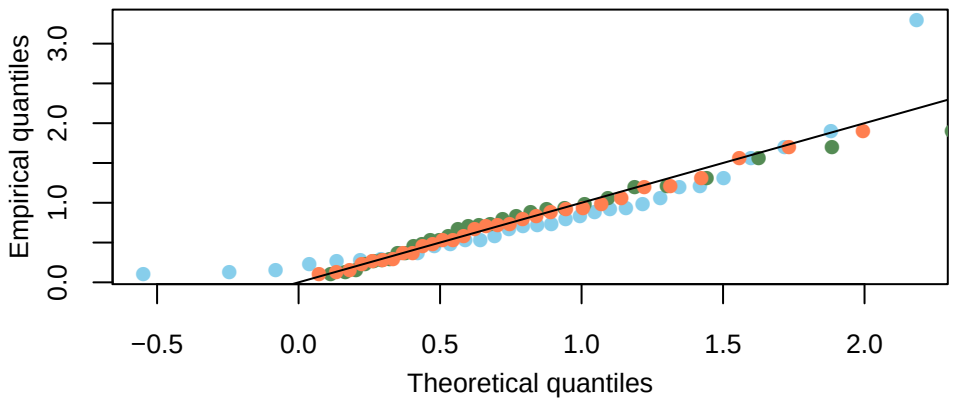
Exposure Unit:
UBC

Chemical (mg/kg):
Benz[a]anthracene

Legend

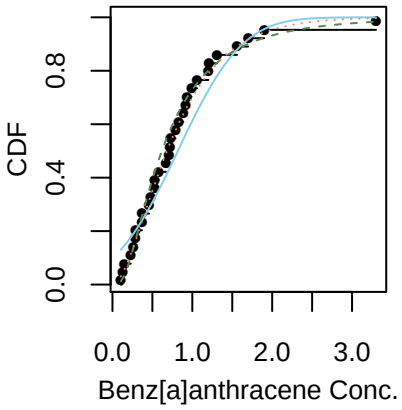
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

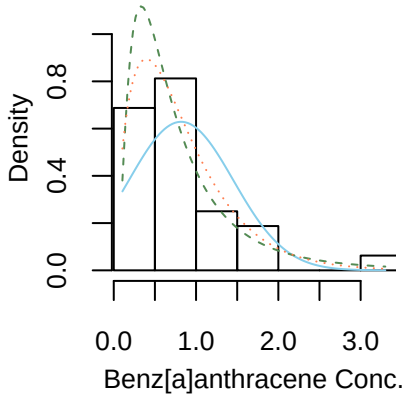


ECDF, Histogram & Q−Q (Detects Only)

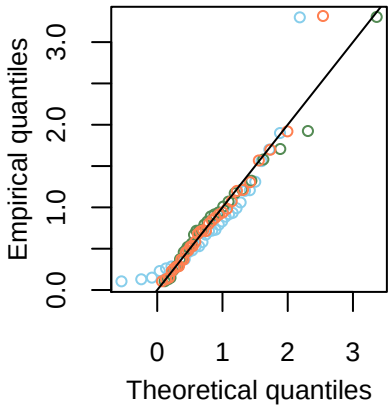
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 0.11 J	Arithmetic Mean = 0.82
N (detect) = 32	SD (log detect) = 0.8	Max (detect) = 3 J	Arithmetic SD = 0.64

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00016	0.074	–	–	–	–	65.6868	68.6183
Lognormal	0.78	0.53	–	–	–	–	48.66	51.5914
Gamma	–	–	0.0545	0.165	0.1437	0.775	48.3829	51.3144

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Benz[a]anthracene

Media:
Surface Sediment (0−15 cm)

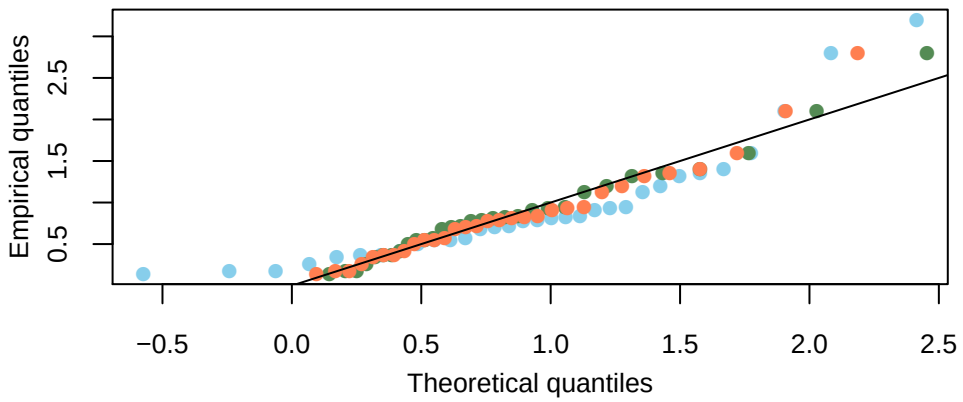
Exposure Unit:
UBC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

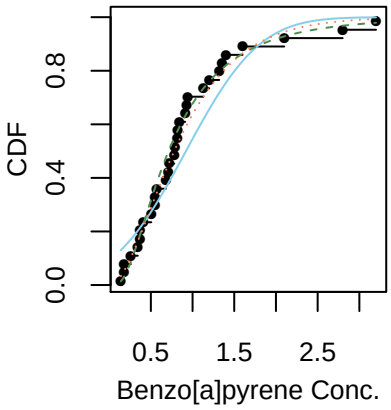
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

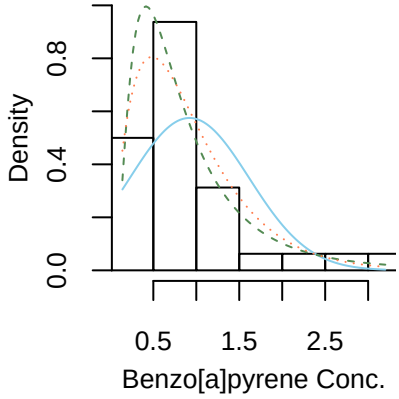


ECDF, Histogram & Q−Q (Detects Only)

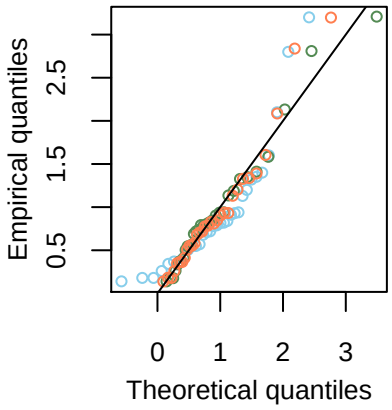
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 0.14 J	Arithmetic Mean = 0.92
N (detect) = 32	SD (log detect) = 0.75	Max (detect) = 3 J	Arithmetic SD = 0.7

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00014	0.0011	–	–	–	–	71.405	74.3365
Lognormal	0.75	0.57	–	–	–	–	53.6647	56.5962
Gamma	–	–	0.1156	0.162	0.2994	0.758	54.3885	57.32

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Benzo[a]pyrene

Media:
Surface Sediment (0−15 cm)

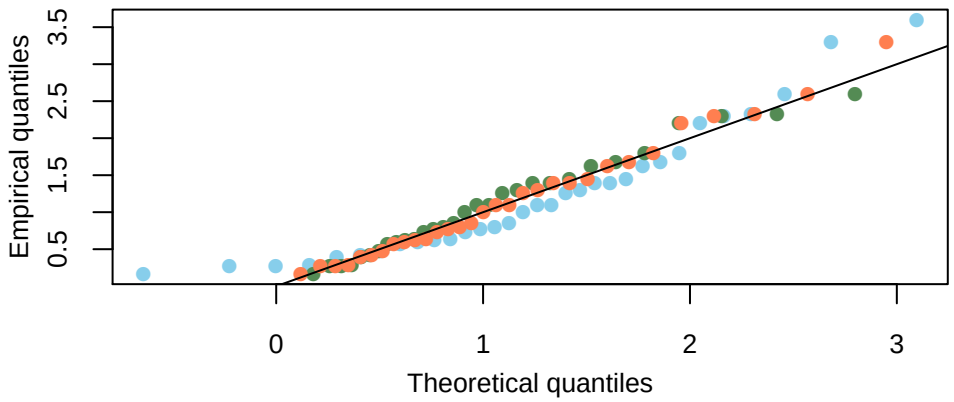
Exposure Unit:
UBC

Chemical (mg/kg):
Benzo[b]fluoranthene

Legend

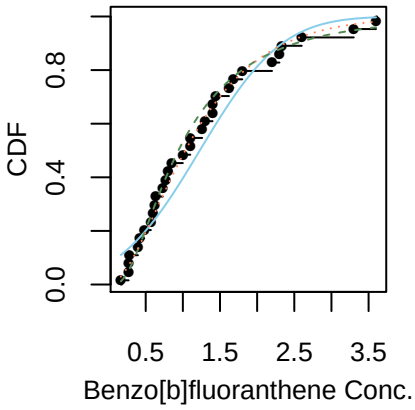
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

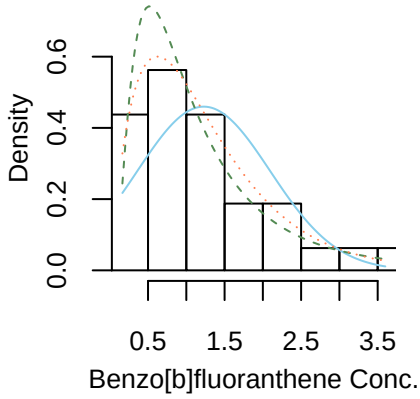


ECDF, Histogram & Q−Q (Detects Only)

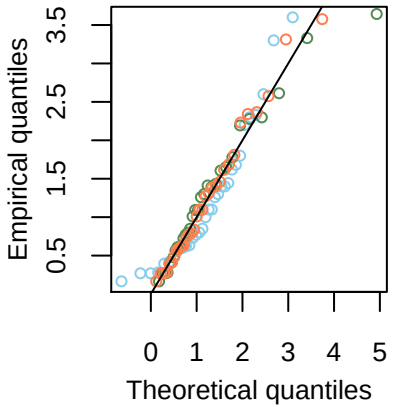
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 0.17 J	Arithmetic Mean = 1
N (detect) = 32	SD (log detect) = 0.78	Max (detect) = 3 J	Arithmetic SD = 0.88

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0062	0.15	–	–	–	–	85.7367	88.6681
Lognormal	0.74	0.82	–	–	–	–	74.074	77.0055
Gamma	–	–	0.06948	0.162	0.1684	0.758	73.5021	76.4336

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Benzo[b]fluoranthene

Media:
Surface Sediment (0−15 cm)

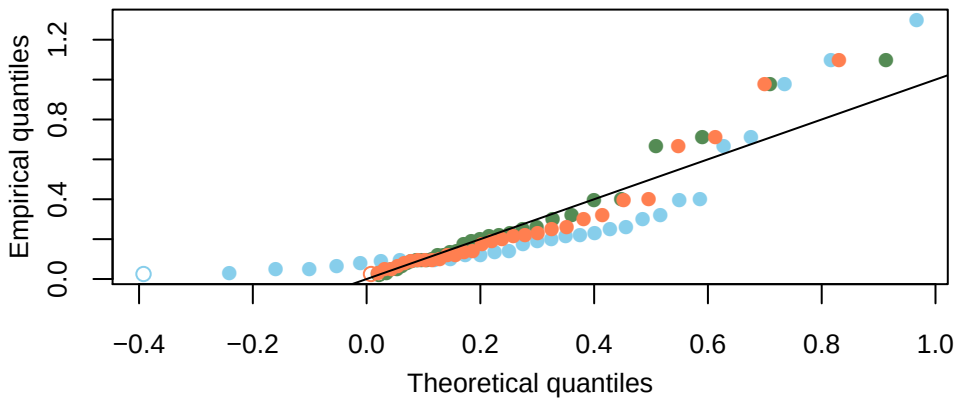
Exposure Unit:
UBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

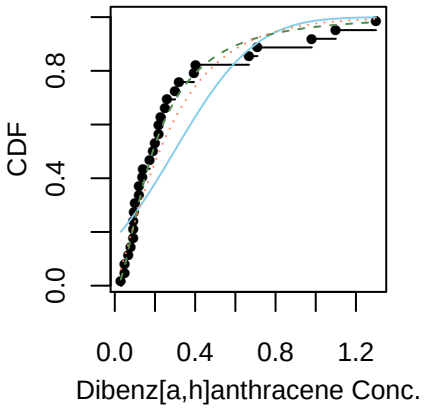
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

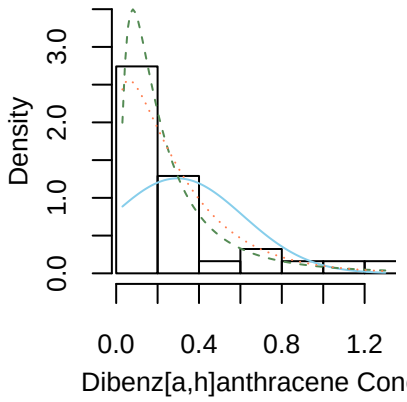


ECDF, Histogram & Q−Q (Detects Only)

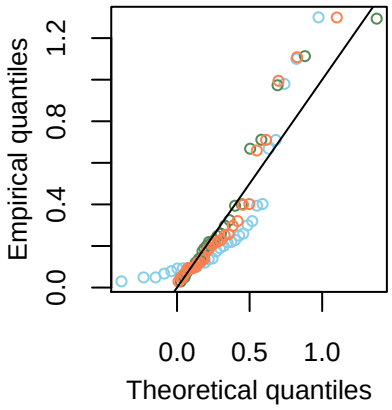
ECDF



Histogram



Q−Q



N = 32	FOD = 97%	Min (detect) = 0.03 J	Kaplan Meier Mean = 0.29
N (detect) = 31	SD (log detect) = 0.94	Max (detect) = 1 J	Kaplan Meier SD = 0.32

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.6e−05	–	–	–	–	20.9965	23.9279
Lognormal	0.77	0.96	–	–	–	–	−17.2985	−14.367
Gamma	–	–	0.1372	0.165	0.8388	0.775	−12.2624	−9.33096

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.1e−05	–	–	–	–	20.7507	23.6187
Lognormal	0.64	0.91	–	–	–	–	−16.0126	−13.1446
Gamma	–	–	0.1456	0.165	0.9502	0.775	−10.4072	−7.53921

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Dibenz[a,h]anthracene

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **110**

Media:
Surface Sediment (0−15 cm)

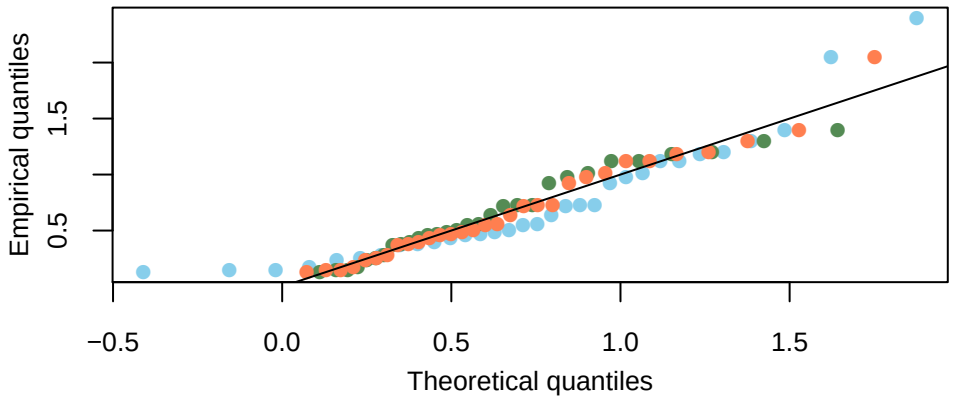
Exposure Unit:
UBC

Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

Legend

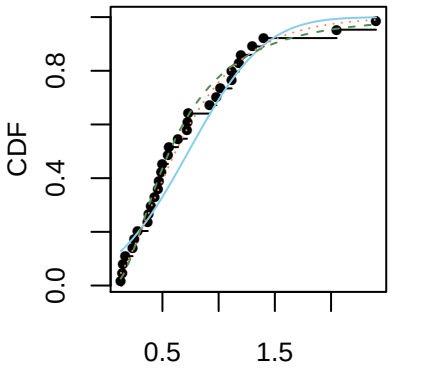
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

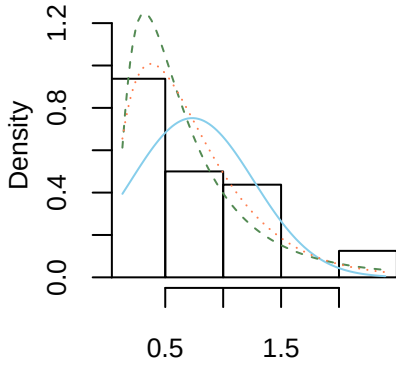


ECDF, Histogram & Q−Q (Detects Only)

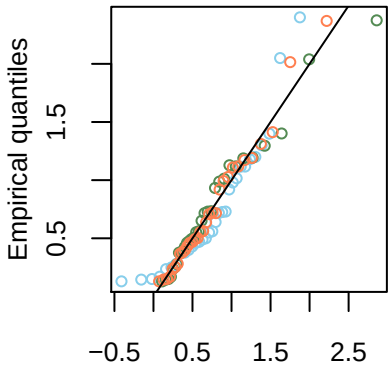
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 0.13 J	Arithmetic Mean = 0.73
N (detect) = 32	SD (log detect) = 0.77	Max (detect) = 2 J	Arithmetic SD = 0.54

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0014	0.04	–	–	–	–	54.2594	57.1909
Lognormal	0.58	0.84	–	–	–	–	40.0541	42.9856
Gamma	–	–	0.08319	0.162	0.2385	0.758	40.1936	43.125

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Indeno[1,2,3−cd]pyrene

Media:
Surface Sediment (0−15 cm)

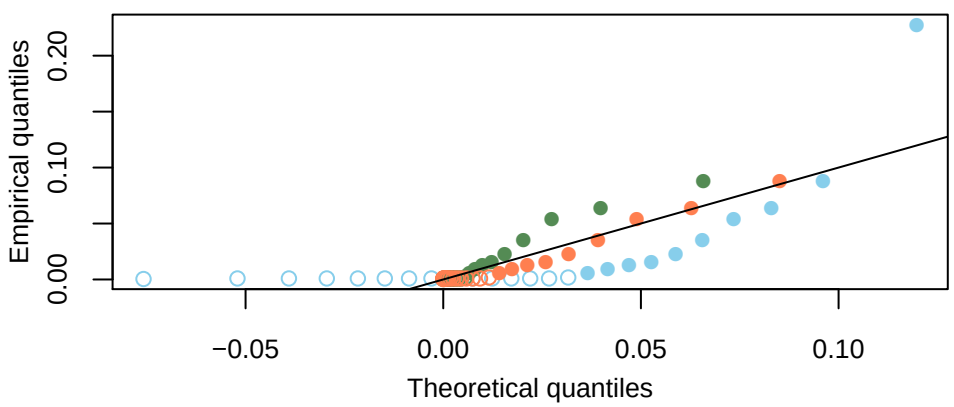
Exposure Unit:
UBC

Chemical (mg/kg):
Aldrin

Legend

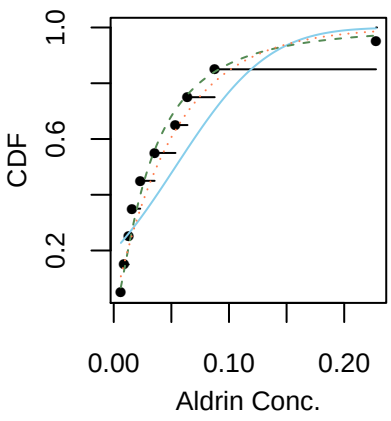
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

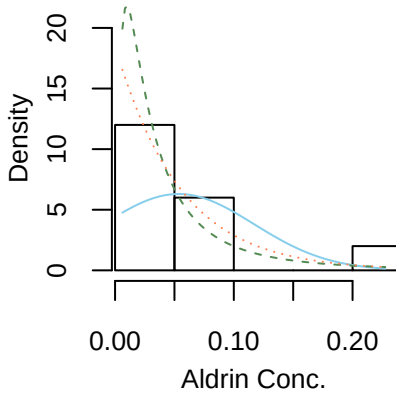


ECDF, Histogram & Q−Q (Detects Only)

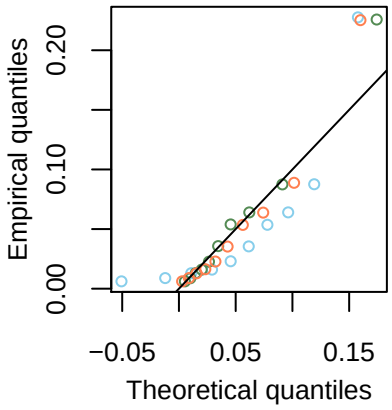
ECDF



Histogram



Q−Q



N = 25	FOD = 40%	Min (detect) = 0.0062 J	Kaplan Meier Mean = 0.021
N (detect) = 10	SD (log detect) = 1.1	Max (detect) = 0.23 J	Kaplan Meier SD = 0.048

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.5e−07	–	–	–	–	−77.2761	−74.8384
Lognormal	0.00022	1.4e−07	–	–	–	–	−173.699	−171.262
Gamma	–	–	0.3227	0.1937	2.69	0.8999	−161.75	−159.313

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0012	0.11	–	–	–	–	−22.8068	−22.2017
Lognormal	0.95	0.97	–	–	–	–	−36.3442	−35.739
Gamma	–	–	0.1525	0.274	0.3166	0.748	−34.5492	−33.944

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

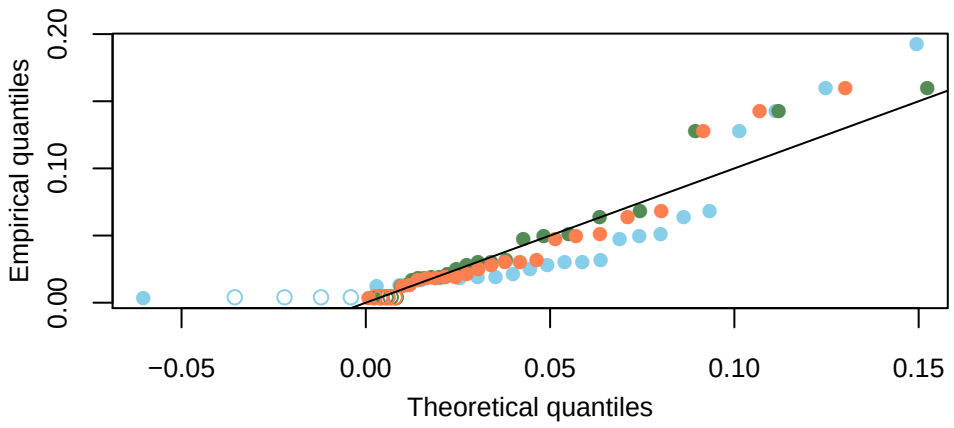
Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Aldrin

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
UBC
Chemical (mg/kg):
Heptachlor Epoxide

Legend

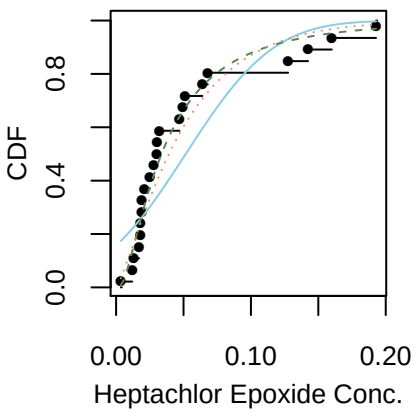
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

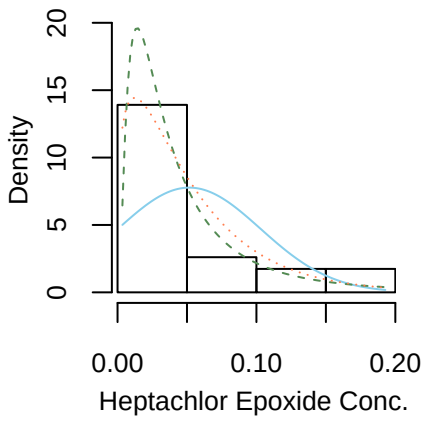


ECDF, Histogram & Q−Q (Detects Only)

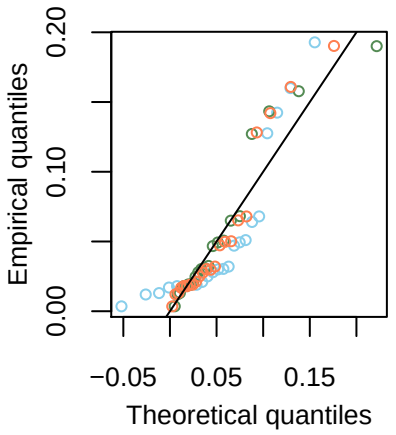
ECDF



Histogram



Q−Q



N = 27	FOD = 85%	Min (detect) = 0.0035 J	Kaplan Meier Mean = 0.044
N (detect) = 23	SD (log detect) = 0.95	Max (detect) = 0.19 J	Kaplan Meier SD = 0.051

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	4.2e−05	–	–	–	–	−80.8132	−78.2215
Lognormal	0.15	0.35	–	–	–	–	−112.168	−109.577
Gamma	–	–	0.151	0.184	0.668	0.807	−109.955	−107.363

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	8e−05	0.00045	–	–	–	–	−67.3198	−65.0488
Lognormal	0.39	0.4	–	–	–	–	−89.884	−87.613
Gamma	–	–	0.1896	0.187	0.8641	0.769	−87.2688	−84.9978

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−Heptachlor Epoxide

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **113**

Media:
Surface Sediment (0−15 cm)

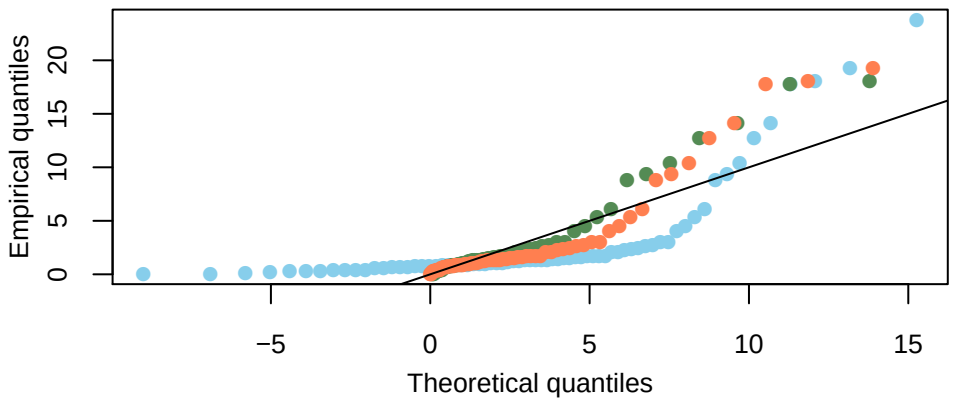
Exposure Unit:
UBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

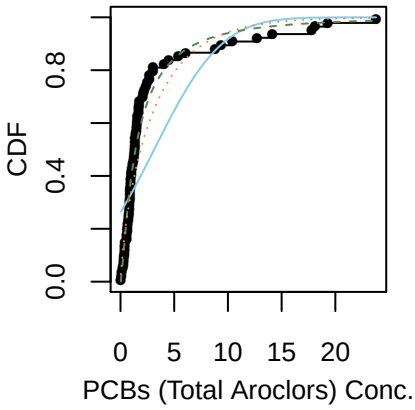
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

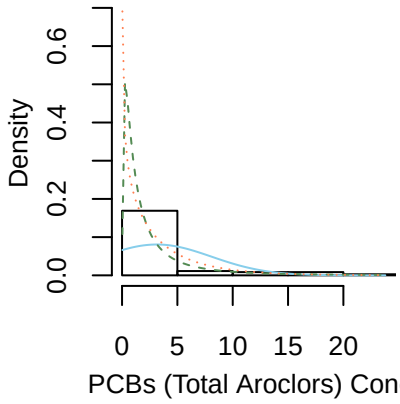


ECDF, Histogram & Q−Q (Detects Only)

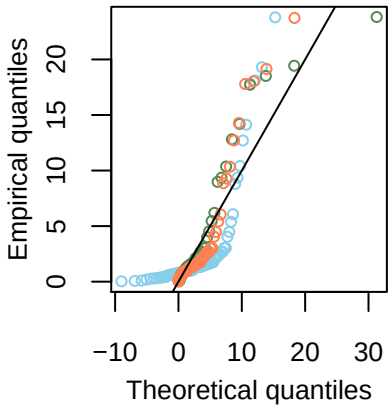
ECDF



Histogram



Q−Q



N = 71	FOD = 100%	Min (detect) = 0.03 J	Arithmetic Mean = 3
N (detect) = 71	SD (log detect) = 1.3	Max (detect) = 24 J	Arithmetic SD = 5

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	9.2e−21	–	–	–	–	432.37	436.895
Lognormal	0.028	0.015	–	–	–	–	285.99	290.515
Gamma	–	–	0.2103	0.113	3.644	0.817	303.389	307.914

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−PCBs (Total Aroclors)

Media:
Surface Sediment (0−15 cm)

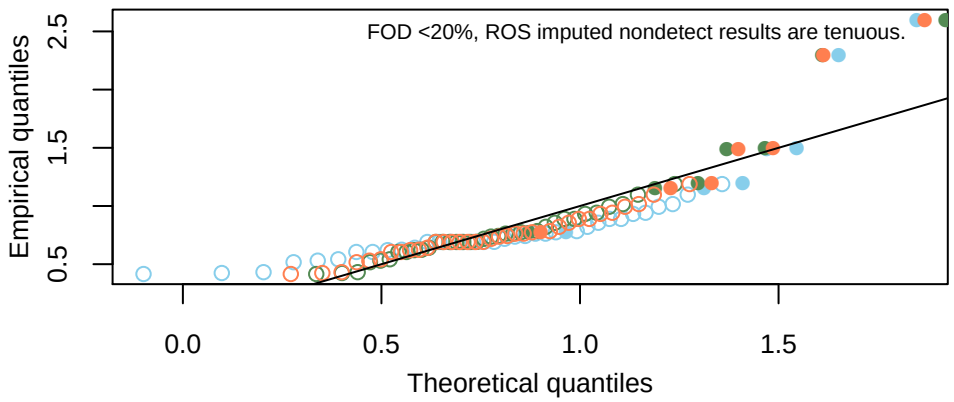
Exposure Unit:
MBC

Chemical (mg/kg):
Antimony

Legend

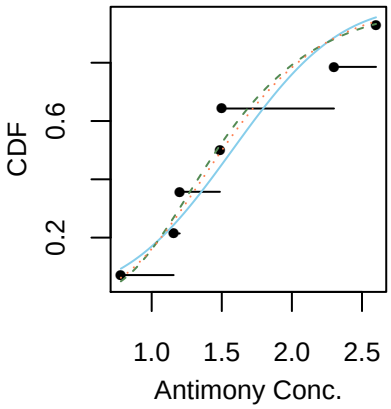
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

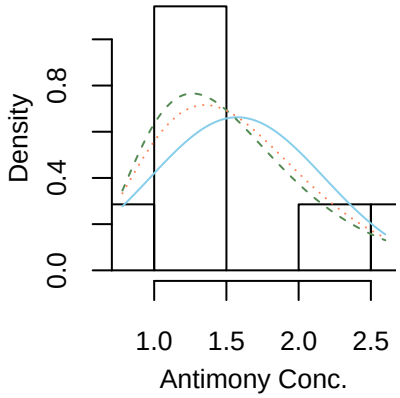


ECDF, Histogram & Q−Q (Detects Only)

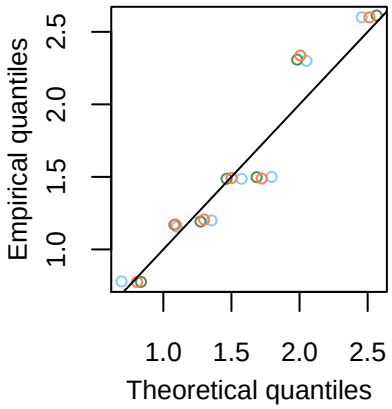
ECDF



Histogram



Q−Q



N = 45	FOD = 16%	Min (detect) = 0.78 J	Kaplan Meier Mean = 0.94
N (detect) = 7	SD (log detect) = 0.41	Max (detect) = 2 J	Kaplan Meier SD = 0.39

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00019	–	–	–	–	52.4503	55.9256
Lognormal	0.011	0.031	–	–	–	–	24.7882	28.2636
Gamma	–	–	0.1686	0.14	1.544	0.751	31.5806	35.0559

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.42	0.16	–	–	–	–	16.7616	16.6534
Lognormal	0.77	0.61	–	–	–	–	15.7649	15.6567
Gamma	–	–	NA	NA	NA	NA	15.8745	15.7663

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Antimony

Media:
Surface Sediment (0−15 cm)

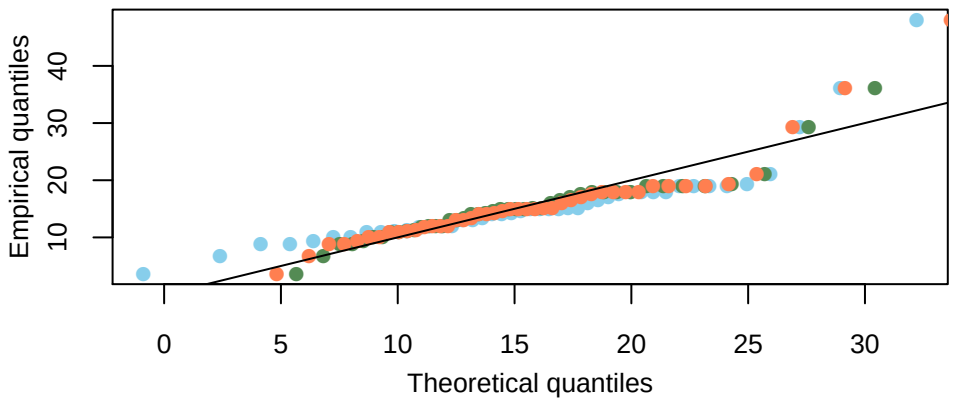
Exposure Unit:
MBC

Chemical (mg/kg):
Arsenic

Legend

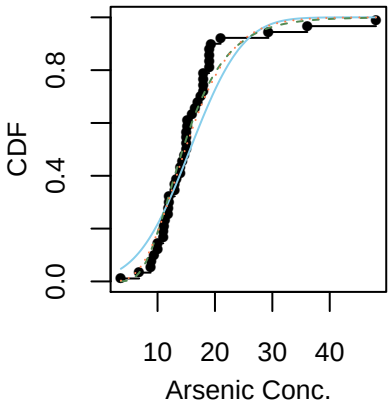
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

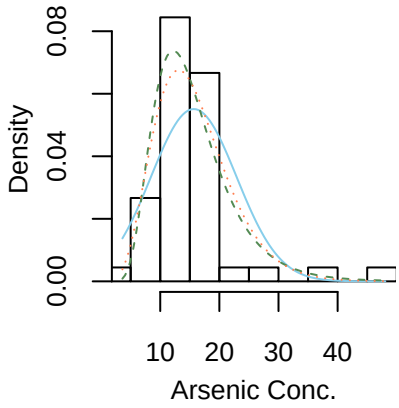


ECDF, Histogram & Q−Q (Detects Only)

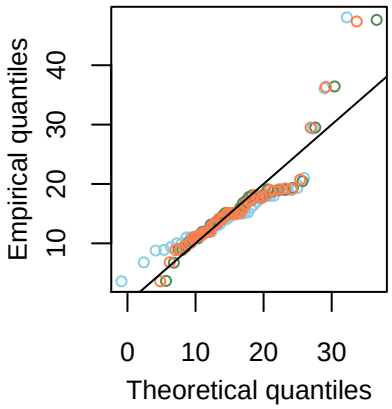
ECDF



Histogram



Q−Q



N = 45	FOD = 100%	Min (detect) = 3	Arithmetic Mean = 16
N (detect) = 45	SD (log detect) = 0.41	Max (detect) = 48 J	Arithmetic SD = 7

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	8e−06	–	–	–	–	309.856	313.469
Lognormal	0.0082	0.013	–	–	–	–	291.087	294.7
Gamma	–	–	0.164	0.132	1.189	0.753	293.041	296.655

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Arsenic

Media:
Surface Sediment (0−15 cm)

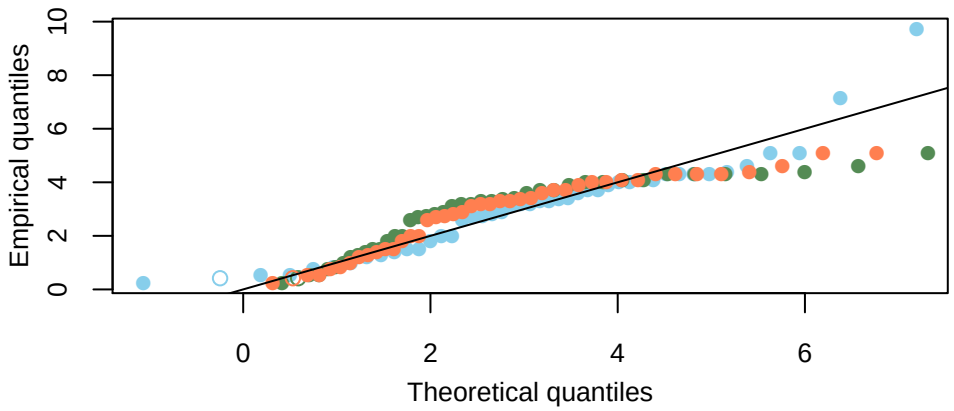
Exposure Unit:
MBC

Chemical (mg/kg):
Cadmium

Legend

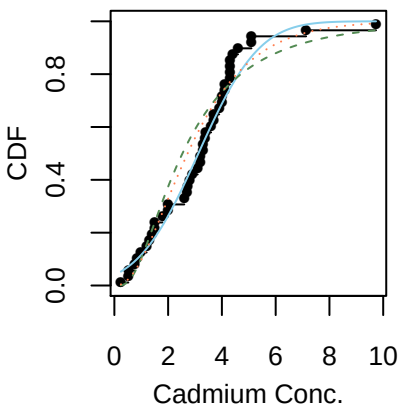
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

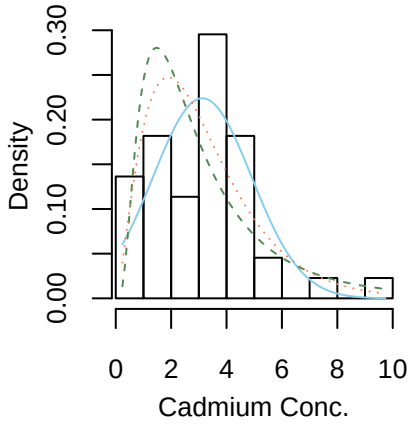


ECDF, Histogram & Q−Q (Detects Only)

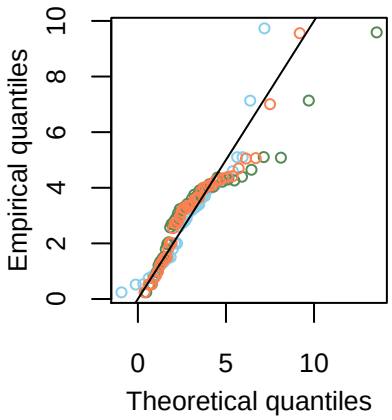
ECDF



Histogram



Q−Q



N = 45	FOD = 98%	Min (detect) = 0.24 J	Kaplan Meier Mean = 3
N (detect) = 44	SD (log detect) = 0.74	Max (detect) = 9 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.003	0.094	–	–	–	–	184.915	188.528
Lognormal	6e−04	9.8e−05	–	–	–	–	188.813	192.426
Gamma	–	–	0.1584	0.133	1.23	0.761	180.284	183.897

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0031	0.077	–	–	–	–	179.681	183.249
Lognormal	0.00075	2e−04	–	–	–	–	183.724	187.292
Gamma	–	–	0.1537	0.141	1.153	0.759	175.498	179.067

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Cadmium

Media:
Surface Sediment (0−15 cm)

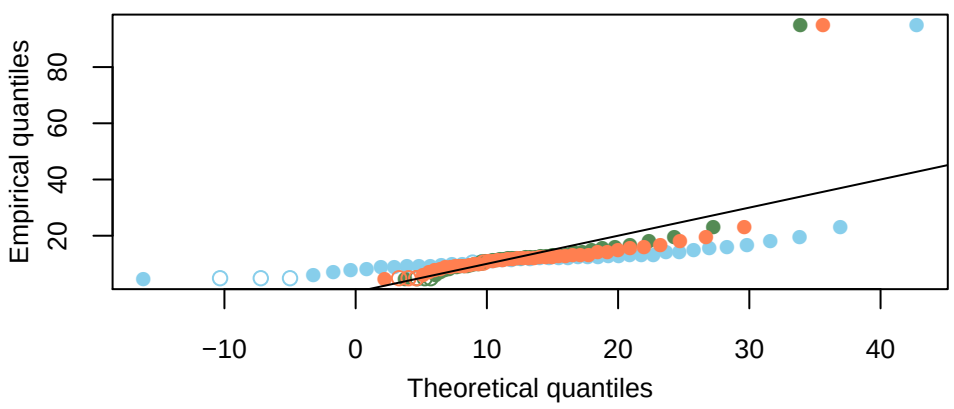
Exposure Unit:
MBC

Chemical (mg/kg):
Cobalt

Legend

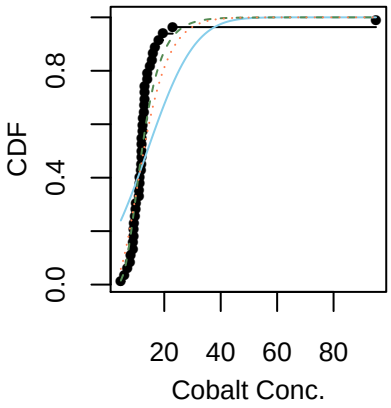
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

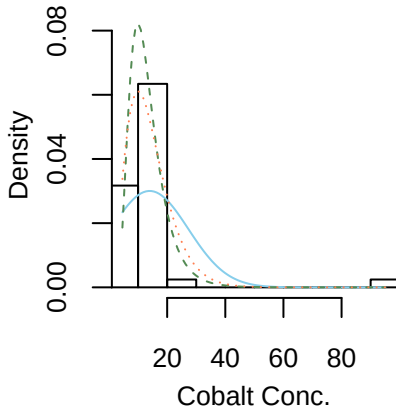


ECDF, Histogram & Q−Q (Detects Only)

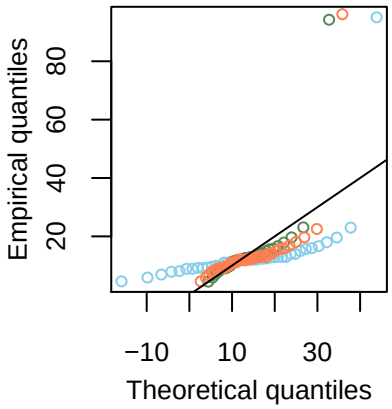
ECDF



Histogram



Q−Q



N = 45	FOD = 91%	Min (detect) = 4 J	Kaplan Meier Mean = 13
N (detect) = 41	SD (log detect) = 0.45	Max (detect) = 95 J	Kaplan Meier SD = 13

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.8e−12	–	–	–	–	361.759	365.372
Lognormal	2e−05	0.0036	–	–	–	–	283.939	287.552
Gamma	–	–	0.2198	0.133	3.073	0.761	301.745	305.358

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.4e−12	–	–	–	–	332.437	335.864
Lognormal	1e−05	8e−04	–	–	–	–	257.862	261.289
Gamma	–	–	0.2384	0.141	3.626	0.759	276.855	280.282

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Cobalt

Media:
Surface Sediment (0−15 cm)

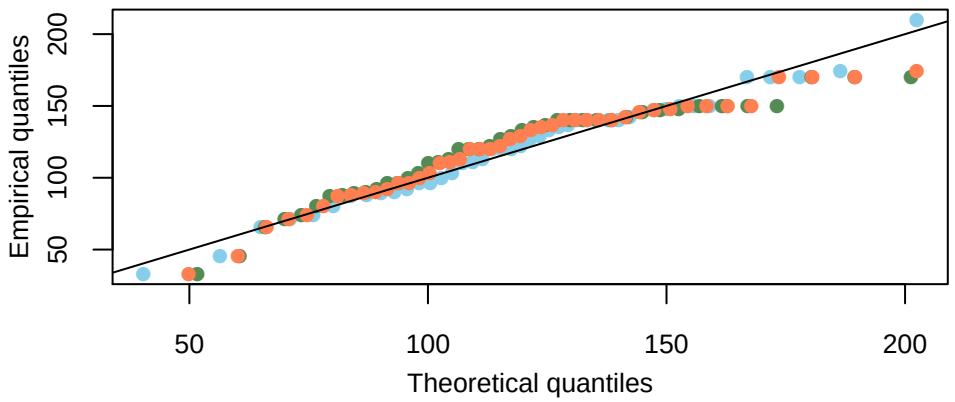
Exposure Unit:
MBC

Chemical (mg/kg):
Copper

Legend

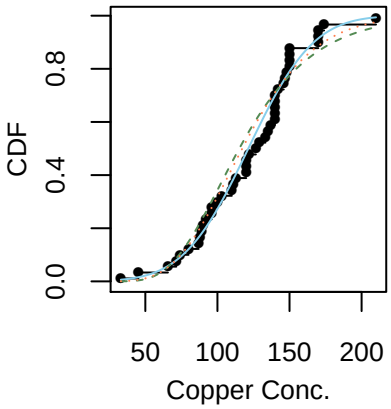
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

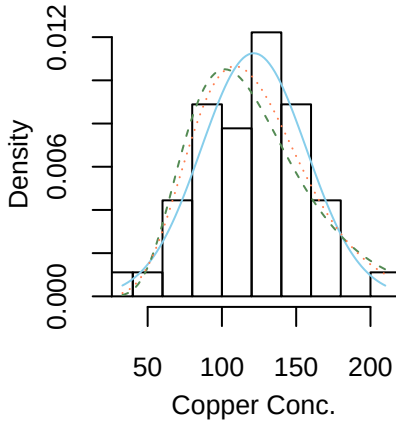


ECDF, Histogram & Q−Q (Detects Only)

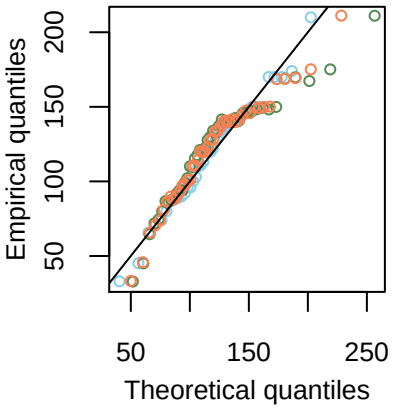
ECDF



Histogram



Q−Q



N = 45	FOD = 100%	Min (detect) = 33	Arithmetic Mean = 120
N (detect) = 45	SD (log detect) = 0.35	Max (detect) = 210 J	Arithmetic SD = 36

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.59	0.29	–	–	–	–	452.82	456.433
Lognormal	0.00068	0.017	–	–	–	–	464.494	468.107
Gamma	–	–	0.1285	0.132	0.914	0.753	458.678	462.291

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Copper

Media:
Surface Sediment (0−15 cm)

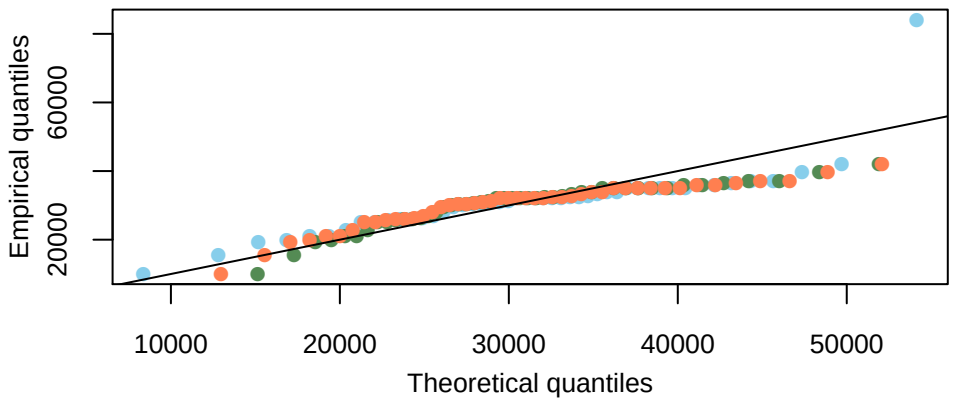
Exposure Unit:
MBC

Chemical (mg/kg):
Iron

Legend

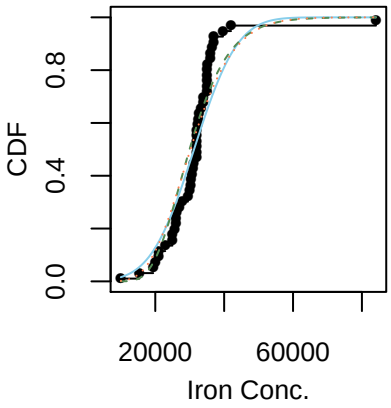
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

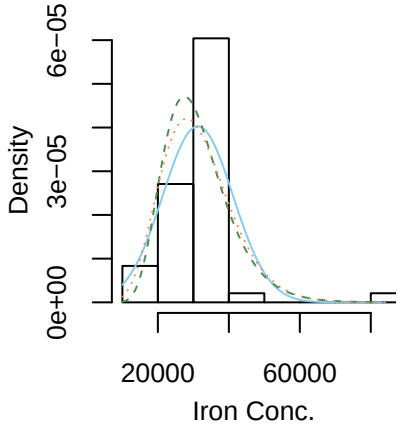


ECDF, Histogram & Q−Q (Detects Only)

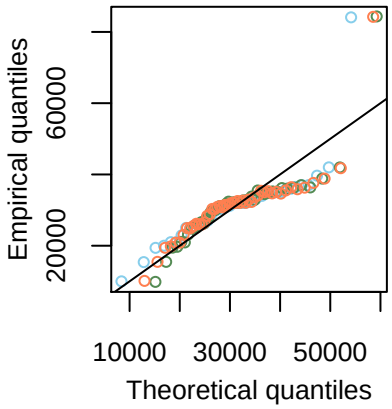
ECDF



Histogram



Q−Q



N = 48	FOD = 100%	Min (detect) = 10,000	Arithmetic Mean = 31,000
N (detect) = 48	SD (log detect) = 0.3	Max (detect) = 84,000 J	Arithmetic SD = 10,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.4e−06	–	–	–	–	1023.47	1027.21
Lognormal	2e−05	0.00067	–	–	–	–	1012.58	1016.32
Gamma	–	–	0.1949	0.132	2.548	0.753	1013.15	1016.89

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Iron

Media:
Surface Sediment (0−15 cm)

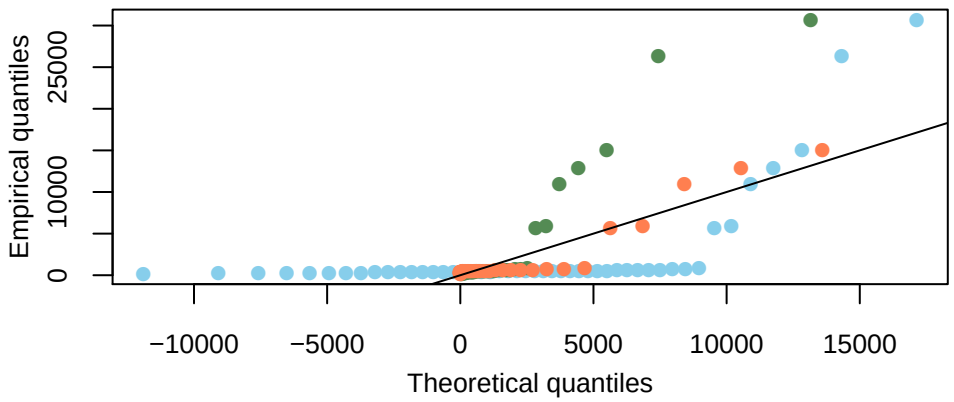
Exposure Unit:
MBC

Chemical (mg/kg):
Manganese

Legend

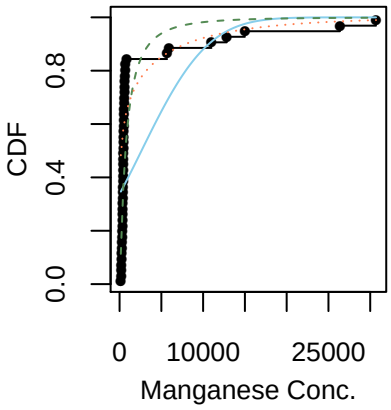
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

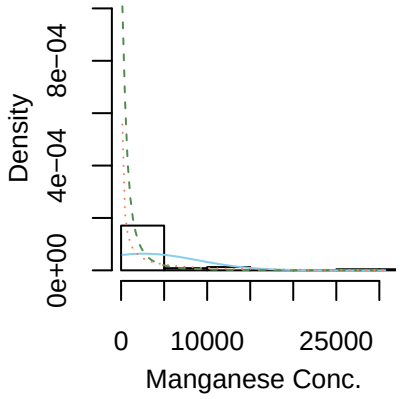


ECDF, Histogram & Q−Q (Detects Only)

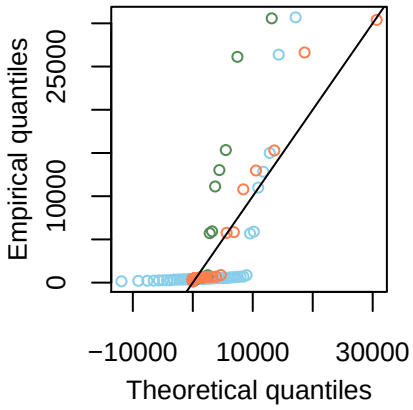
ECDF



Histogram



Q−Q



N = 48	FOD = 100%	Min (detect) = 150	Arithmetic Mean = 2,600
N (detect) = 48	SD (log detect) = 1.3	Max (detect) = 31,000 J	Arithmetic SD = 6,300

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.2e−29	–	–	–	–	979.79	983.532
Lognormal	0	2.1e−14	–	–	–	–	791.773	795.515
Gamma	–	–	0.491	0.1515	12.65	1.006	860.873	864.615

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Manganese

Media:
Surface Sediment (0−15 cm)

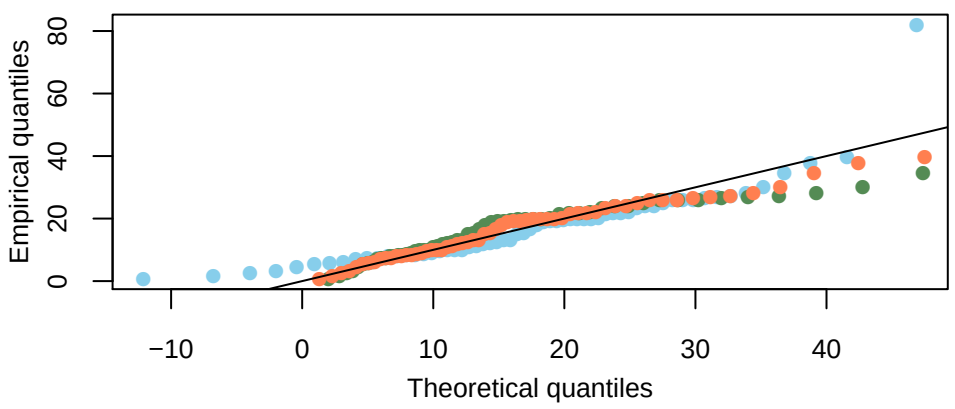
Exposure Unit:
MBC

Chemical (mg/kg):
Mercury

Legend

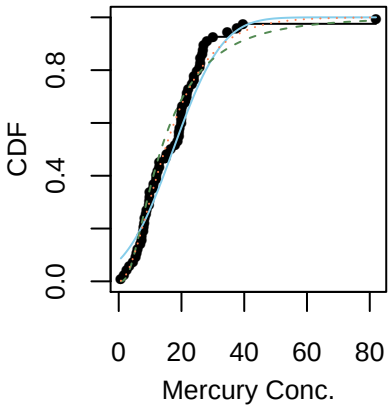
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

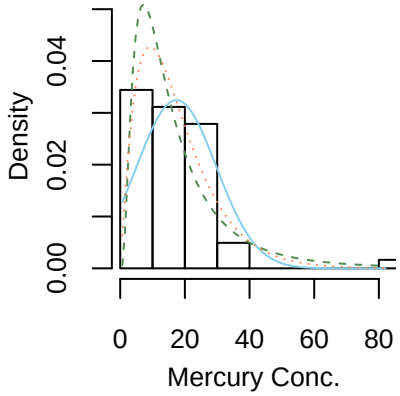


ECDF, Histogram & Q−Q (Detects Only)

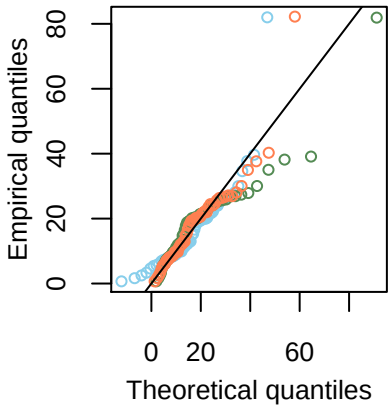
ECDF



Histogram



Q−Q



N = 61	FOD = 100%	Min (detect) = 0.68	Arithmetic Mean = 17
N (detect) = 61	SD (log detect) = 0.8	Max (detect) = 82 J	Arithmetic SD = 12

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.033	–	–	–	–	483.193	487.415
Lognormal	0.00084	0.0079	–	–	–	–	466.815	471.037
Gamma	–	–	0.1091	0.116	0.6016	0.763	458.018	462.24

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Mercury

Media:
Surface Sediment (0−15 cm)

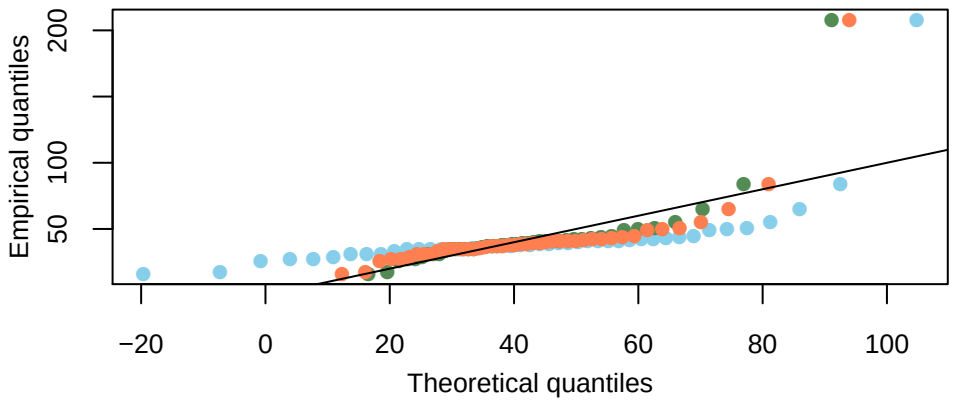
Exposure Unit:
MBC

Chemical (mg/kg):
Nickel

Legend

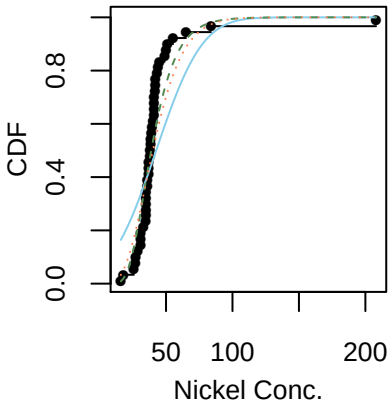
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

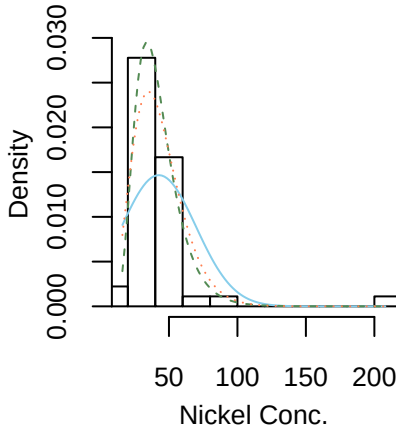


ECDF, Histogram & Q−Q (Detects Only)

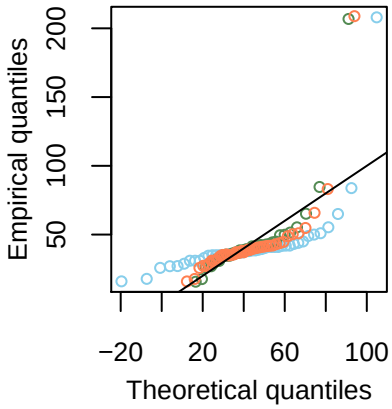
ECDF



Histogram



Q−Q



N = 45	FOD = 100%	Min (detect) = 16	Arithmetic Mean = 43
N (detect) = 45	SD (log detect) = 0.38	Max (detect) = 210 J	Arithmetic SD = 28

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.2e−12	–	–	–	–	429.026	432.64
Lognormal	0	0.00016	–	–	–	–	372.254	375.868
Gamma	–	–	0.2374	0.132	3.699	0.753	386.234	389.847

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

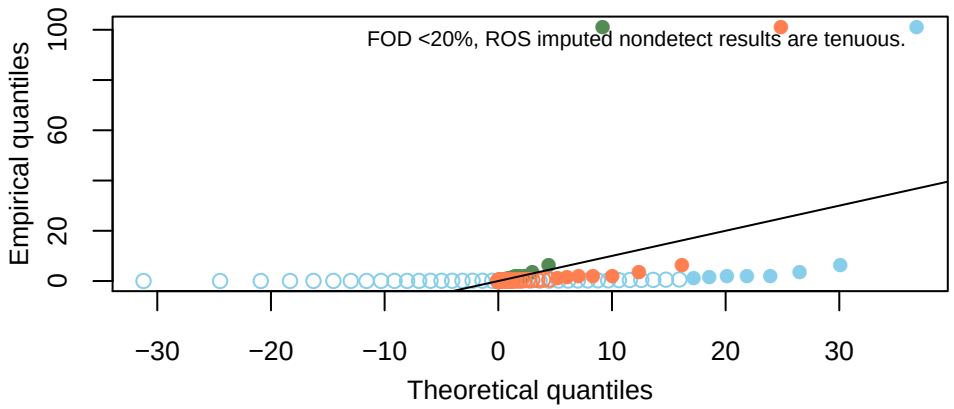
DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Nickel

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
MBC
Chemical (mg/kg):
Thallium

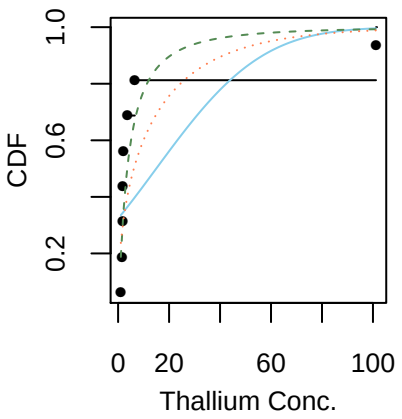
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

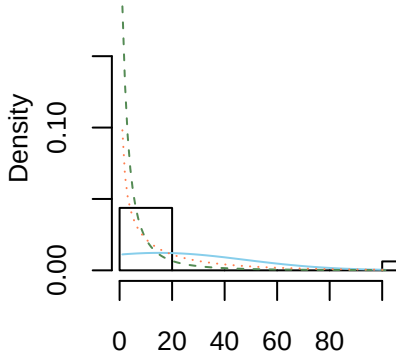


ECDF, Histogram & Q−Q (Detects Only)

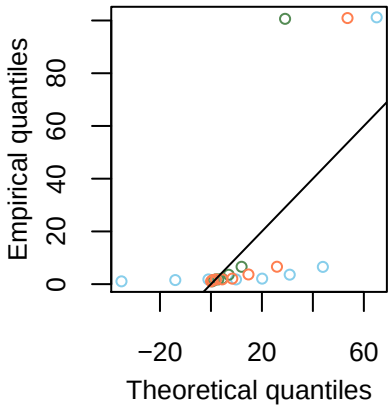
ECDF



Histogram



Q−Q



N = 45	FOD = 18%	Min (detect) = 1 J	Kaplan Meier Mean = 3
N (detect) = 8	SD (log detect) = 1.5	Max (detect) = 100 J	Kaplan Meier SD = 15

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.3e−26	–	–	–	–	374.686	378.299
Lognormal	0.0013	0.014	–	–	–	–	42.1605	45.7739
Gamma	–	–	0.3176	0.1466	7.367	0.9114	96.9077	100.521

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	8.7e−06	–	–	–	–	82.4705	82.6294
Lognormal	0.0077	0.096	–	–	–	–	52.0896	52.2485
Gamma	–	–	0.3633	0.3231	1.535	0.8358	58.4781	58.637

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Thallium

Media:
Surface Sediment (0−15 cm)

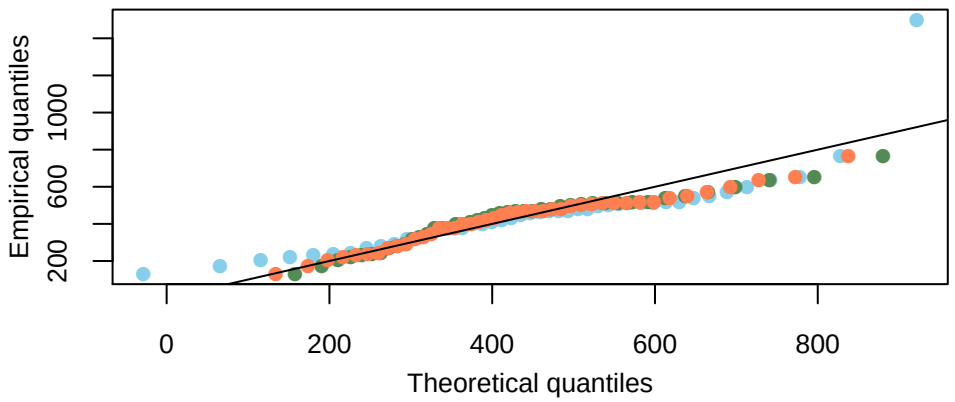
Exposure Unit:
MBC

Chemical (mg/kg):
Zinc

Legend

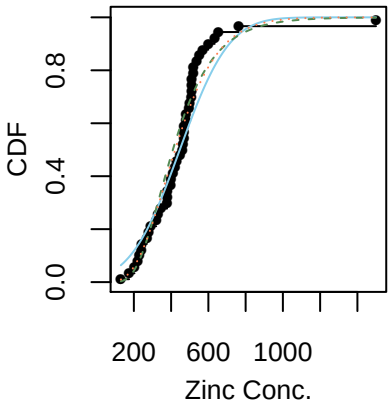
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

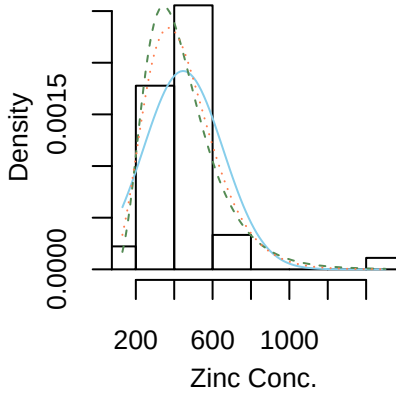


ECDF, Histogram & Q−Q (Detects Only)

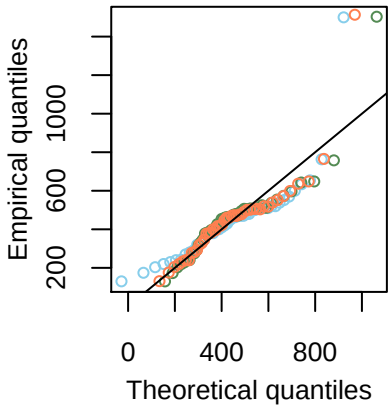
ECDF



Histogram



Q−Q



N = 45	FOD = 100%	Min (detect) = 130	Arithmetic Mean = 450
N (detect) = 45	SD (log detect) = 0.42	Max (detect) = 1,500 J	Arithmetic SD = 210

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00047	–	–	–	–	611.985	615.598
Lognormal	0.022	0.033	–	–	–	–	594.376	597.989
Gamma	–	–	0.1256	0.132	0.9835	0.753	595.779	599.392

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Zinc

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **125**

Media:
Surface Sediment (0−15 cm)

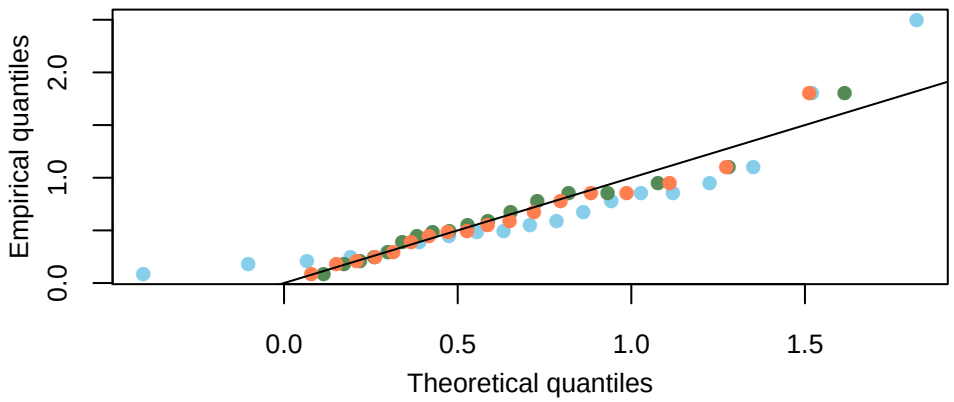
Exposure Unit:
MBC

Chemical (mg/kg):
Benz[a]anthracene

Legend

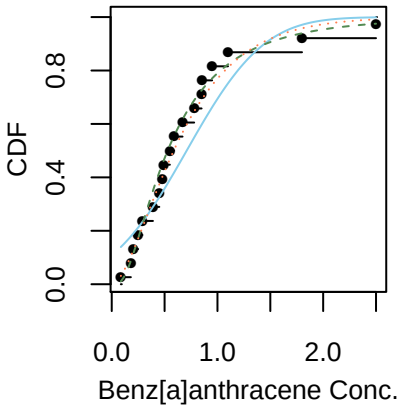
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

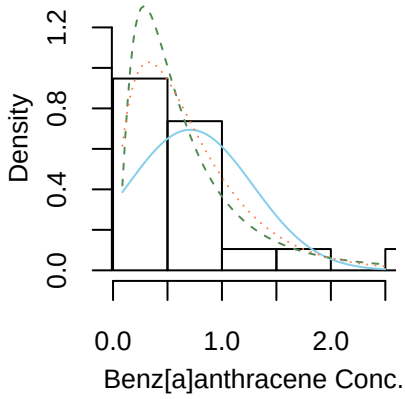


ECDF, Histogram & Q−Q (Detects Only)

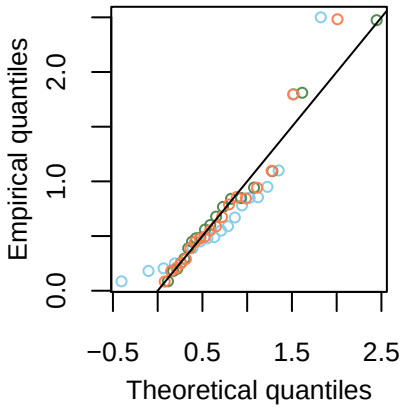
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 0.086 J	Arithmetic Mean = 0.71
N (detect) = 19	SD (log detect) = 0.81	Max (detect) = 2 J	Arithmetic SD = 0.59

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0016	0.064	–	–	–	–	36.8628	38.7516
Lognormal	0.99	0.84	–	–	–	–	24.7763	26.6652
Gamma	–	–	0.09657	0.204	0.2198	0.769	25.3078	27.1967

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Benz[a]anthracene

Media:
Surface Sediment (0−15 cm)

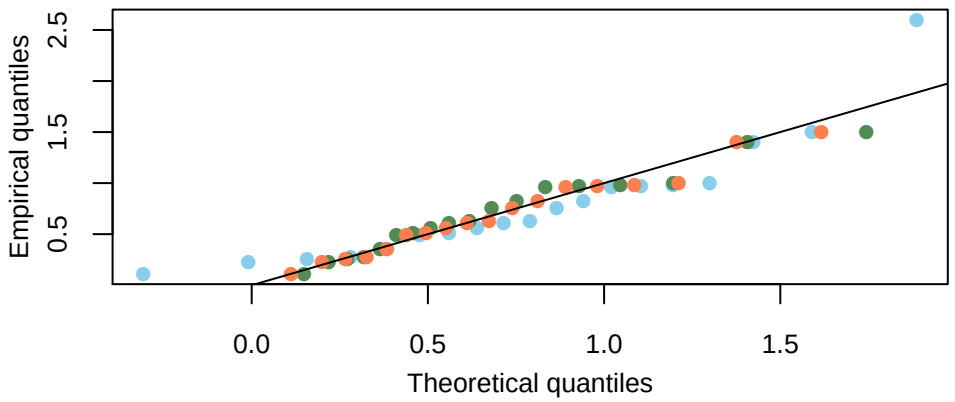
Exposure Unit:
MBC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

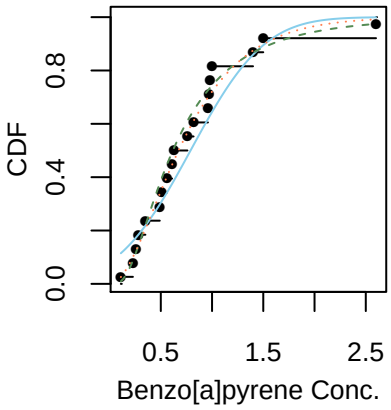
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

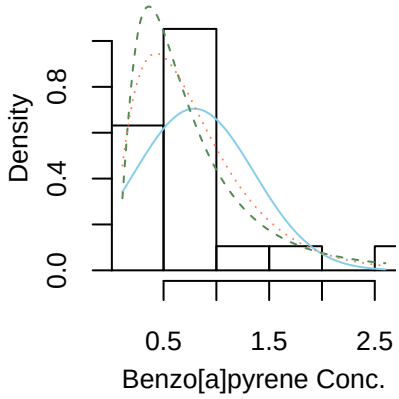


ECDF, Histogram & Q−Q (Detects Only)

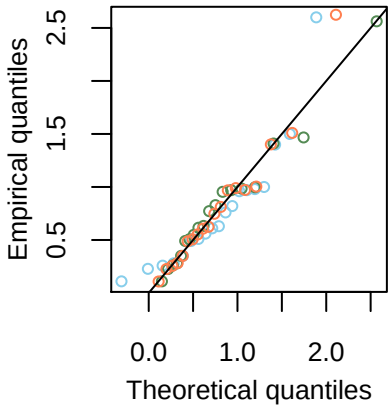
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 0.11 J	Arithmetic Mean = 0.79
N (detect) = 19	SD (log detect) = 0.76	Max (detect) = 2 J	Arithmetic SD = 0.58

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0068	0.041	–	–	–	–	36.3012	38.1901
Lognormal	0.91	0.71	–	–	–	–	27.9264	29.8153
Gamma	–	–	0.1214	0.201	0.1903	0.752	27.6625	29.5513

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Benzo[a]pyrene

Media:
Surface Sediment (0−15 cm)

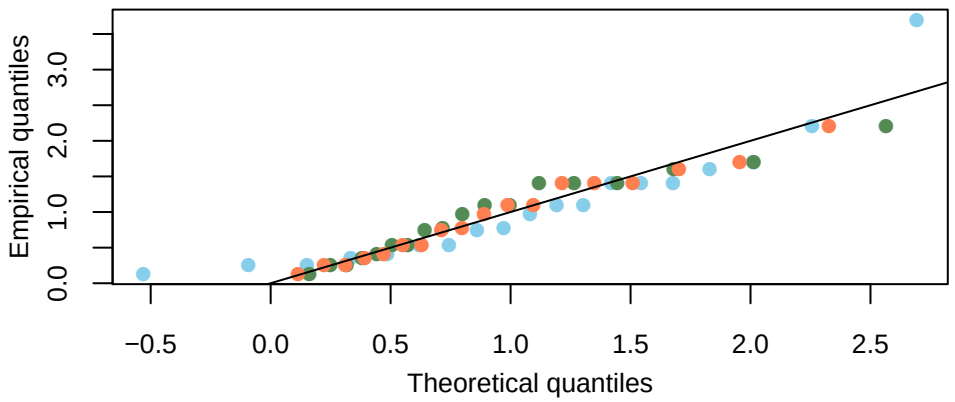
Exposure Unit:
MBC

Chemical (mg/kg):
Benzo[b]fluoranthene

Legend

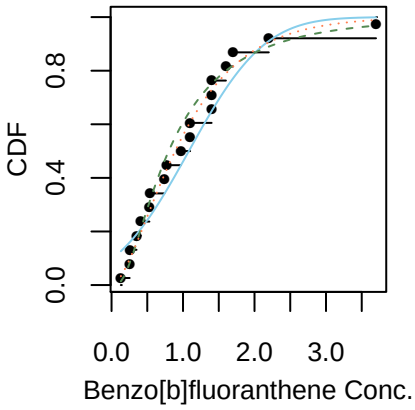
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

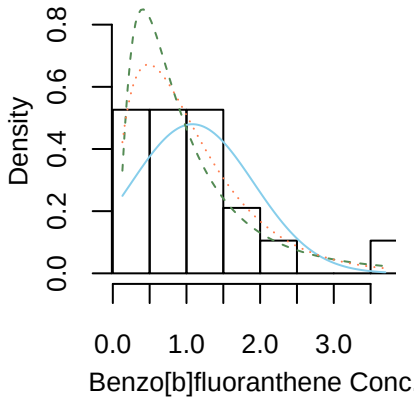


ECDF, Histogram & Q−Q (Detects Only)

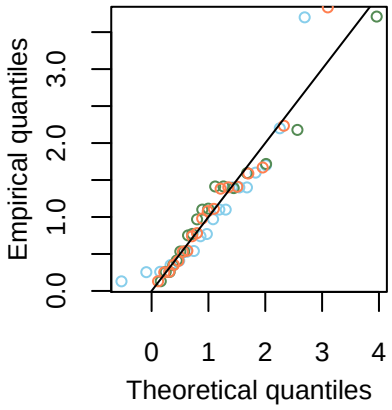
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 0.13 J	Arithmetic Mean = 1
N (detect) = 19	SD (log detect) = 0.85	Max (detect) = 3 J	Arithmetic SD = 0.85

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.009	0.37	–	–	–	–	50.913	52.8018
Lognormal	0.85	0.67	–	–	–	–	42.1349	44.0238
Gamma	–	–	0.09661	0.204	0.1924	0.769	41.6675	43.5563

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Benzo[b]fluoranthene

Media:
Surface Sediment (0−15 cm)

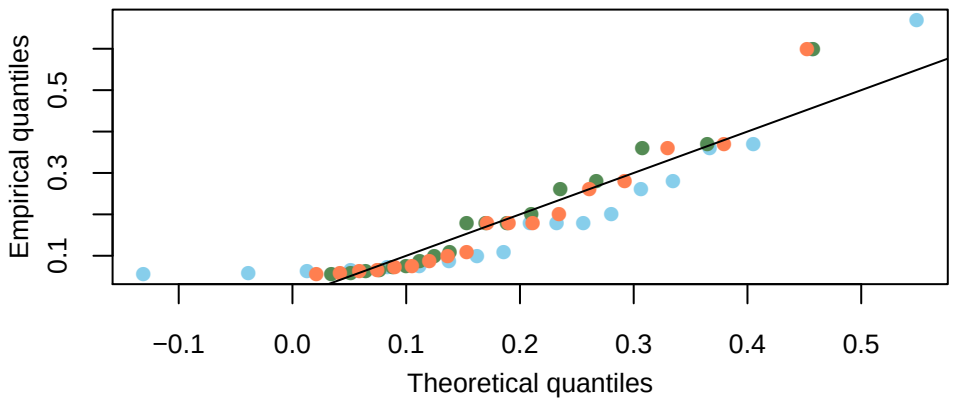
Exposure Unit:
MBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

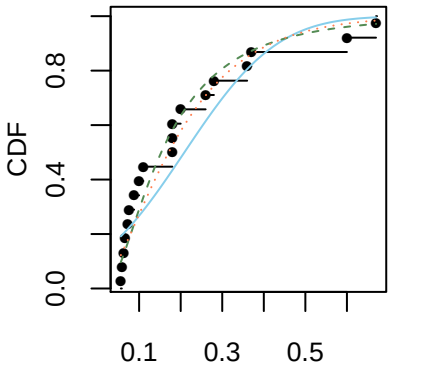
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

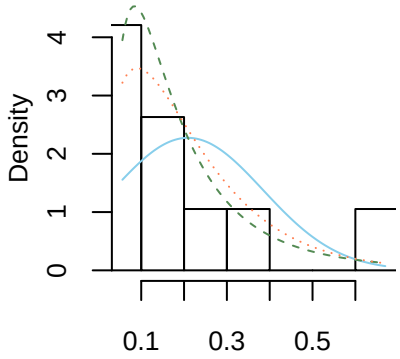


ECDF, Histogram & Q−Q (Detects Only)

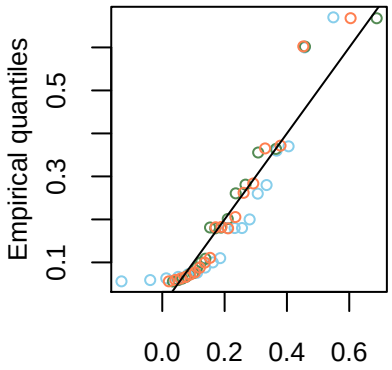
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 0.056 J	Arithmetic Mean = 0.21
N (detect) = 19	SD (log detect) = 0.8	Max (detect) = 0.67 J	Arithmetic SD = 0.18

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0012	0.036	–	–	–	–	−8.22524	−6.33636
Lognormal	0.15	0.48	–	–	–	–	−23.0447	−21.1559
Gamma	–	–	0.1671	0.204	0.6477	0.769	−20.5766	−18.6877

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Dibenz[a,h]anthracene

Media:
Surface Sediment (0−15 cm)

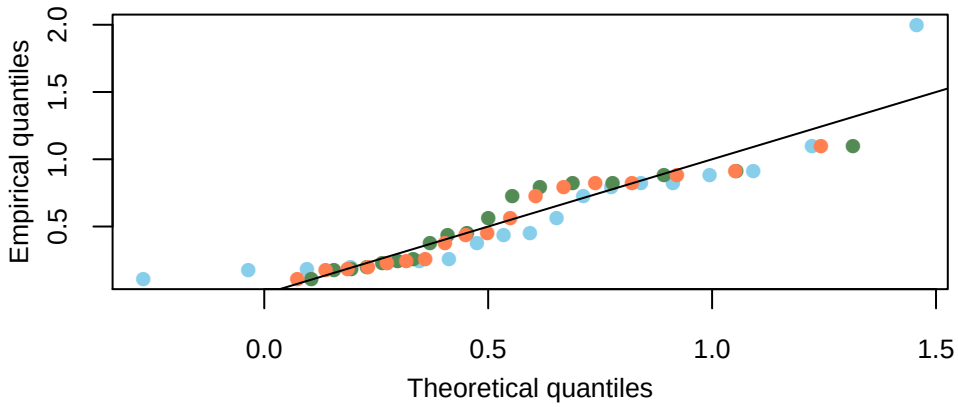
Exposure Unit:
MBC

Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

Legend

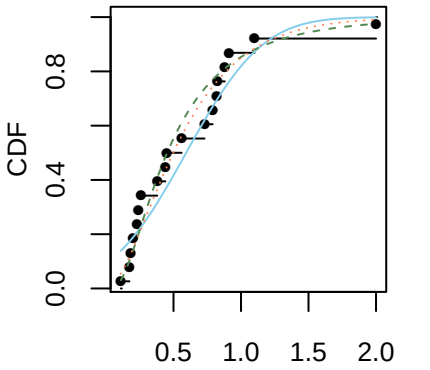
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

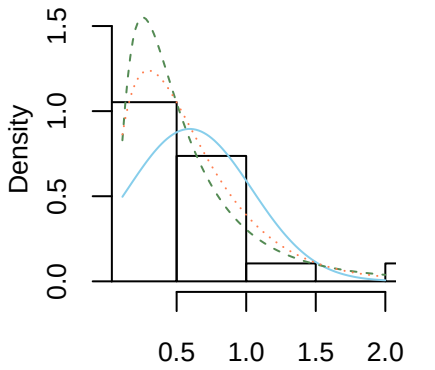


ECDF, Histogram & Q−Q (Detects Only)

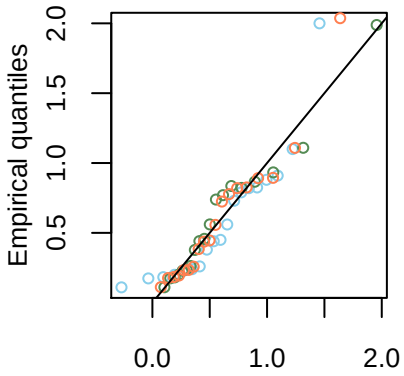
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 0.11 J	Arithmetic Mean = 0.59
N (detect) = 19	SD (log detect) = 0.78	Max (detect) = 2 J	Arithmetic SD = 0.46

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0046	0.32	–	–	–	–	27.1971	29.086
Lognormal	0.56	0.3	–	–	–	–	17.1323	19.0212
Gamma	–	–	0.1494	0.204	0.4141	0.769	17.806	19.6949

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Indeno[1,2,3−cd]pyrene

Media:
Surface Sediment (0−15 cm)

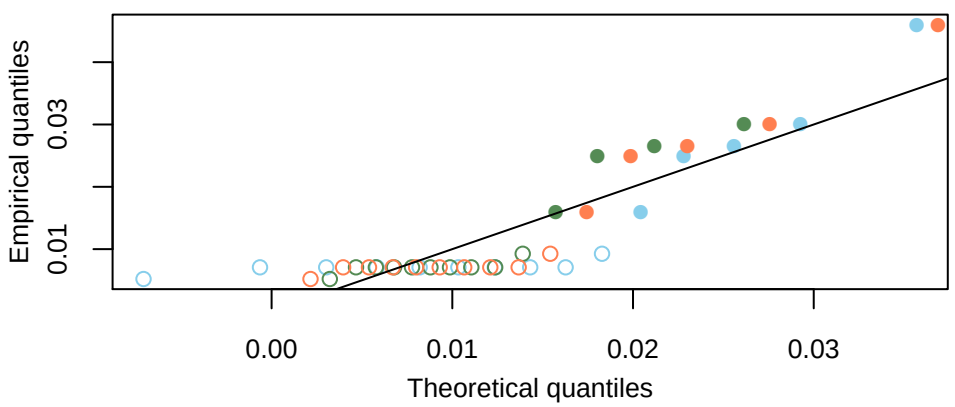
Exposure Unit:
MBC

Chemical (mg/kg):
Aldrin

Legend

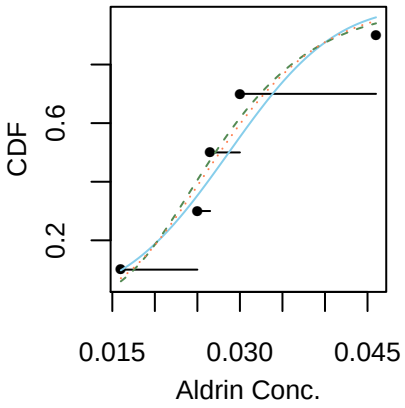
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

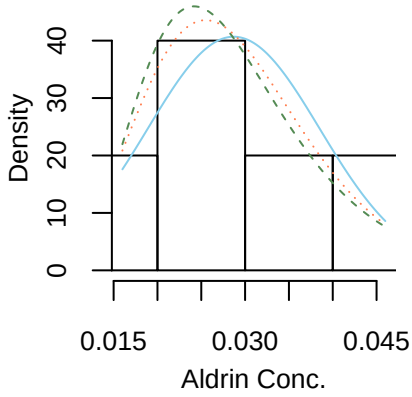


ECDF, Histogram & Q−Q (Detects Only)

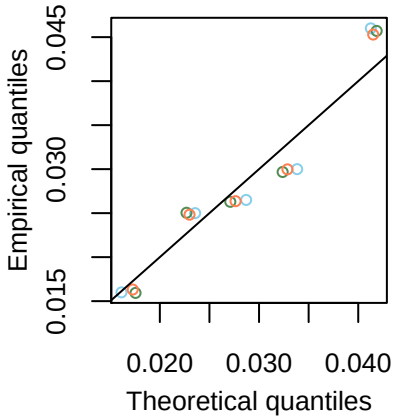
ECDF



Histogram



Q−Q



N = 15	FOD = 33%	Min (detect) = 0.016 J	Kaplan Meier Mean = 0.0096
N (detect) = 5	SD (log detect) = 0.38	Max (detect) = 0.046 J	Kaplan Meier SD = 0.015

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00035	0.00011	–	–	–	–	−86.9601	−85.544
Lognormal	0.002	5.7e−05	–	–	–	–	−100.505	−99.0886
Gamma	–	–	NA	NA	NA	NA	−97.2565	−95.8404

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.6	N<5	–	–	–	–	−28.0581	−28.8392
Lognormal	0.86	N<5	–	–	–	–	−28.7057	−29.4868
Gamma	–	–	NA	NA	NA	NA	−28.6365	−29.4176

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Aldrin

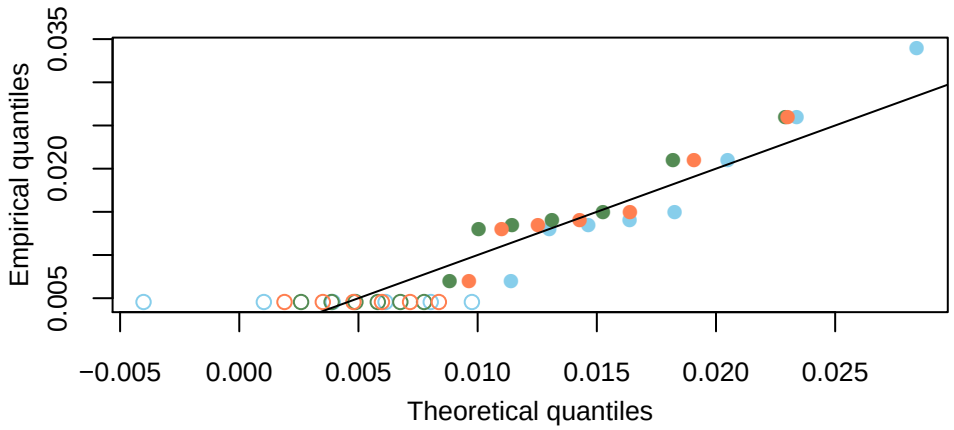
Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **131**

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
MBC
Chemical (mg/kg):
Heptachlor Epoxide

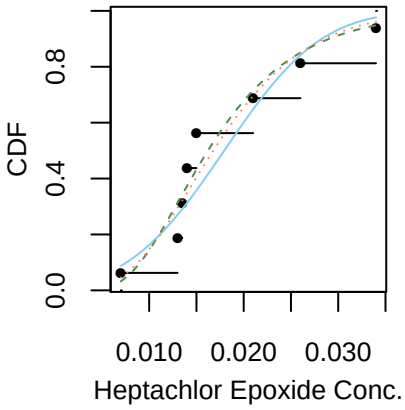
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

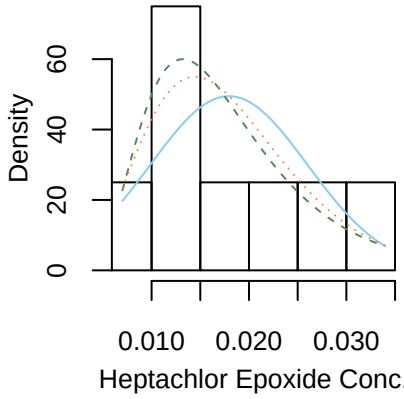


ECDF, Histogram & Q−Q (Detects Only)

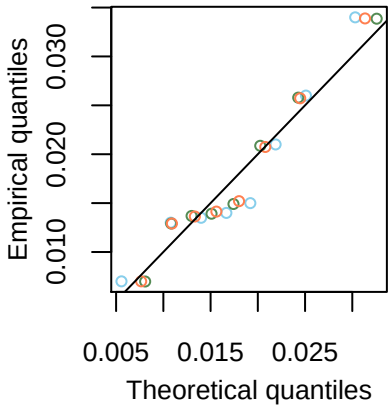
ECDF



Histogram



Q−Q



N = 14	FOD = 57%	Min (detect) = 0.007 J	Kaplan Meier Mean = 0.01
N (detect) = 8	SD (log detect) = 0.49	Max (detect) = 0.034 J	Kaplan Meier SD = 0.011

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0085	0.06	–	–	–	–	−88.1688	−86.8907
Lognormal	0.017	0.009	–	–	–	–	−96.2617	−94.9836
Gamma	–	–	NA	NA	NA	NA	−94.9336	−93.6554

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.39	0.12	–	–	–	–	−50.4226	−50.2637
Lognormal	0.76	0.46	–	–	–	–	−51.8531	−51.6942
Gamma	–	–	0.2211	0.295	0.3159	0.719	−51.7985	−51.6396

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−Heptachlor Epoxide

Media:
Surface Sediment (0−15 cm)

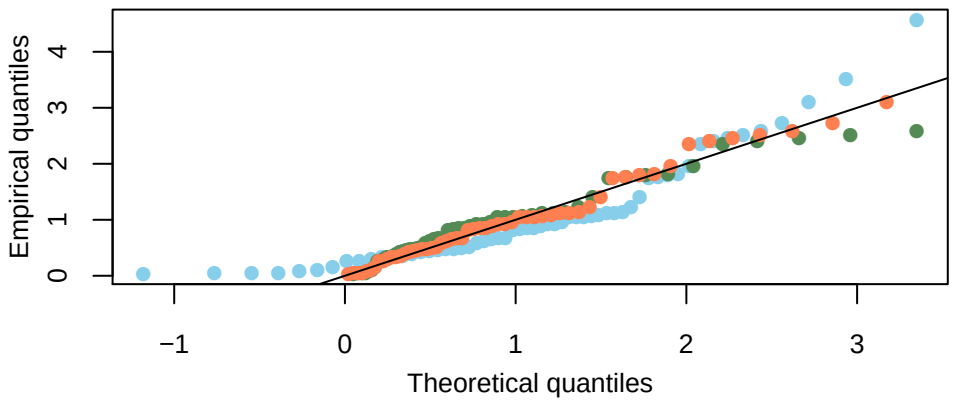
Exposure Unit:
MBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

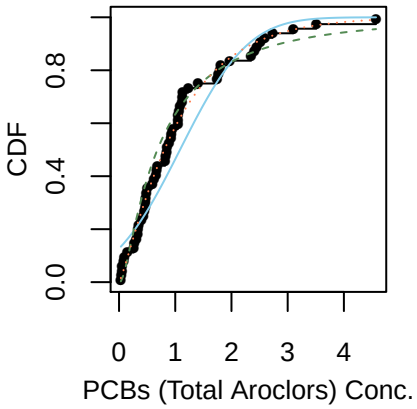
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

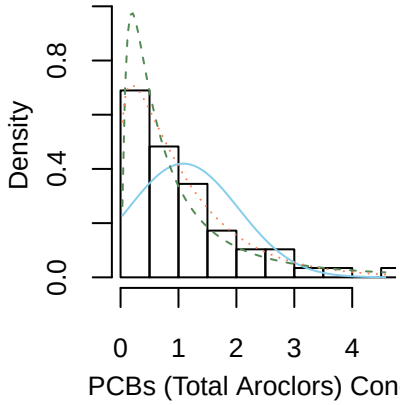


ECDF, Histogram & Q−Q (Detects Only)

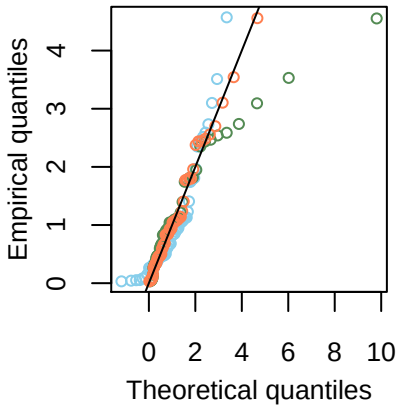
ECDF



Histogram



Q−Q



N = 58	FOD = 100%	Min (detect) = 0.032 J	Arithmetic Mean = 1
N (detect) = 58	SD (log detect) = 1.1	Max (detect) = 4 J	Arithmetic SD = 0.96

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	1.9e−06	–	–	–	–	162.77	166.891
Lognormal	0.0026	0.049	–	–	–	–	137.313	141.433
Gamma	–	–	0.08739	0.129	0.343	0.78	128.155	132.276

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−PCBs (Total Aroclors)

Media:
Surface Sediment (0−15 cm)

Exposure Unit:
BCC

Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 16	FOD = 12%	Min (detect) = 1 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 4 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Antimony

Media:
Surface Sediment (0−15 cm)

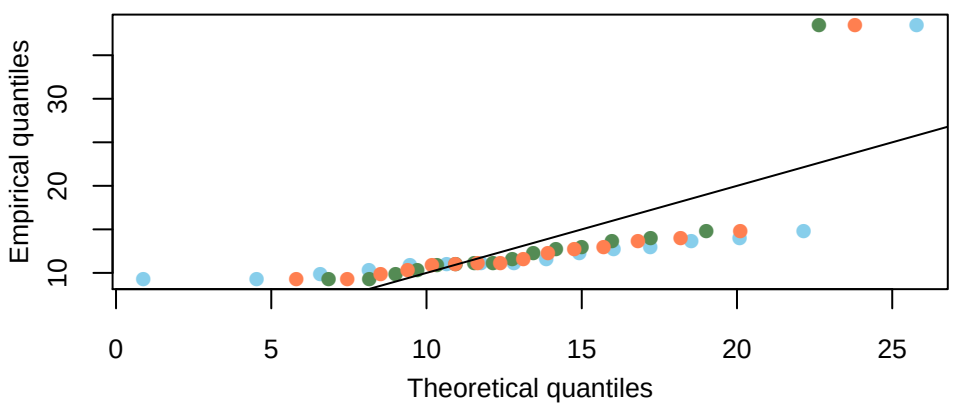
Exposure Unit:
BCC

Chemical (mg/kg):
Arsenic

Legend

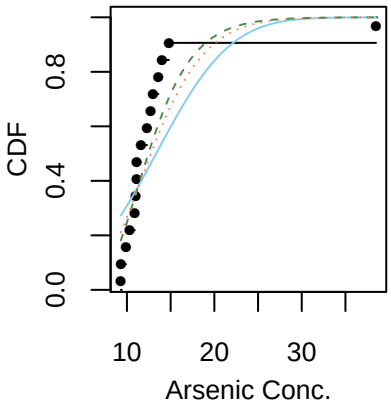
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

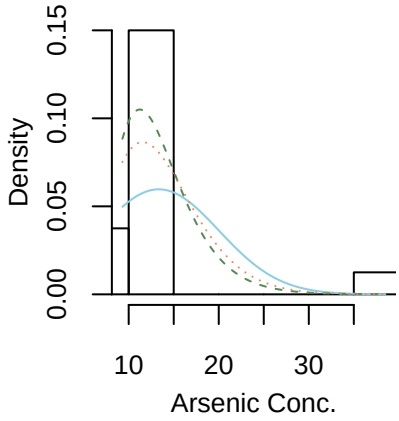


ECDF, Histogram & Q−Q (Detects Only)

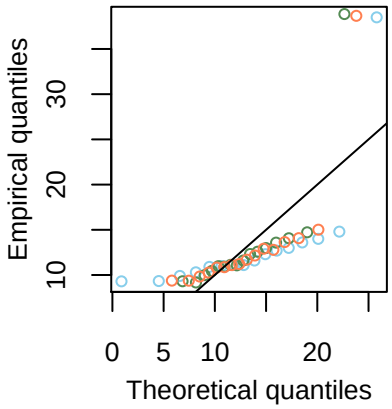
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 9 J	Arithmetic Mean = 13
N (detect) = 16	SD (log detect) = 0.33	Max (detect) = 38 J	Arithmetic SD = 6

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	8.6e−06	–	–	–	–	110.206	111.751
Lognormal	1e−04	0.015	–	–	–	–	93.7512	95.2964
Gamma	–	–	0.2786	0.216	2.09	0.741	98.7435	100.289

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Arsenic

Media:
Surface Sediment (0−15 cm)

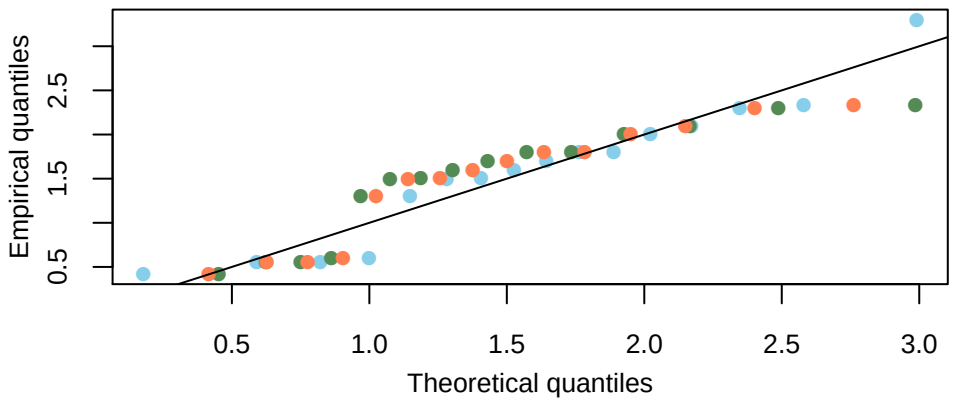
Exposure Unit:
BCC

Chemical (mg/kg):
Cadmium

Legend

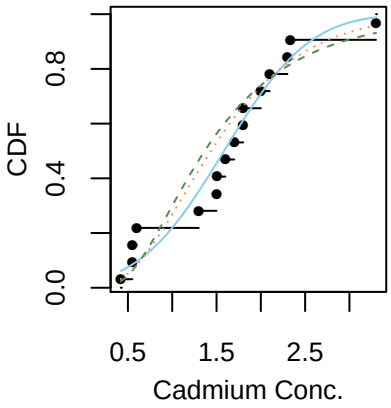
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

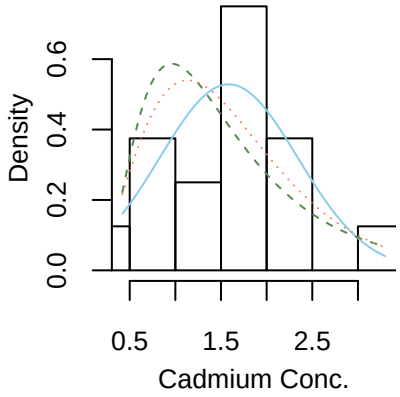


ECDF, Histogram & Q−Q (Detects Only)

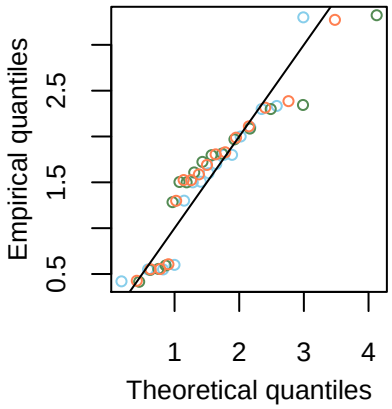
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 0.42 J	Arithmetic Mean = 1
N (detect) = 16	SD (log detect) = 0.61	Max (detect) = 3 J	Arithmetic SD = 0.78

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.33	0.47	–	–	–	–	40.4126	41.9578
Lognormal	0.027	0.0094	–	–	–	–	42.6878	44.233
Gamma	–	–	0.2183	0.218	0.791	0.75	40.7612	42.3063

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Cadmium

Media:
Surface Sediment (0−15 cm)

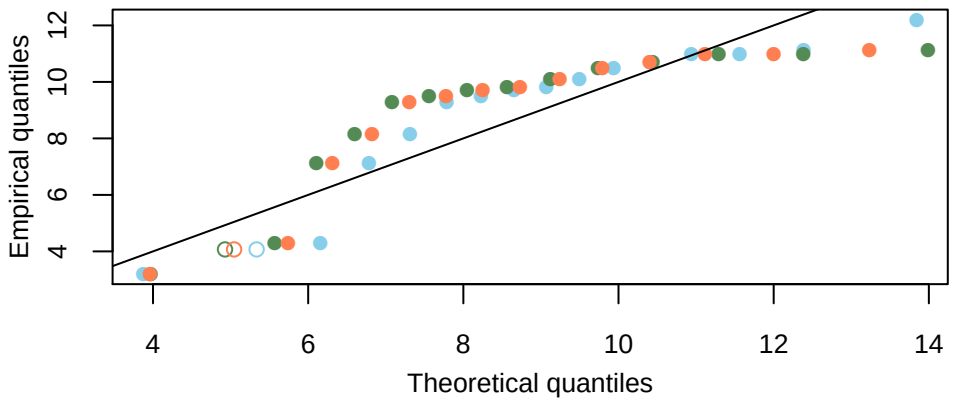
Exposure Unit:
BCC

Chemical (mg/kg):
Cobalt

Legend

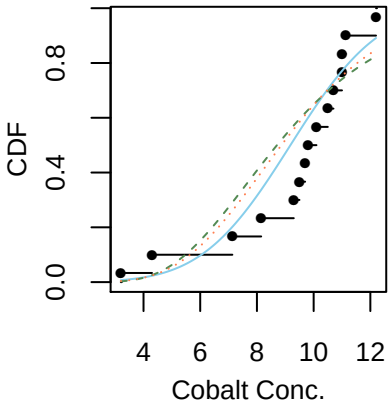
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

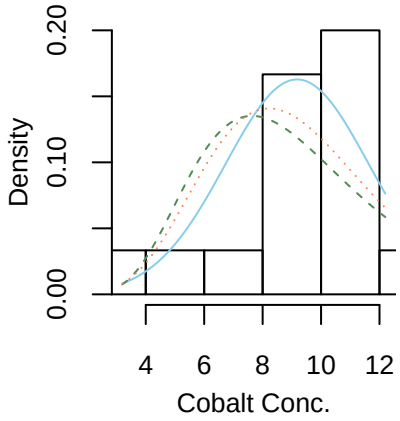


ECDF, Histogram & Q−Q (Detects Only)

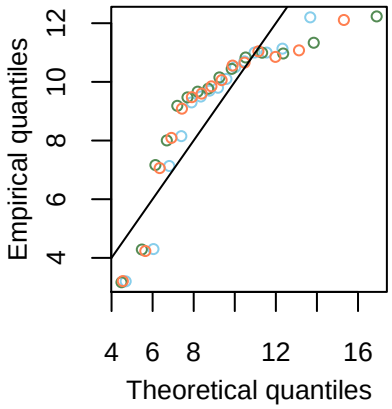
ECDF



Histogram



Q−Q



N = 16	FOD = 94%	Min (detect) = 3 J	Kaplan Meier Mean = 8
N (detect) = 15	SD (log detect) = 0.37	Max (detect) = 12 J	Kaplan Meier SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.012	0.0083	–	–	–	–	80.8997	82.4449
Lognormal	0.00094	0.00054	–	–	–	–	87.4776	89.0227
Gamma	–	–	0.2882	0.216	1.517	0.741	84.8731	86.4183

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.012	0.011	–	–	–	–	73.4539	74.87
Lognormal	0.00053	0.00062	–	–	–	–	80.9991	82.4152
Gamma	–	–	0.2921	0.222	1.481	0.739	78.0995	79.5156

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Cobalt

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **137**

Media:
Surface Sediment (0−15 cm)

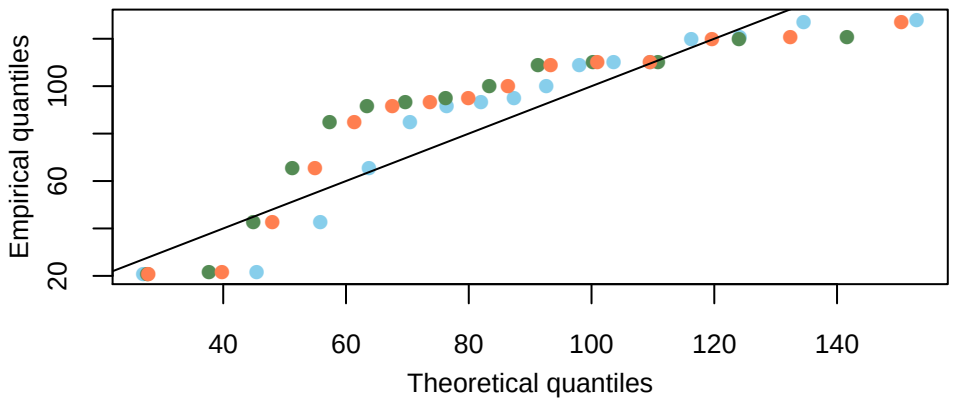
Exposure Unit:
BCC

Chemical (mg/kg):
Copper

Legend

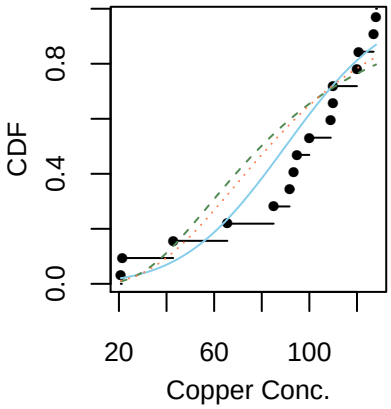
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

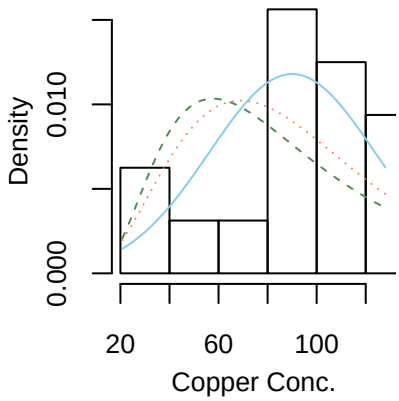


ECDF, Histogram & Q−Q (Detects Only)

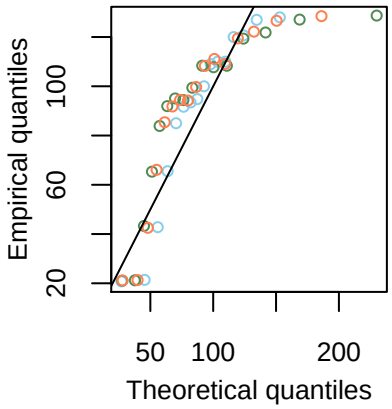
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 21 J	Arithmetic Mean = 90
N (detect) = 16	SD (log detect) = 0.59	Max (detect) = 130 J	Arithmetic SD = 35

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.021	0.066	–	–	–	–	162.078	163.623
Lognormal	0.00041	0.00068	–	–	–	–	171.472	173.017
Gamma	–	–	0.2679	0.218	1.47	0.75	167.466	169.011

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Copper

Media:
Surface Sediment (0−15 cm)

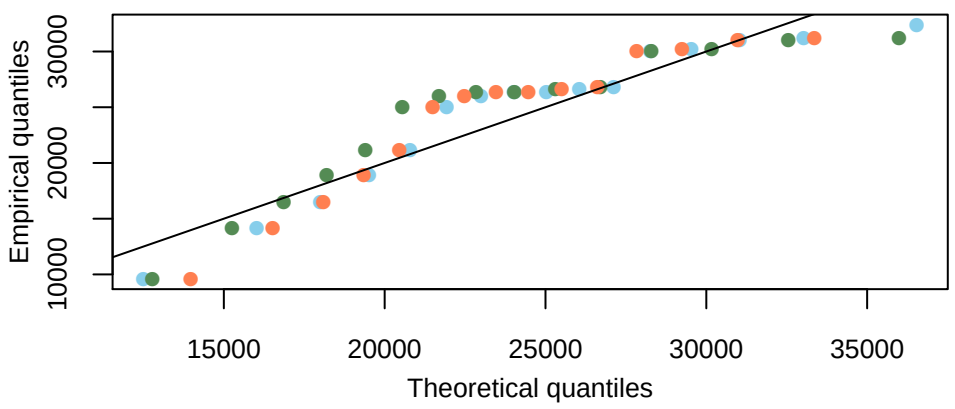
Exposure Unit:
BCC

Chemical (mg/kg):
Iron

Legend

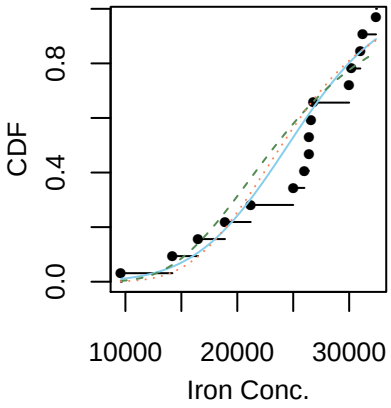
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

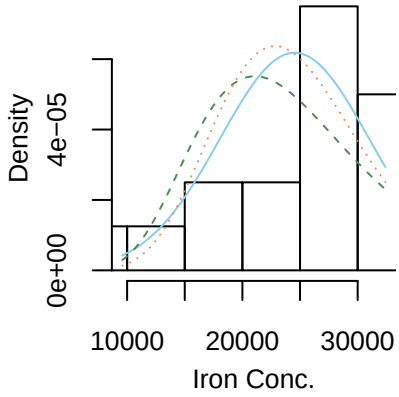


ECDF, Histogram & Q−Q (Detects Only)

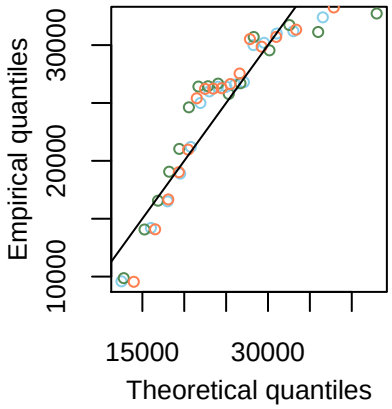
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 9,600 J	Arithmetic Mean = 25,000
N (detect) = 16	SD (log detect) = 0.34	Max (detect) = 32,000 J	Arithmetic SD = 6,700

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.075	0.045	–	–	–	–	330.122	331.667
Lognormal	0.0059	0.004	–	–	–	–	335.481	337.026
Gamma	–	–	0.2514	0.215	1.079	0.739	333.92	335.465

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Iron

Media:
Surface Sediment (0−15 cm)

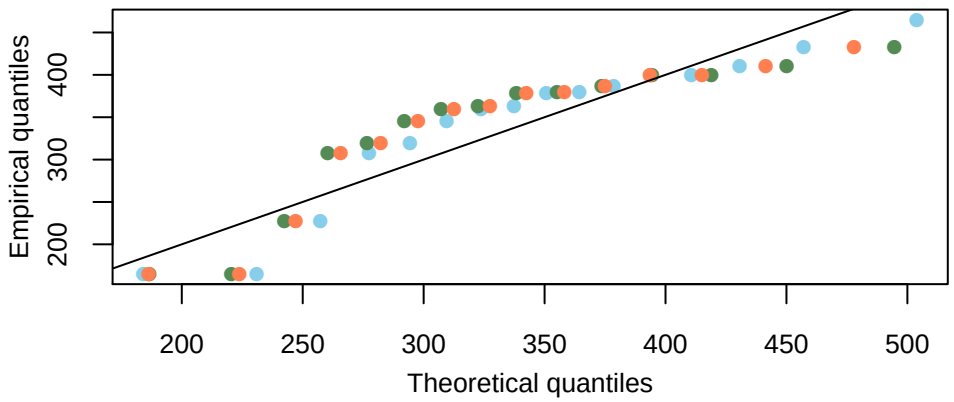
Exposure Unit:
BCC

Chemical (mg/kg):
Manganese

Legend

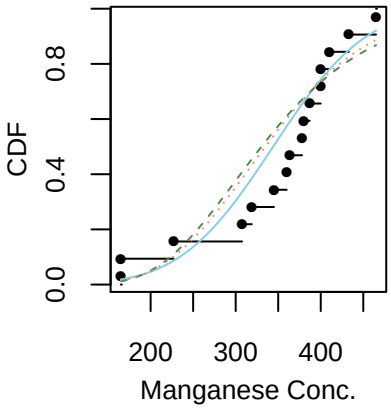
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

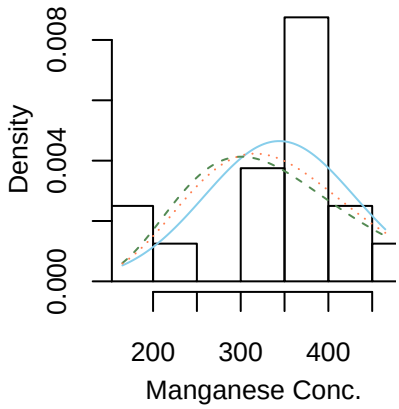


ECDF, Histogram & Q−Q (Detects Only)

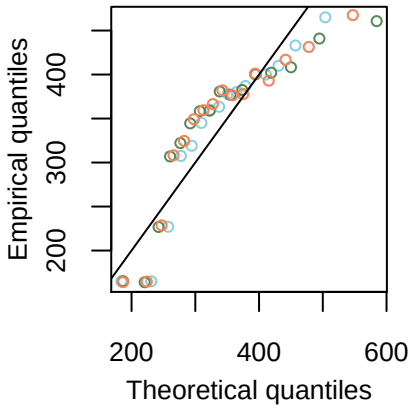
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 160 J	Arithmetic Mean = 340
N (detect) = 16	SD (log detect) = 0.32	Max (detect) = 460 J	Arithmetic SD = 89

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.034	0.1	–	–	–	–	191.879	193.424
Lognormal	0.002	0.013	–	–	–	–	197.156	198.701
Gamma	–	–	0.229	0.215	1.235	0.739	195.106	196.651

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Manganese

Media:
Surface Sediment (0−15 cm)

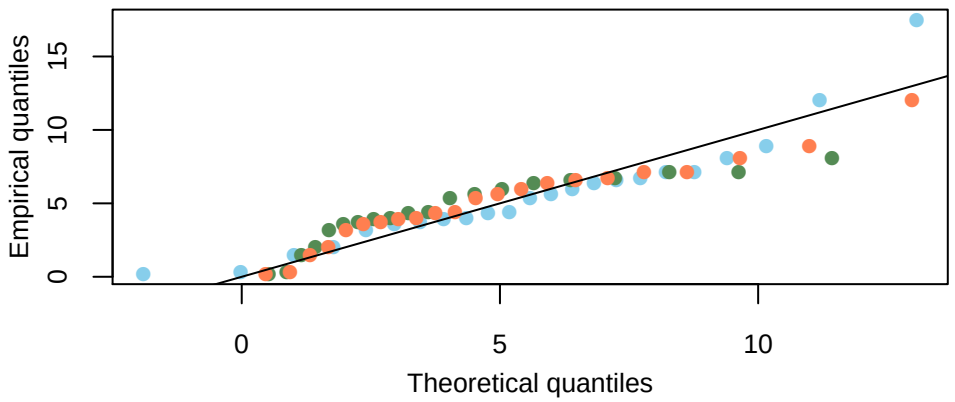
Exposure Unit:
BCC

Chemical (mg/kg):
Mercury

Legend

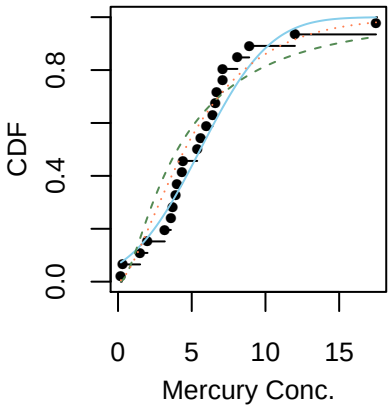
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

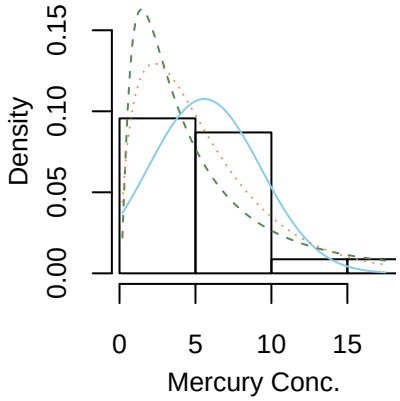


ECDF, Histogram & Q−Q (Detects Only)

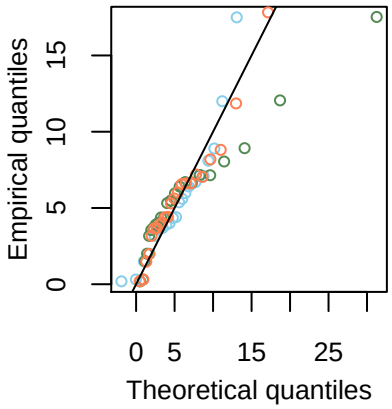
ECDF



Histogram



Q−Q



N = 23	FOD = 100%	Min (detect) = 0.19 J	Arithmetic Mean = 5
N (detect) = 23	SD (log detect) = 1	Max (detect) = 18 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.02	0.08	–	–	–	–	129.558	131.829
Lognormal	0.00055	0.0016	–	–	–	–	134.081	136.352
Gamma	–	–	0.1765	0.187	0.769	0.769	125.892	128.163

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Mercury

Media:
Surface Sediment (0−15 cm)

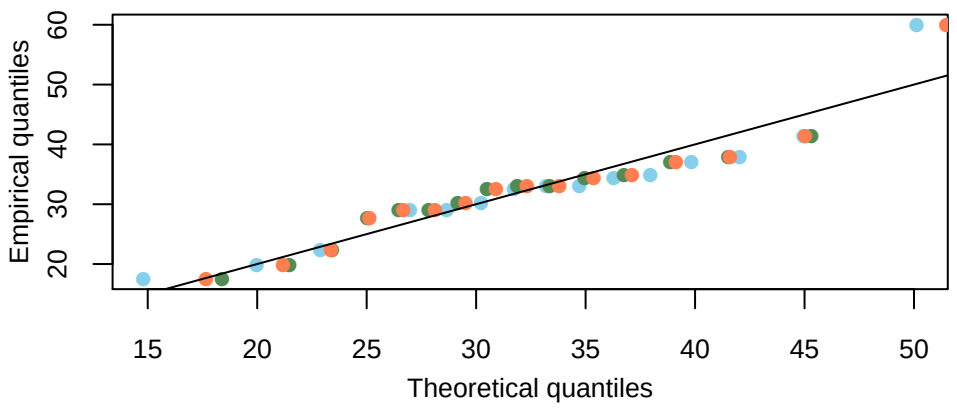
Exposure Unit:
BCC

Chemical (mg/kg):
Nickel

Legend

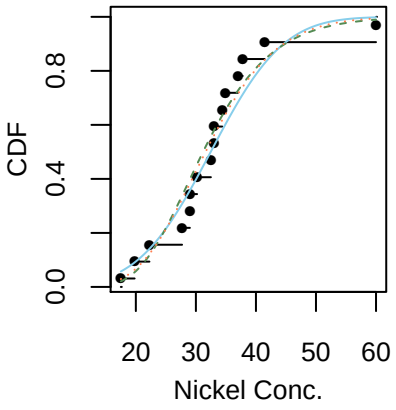
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

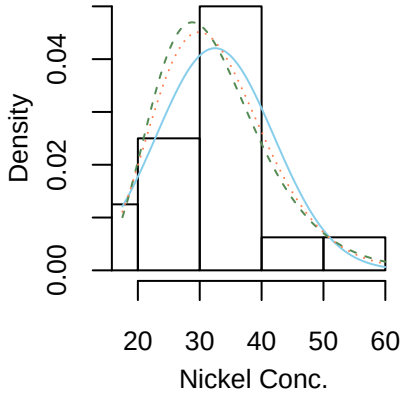


ECDF, Histogram & Q−Q (Detects Only)

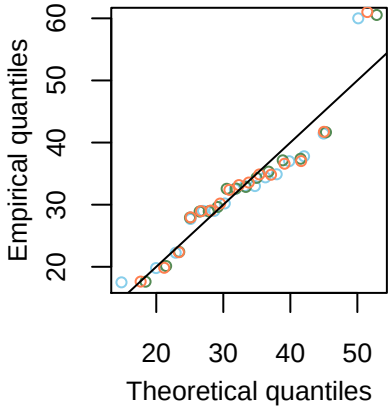
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 18 J	Arithmetic Mean = 32
N (detect) = 16	SD (log detect) = 0.29	Max (detect) = 60 J	Arithmetic SD = 9

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.07	0.26	–	–	–	–	121.385	122.93
Lognormal	0.5	0.38	–	–	–	–	119.141	120.686
Gamma	–	–	0.1374	0.215	0.4252	0.739	119.372	120.917

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Nickel

Media:
Surface Sediment (0−15 cm)

Exposure Unit:
BCC

Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 16	FOD = 19%	Min (detect) = 1 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 3 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Thallium

Media:
Surface Sediment (0−15 cm)

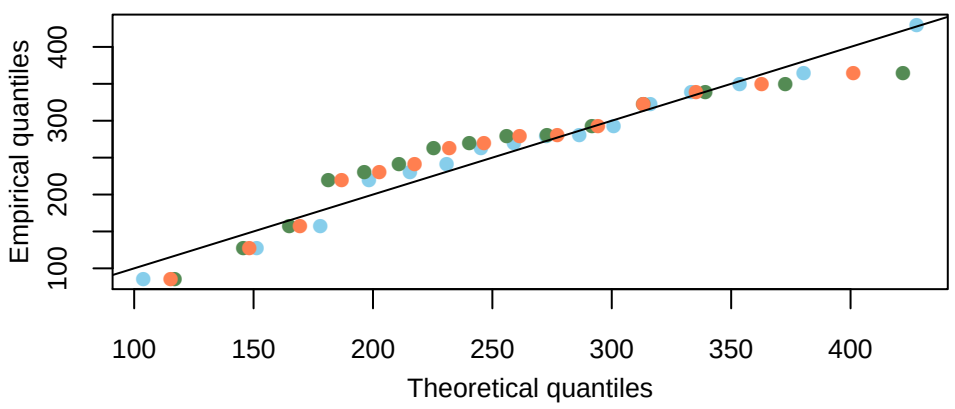
Exposure Unit:
BCC

Chemical (mg/kg):
Zinc

Legend

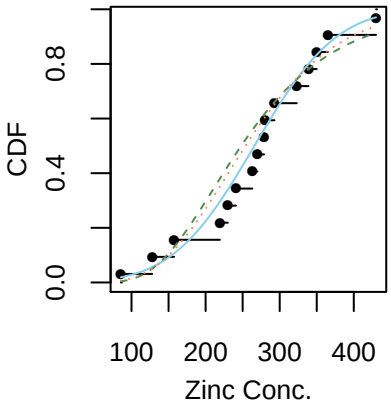
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

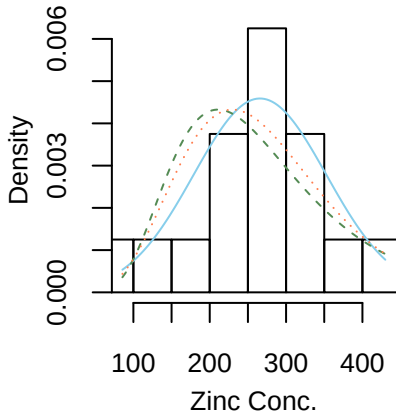


ECDF, Histogram & Q−Q (Detects Only)

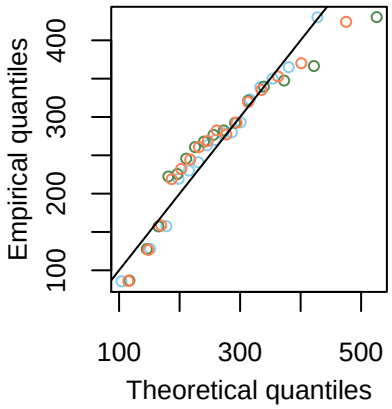
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 86 J	Arithmetic Mean = 270
N (detect) = 16	SD (log detect) = 0.42	Max (detect) = 430 J	Arithmetic SD = 90

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.94	0.83	–	–	–	–	192.289	193.834
Lognormal	0.051	0.1	–	–	–	–	196.78	198.325
Gamma	–	–	0.1641	0.216	0.5143	0.741	194.599	196.144

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Zinc

Media:
Surface Sediment (0−15 cm)

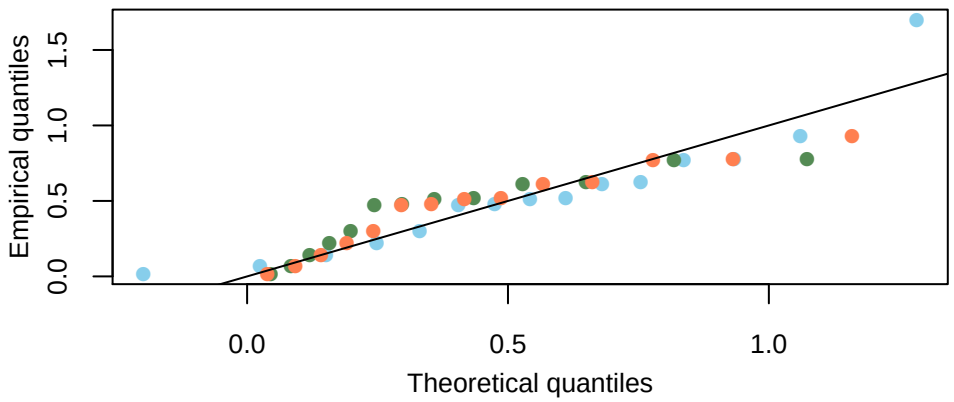
Exposure Unit:
BCC

Chemical (mg/kg):
Benz[a]anthracene

Legend

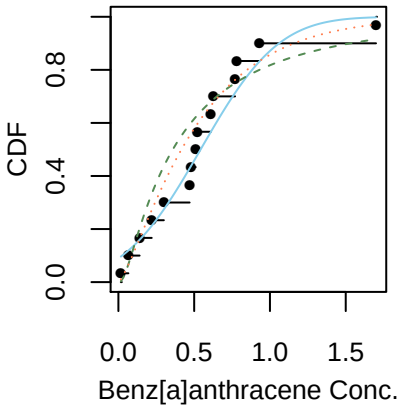
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

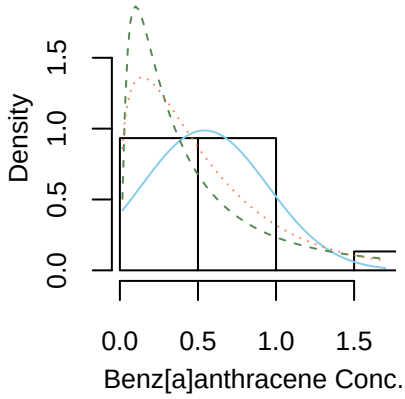


ECDF, Histogram & Q−Q (Detects Only)

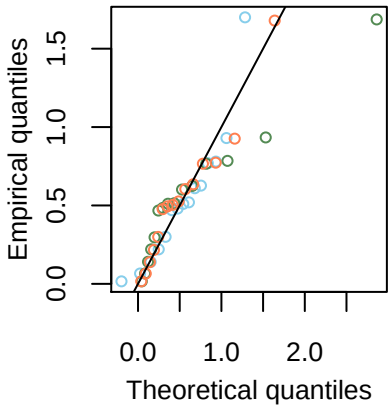
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 0.016 J	Arithmetic Mean = 0.54
N (detect) = 15	SD (log detect) = 1.2	Max (detect) = 1 J	Arithmetic SD = 0.42

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.061	0.44	–	–	–	–	19.3861	20.8022
Lognormal	0.025	0.0084	–	–	–	–	19.5536	20.9697
Gamma	–	–	0.2182	0.228	0.4431	0.763	14.8828	16.2989

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Benz[a]anthracene

Media:
Surface Sediment (0−15 cm)

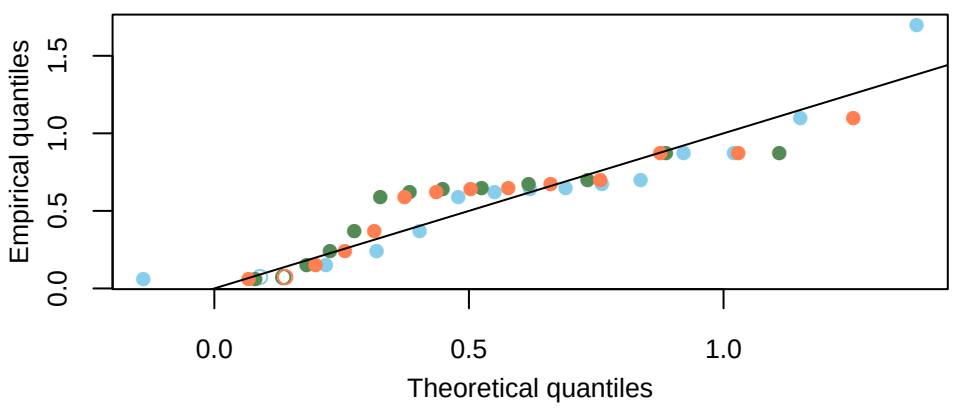
Exposure Unit:
BCC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

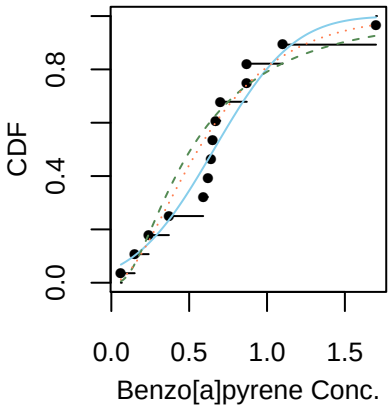
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

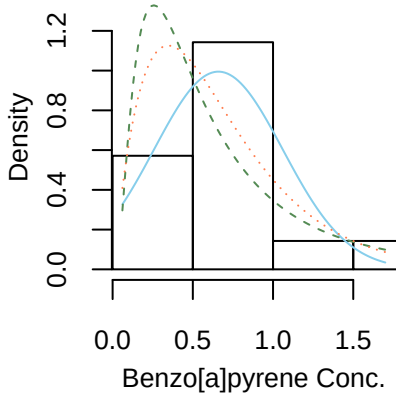


ECDF, Histogram & Q−Q (Detects Only)

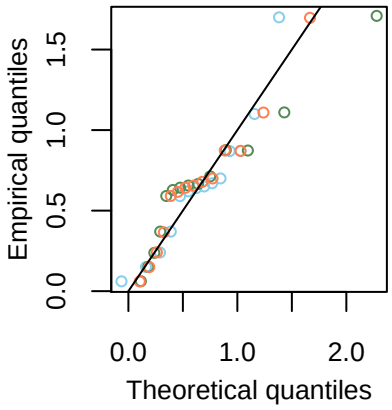
ECDF



Histogram



Q−Q



N = 15	FOD = 93%	Min (detect) = 0.061 J	Kaplan Meier Mean = 0.62
N (detect) = 14	SD (log detect) = 0.86	Max (detect) = 1 J	Kaplan Meier SD = 0.42

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.16	0.38	–	–	–	–	20.1162	21.5323
Lognormal	0.038	0.0028	–	–	–	–	20.544	21.9601
Gamma	–	–	0.244	0.228	0.5953	0.763	17.5329	18.949

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.21	0.29	–	–	–	–	18.1458	19.4239
Lognormal	0.052	0.0038	–	–	–	–	19.6813	20.9594
Gamma	–	–	0.2442	0.27	0.5321	0.736	16.6539	17.932

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Benzo[a]pyrene

Media:
Surface Sediment (0−15 cm)

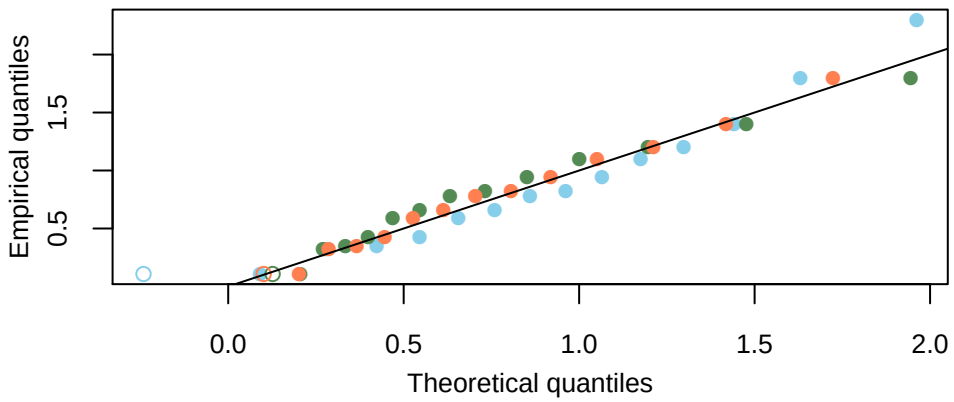
Exposure Unit:
BCC

Chemical (mg/kg):
Benzo[b]fluoranthene

Legend

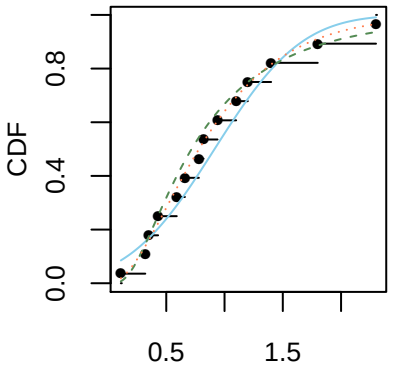
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

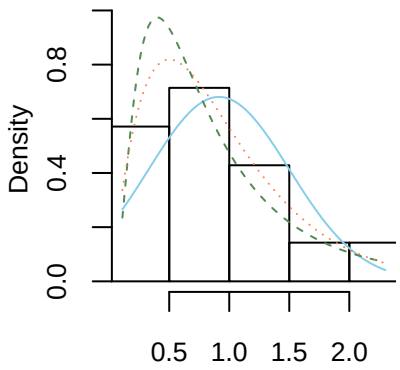


ECDF, Histogram & Q−Q (Detects Only)

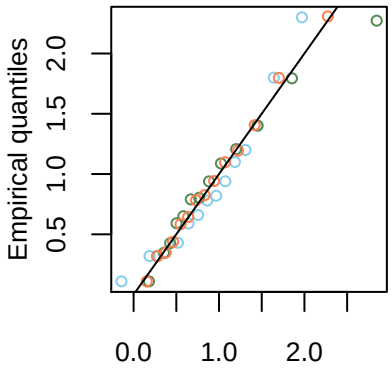
ECDF



Histogram



Q−Q



N = 15	FOD = 93%	Min (detect) = 0.11 J	Kaplan Meier Mean = 0.85
N (detect) = 14	SD (log detect) = 0.79	Max (detect) = 2 J	Kaplan Meier SD = 0.61

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.28	0.75	–	–	–	–	31.2832	32.6993
Lognormal	0.28	0.63	–	–	–	–	28.8629	30.279
Gamma	–	–	0.09495	0.228	0.1662	0.763	27.0295	28.4456

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.38	0.72	–	–	–	–	28.7649	30.043
Lognormal	0.68	0.87	–	–	–	–	26.9022	28.1803
Gamma	–	–	0.07093	0.27	0.1037	0.736	25.4036	26.6818

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Benzo[b]fluoranthene

Media:
Surface Sediment (0−15 cm)

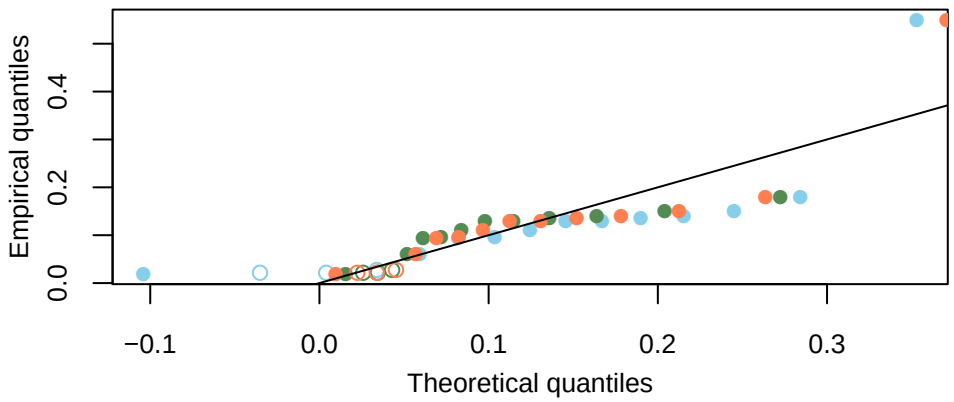
Exposure Unit:
BCC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

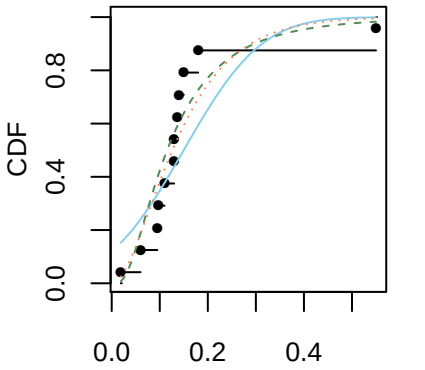
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

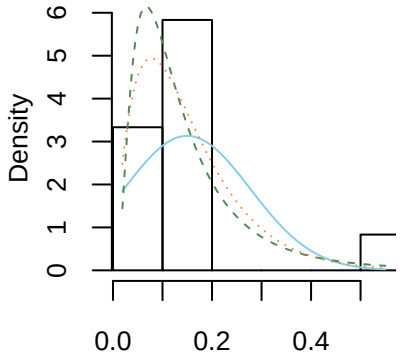


ECDF, Histogram & Q−Q (Detects Only)

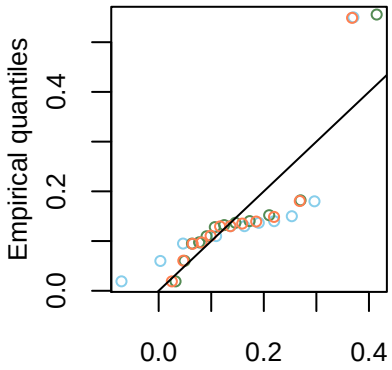
ECDF



Histogram



Q−Q



N = 15	FOD = 80%	Min (detect) = 0.019 J	Kaplan Meier Mean = 0.12
N (detect) = 12	SD (log detect) = 0.77	Max (detect) = 0.55 J	Kaplan Meier SD = 0.13

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00011	0.0015	–	–	–	–	−15.9082	−14.4921
Lognormal	0.087	0.052	–	–	–	–	−30.3028	−28.8867
Gamma	–	–	0.1725	0.228	0.6843	0.763	−29.4623	−28.0462

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00023	0.00065	–	–	–	–	−11.4016	−10.4318
Lognormal	0.074	0.068	–	–	–	–	−21.043	−20.0732
Gamma	–	–	NA	NA	NA	NA	−20.567	−19.5972

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Dibenz[a,h]anthracene

Media:
Surface Sediment (0−15 cm)

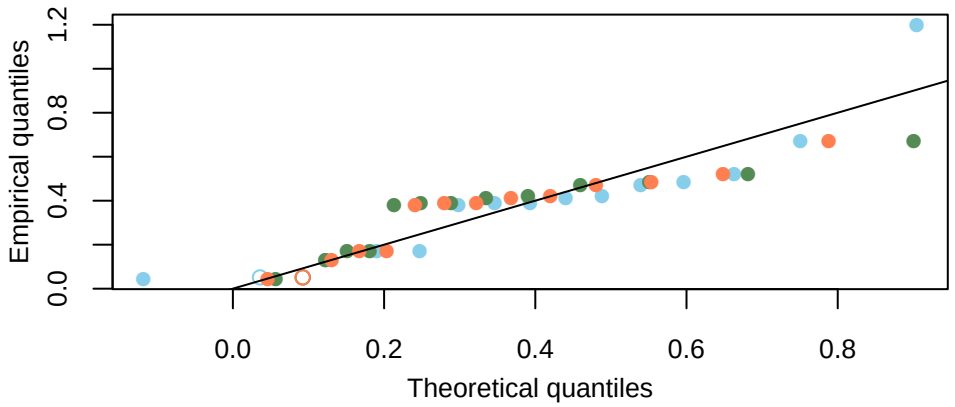
Exposure Unit:
BCC

Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

Legend

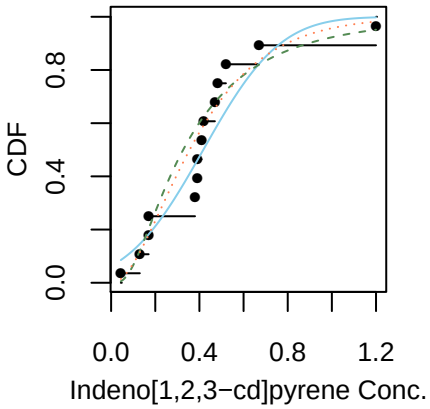
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

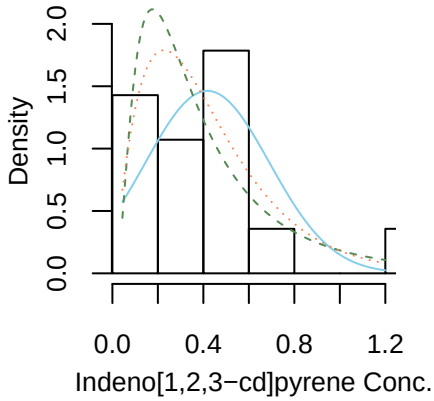


ECDF, Histogram & Q−Q (Detects Only)

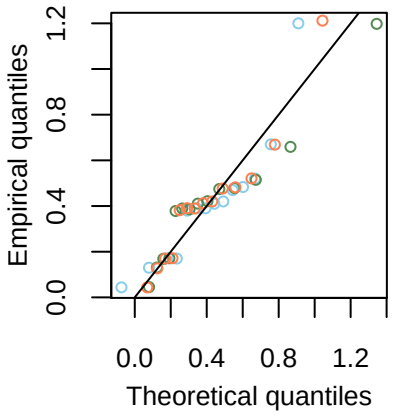
ECDF



Histogram



Q−Q



N = 15	FOD = 93%	Min (detect) = 0.044 J	Kaplan Meier Mean = 0.39
N (detect) = 14	SD (log detect) = 0.81	Max (detect) = 1 J	Kaplan Meier SD = 0.28

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.023	0.12	–	–	–	–	8.25849	9.67459
Lognormal	0.065	0.0019	–	–	–	–	5.72149	7.13759
Gamma	–	–	0.2494	0.228	0.5937	0.763	3.55014	4.96624

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.024	0.076	–	–	–	–	7.3502	8.62832
Lognormal	0.088	0.0025	–	–	–	–	5.61756	6.89568
Gamma	–	–	0.2509	0.27	0.5751	0.736	3.576	4.85411

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Indeno[1,2,3−cd]pyrene

Media:
Surface Sediment (0−15 cm)

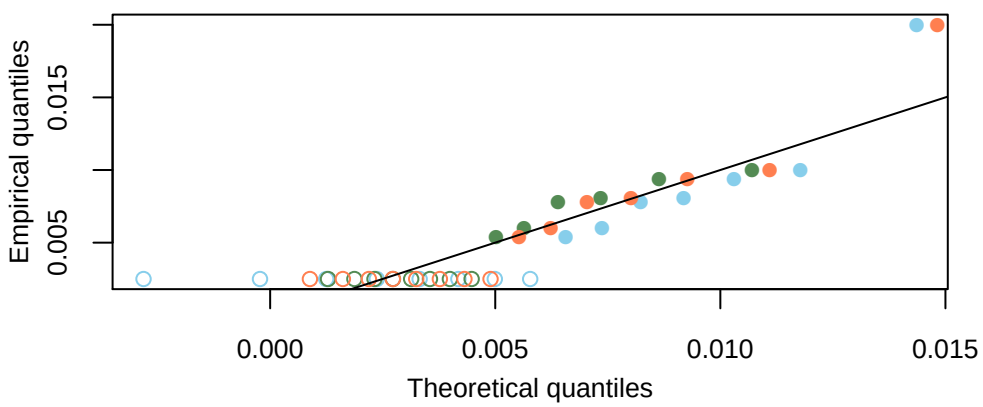
Exposure Unit:
BCC

Chemical (mg/kg):
Aldrin

Legend

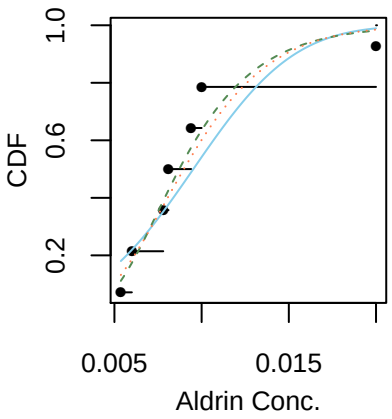
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

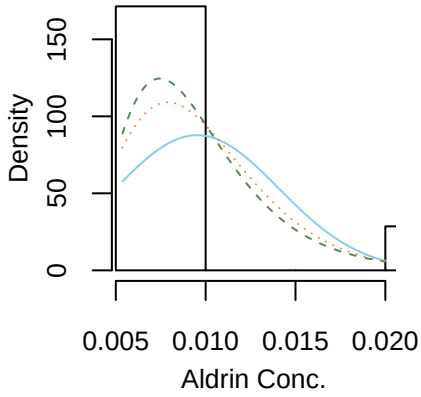


ECDF, Histogram & Q−Q (Detects Only)

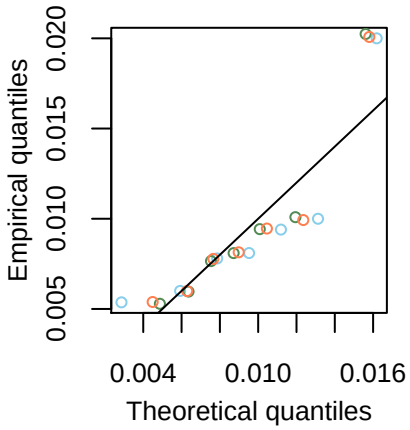
ECDF



Histogram



Q−Q



N = 15	FOD = 47%	Min (detect) = 0.0054 J	Kaplan Meier Mean = 0.0045
N (detect) = 7	SD (log detect) = 0.43	Max (detect) = 0.02 J	Kaplan Meier SD = 0.0056

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00044	0.002	–	–	–	–	−114.344	−112.928
Lognormal	0.003	0.00011	–	–	–	–	−127.267	−125.851
Gamma	–	–	NA	NA	NA	NA	−124.577	−123.161

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.02	0.031	–	–	–	–	−51.6426	−51.7508
Lognormal	0.36	0.31	–	–	–	–	−55.4408	−55.549
Gamma	–	–	NA	NA	NA	NA	−54.4464	−54.5546

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Aldrin

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **150**

Media:
Surface Sediment (0−15 cm)

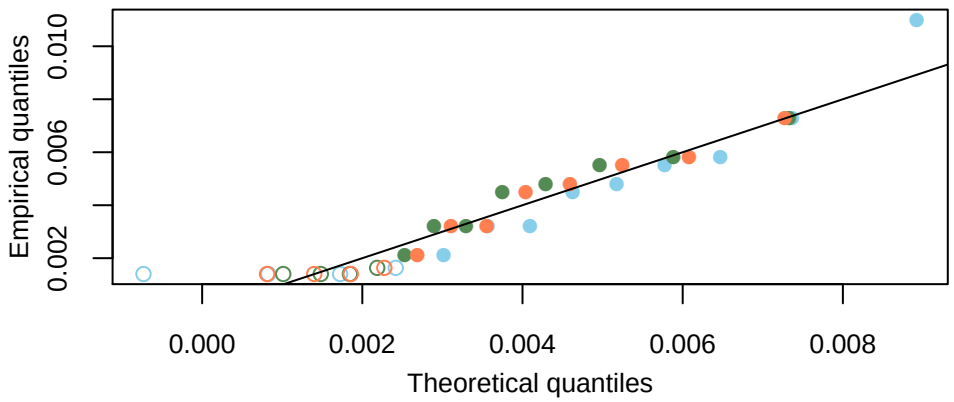
Exposure Unit:
BCC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

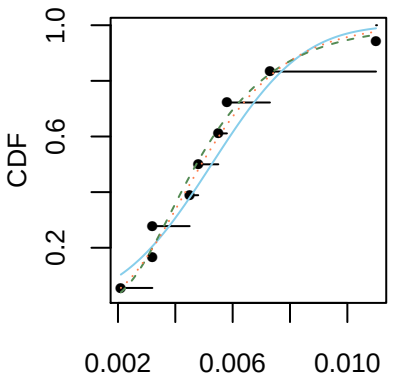
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

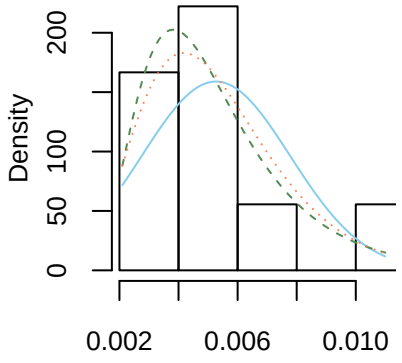


ECDF, Histogram & Q−Q (Detects Only)

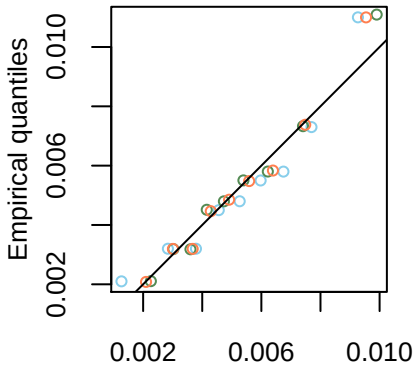
ECDF



Histogram



Q−Q



N = 13	FOD = 69%	Min (detect) = 0.0021 J	Kaplan Meier Mean = 0.0037
N (detect) = 9	SD (log detect) = 0.49	Max (detect) = 0.011 J	Kaplan Meier SD = 0.0031

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.056	0.37	–	–	–	–	−112.603	−111.473
Lognormal	0.27	0.58	–	–	–	–	−118.236	−117.106
Gamma	–	–	0.1536	0.27	0.3914	0.736	−117.61	−116.48

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.31	0.39	–	–	–	–	−78.2306	−77.8361
Lognormal	0.98	0.95	–	–	–	–	−80.6664	−80.272
Gamma	–	–	0.1367	0.282	0.1982	0.73	−80.3784	−79.9839

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−Heptachlor Epoxide

Media:
Surface Sediment (0−15 cm)

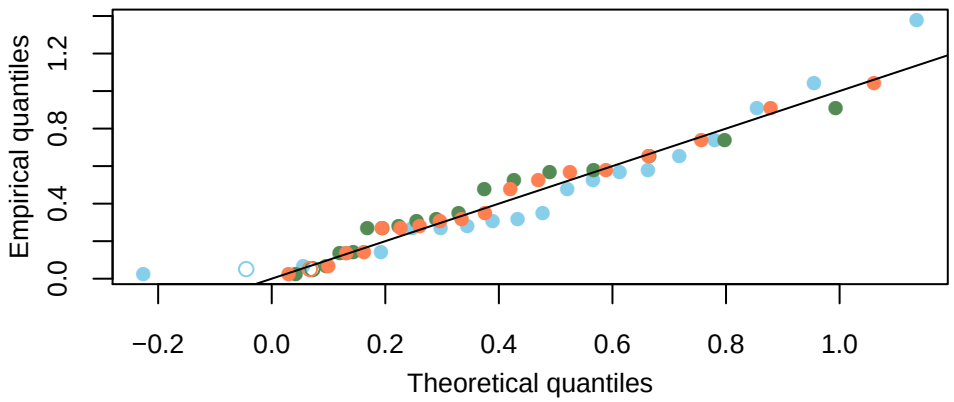
Exposure Unit:
BCC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

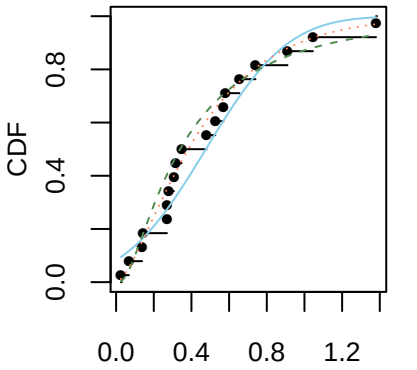
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

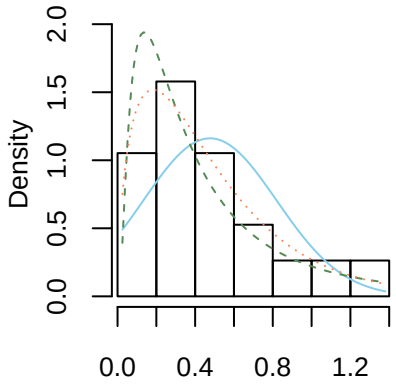


ECDF, Histogram & Q−Q (Detects Only)

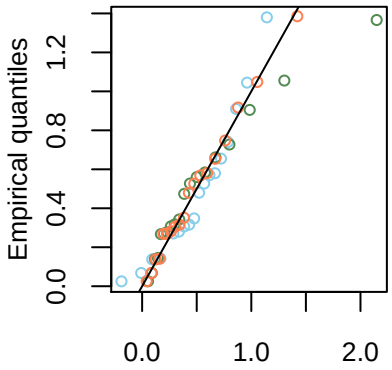
ECDF



Histogram



Q−Q



N = 20	FOD = 95%	Min (detect) = 0.025 J	Kaplan Meier Mean = 0.45
N (detect) = 19	SD (log detect) = 0.98	Max (detect) = 1 J	Kaplan Meier SD = 0.35

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.076	0.15	–	–	–	–	18.469	20.4605
Lognormal	0.16	0.038	–	–	–	–	14.3844	16.3759
Gamma	–	–	0.138	0.199	0.2112	0.768	11.0782	13.0697

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.11	0.17	–	–	–	–	17.3177	19.2065
Lognormal	0.13	0.051	–	–	–	–	15.0084	16.8973
Gamma	–	–	0.1388	0.204	0.1977	0.769	11.4817	13.3705

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−PCBs (Total Aroclors)

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **152**

Media:
Surface Sediment (0−15 cm)

Exposure Unit:
LBC

Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 27	FOD = 7%	Min (detect) = 1 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 2 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Antimony

Media:
Surface Sediment (0−15 cm)

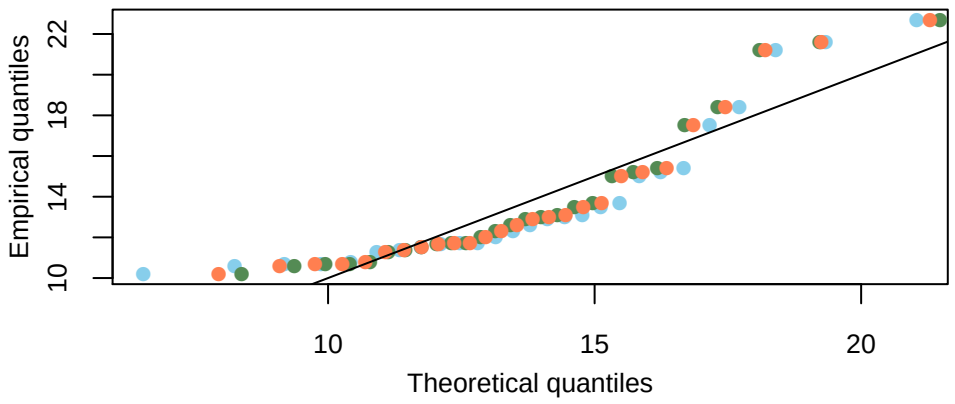
Exposure Unit:
LBC

Chemical (mg/kg):
Arsenic

Legend

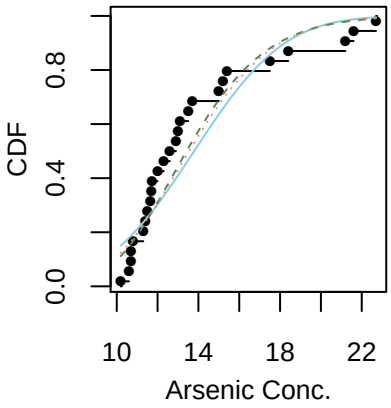
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

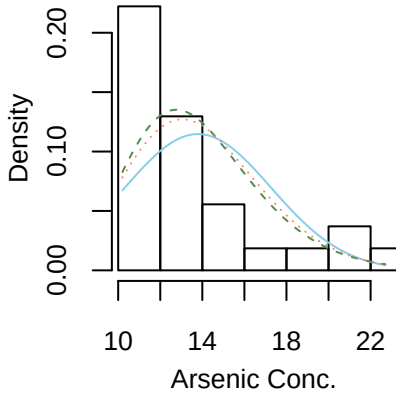


ECDF, Histogram & Q−Q (Detects Only)

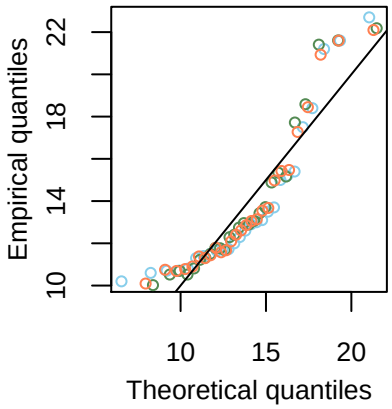
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 10 J	Arithmetic Mean = 14
N (detect) = 27	SD (log detect) = 0.23	Max (detect) = 23 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00027	0.0026	–	–	–	–	147.935	150.526
Lognormal	0.0037	0.041	–	–	–	–	140.441	143.033
Gamma	–	–	0.1857	0.175	1.429	0.745	142.639	145.231

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Arsenic

Media:
Surface Sediment (0−15 cm)

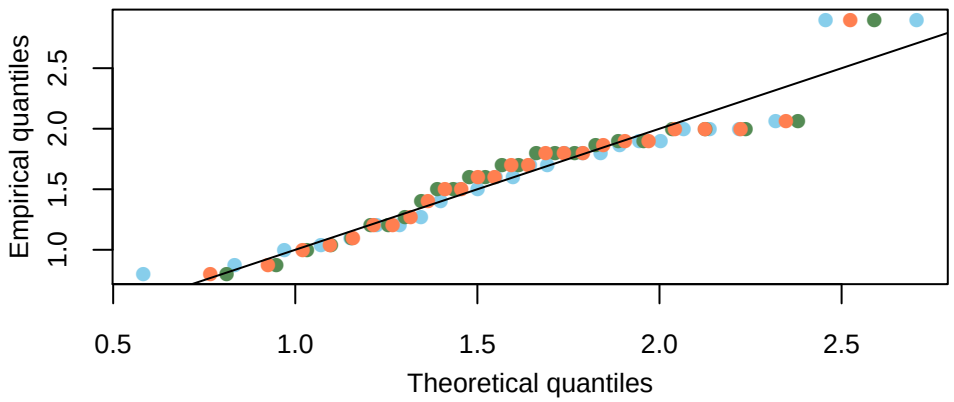
Exposure Unit:
LBC

Chemical (mg/kg):
Cadmium

Legend

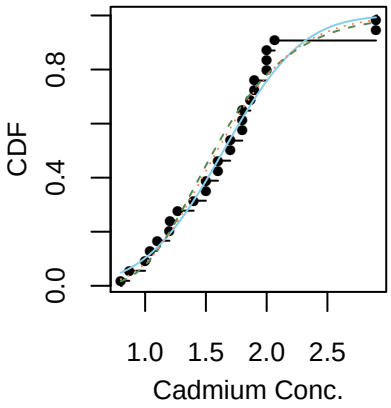
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

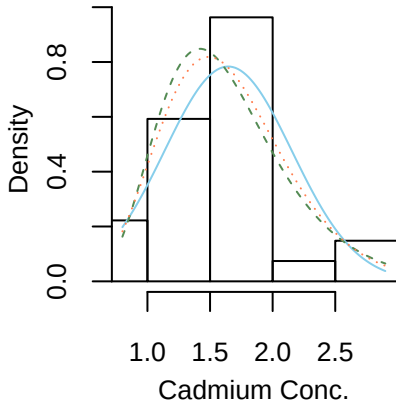


ECDF, Histogram & Q−Q (Detects Only)

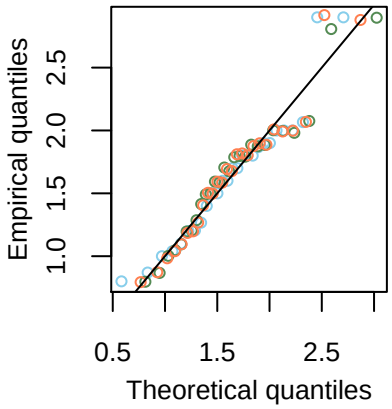
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 0.8 J	Arithmetic Mean = 1
N (detect) = 27	SD (log detect) = 0.32	Max (detect) = 2 J	Arithmetic SD = 0.52

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.083	0.23	–	–	–	–	44.1664	46.758
Lognormal	0.34	0.4	–	–	–	–	42.5656	45.1572
Gamma	–	–	0.1182	0.175	0.442	0.745	42.2747	44.8664

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Cadmium

Media:
Surface Sediment (0−15 cm)

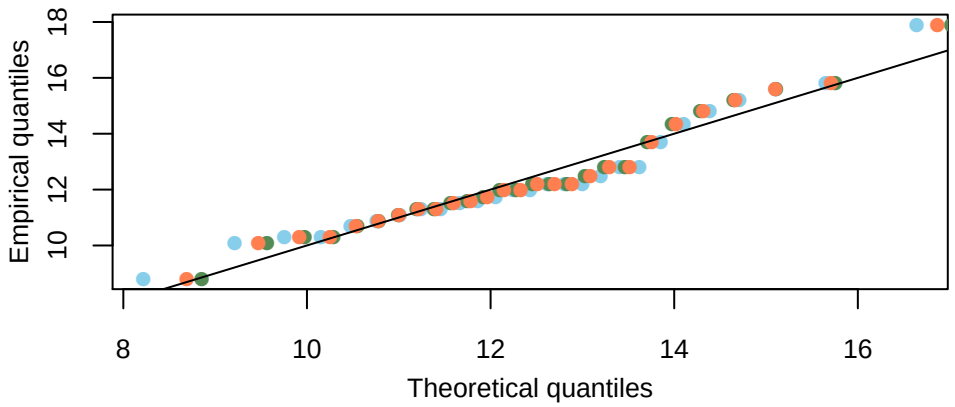
Exposure Unit:
LBC

Chemical (mg/kg):
Cobalt

Legend

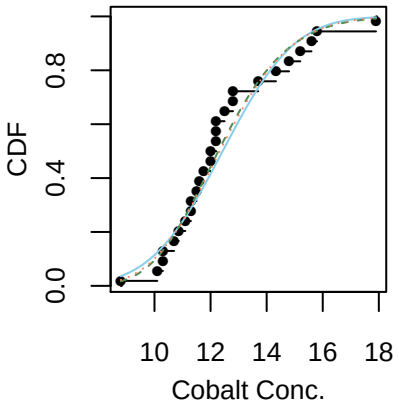
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

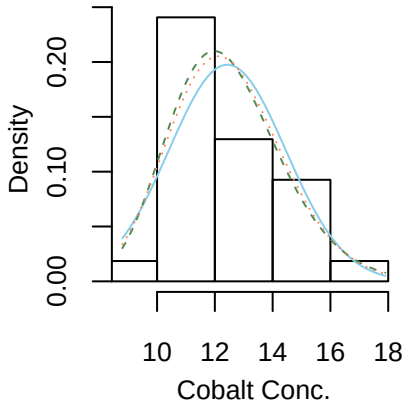


ECDF, Histogram & Q−Q (Detects Only)

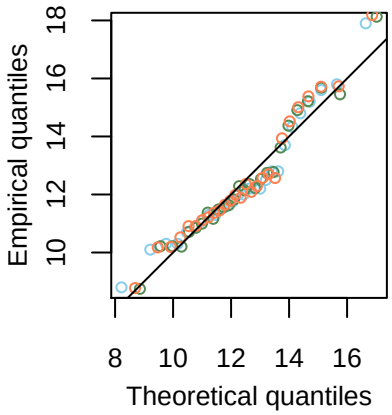
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 8 J	Arithmetic Mean = 12
N (detect) = 27	SD (log detect) = 0.16	Max (detect) = 18 J	Arithmetic SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.12	0.034	–	–	–	–	118.576	121.168
Lognormal	0.58	0.15	–	–	–	–	115.933	118.525
Gamma	–	–	0.1559	0.174	0.5163	0.743	116.612	119.204

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Cobalt

Media:
Surface Sediment (0−15 cm)

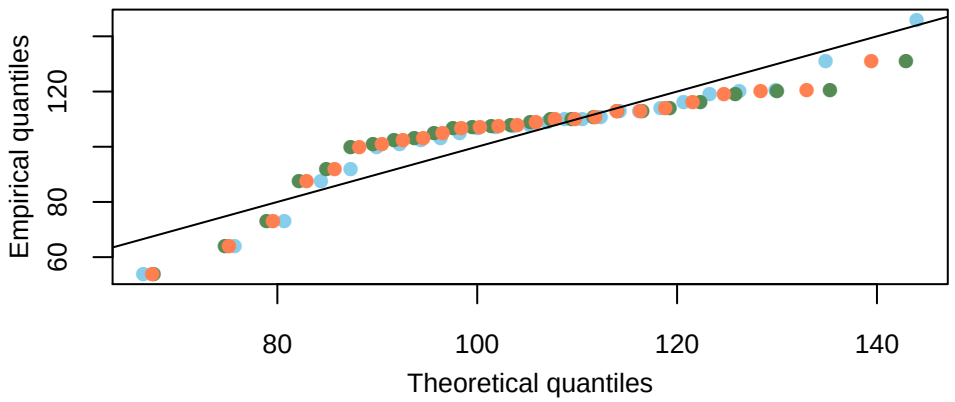
Exposure Unit:
LBC

Chemical (mg/kg):
Copper

Legend

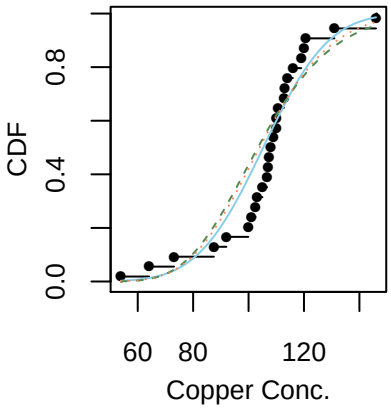
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

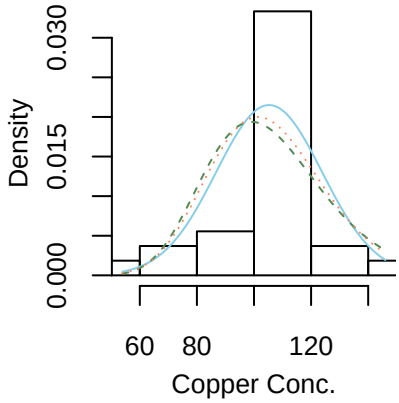


ECDF, Histogram & Q−Q (Detects Only)

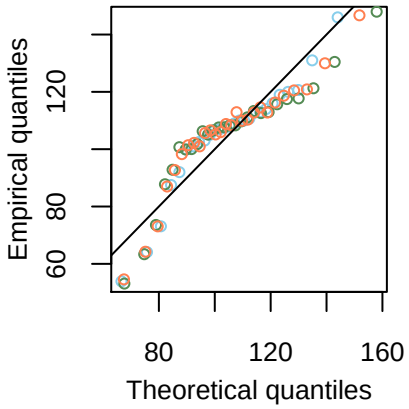
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 54	Arithmetic Mean = 110
N (detect) = 27	SD (log detect) = 0.21	Max (detect) = 150 J	Arithmetic SD = 19

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.013	0.006	–	–	–	–	238.341	240.933
Lognormal	0.00034	0.00015	–	–	–	–	245.067	247.659
Gamma	–	–	0.2329	0.174	1.677	0.743	242.42	245.012

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Copper

Media:
Surface Sediment (0−15 cm)

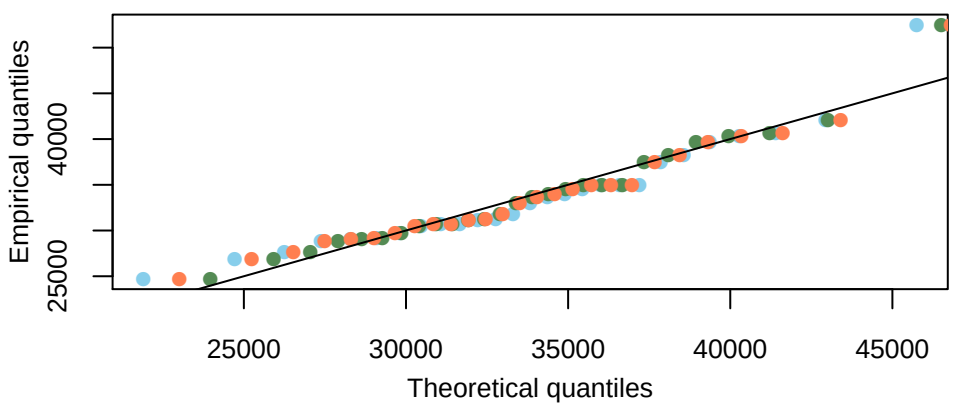
Exposure Unit:
LBC

Chemical (mg/kg):
Iron

Legend

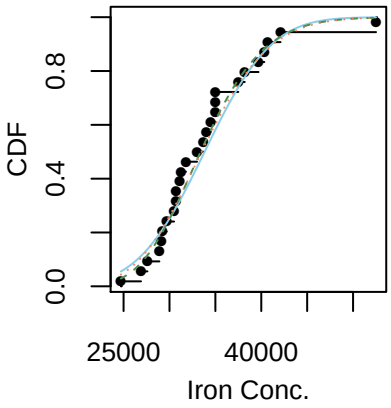
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

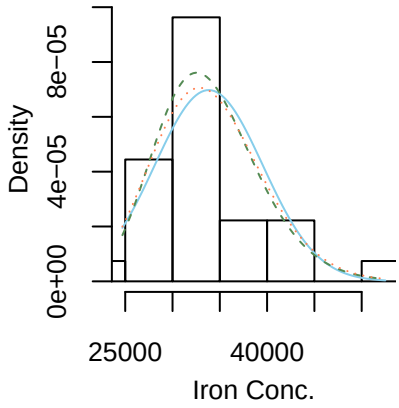


ECDF, Histogram & Q−Q (Detects Only)

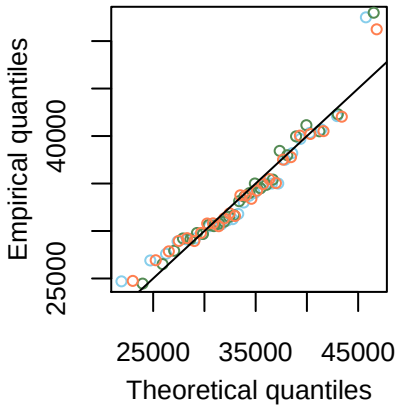
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 25,000 J	Arithmetic Mean = 34,000
N (detect) = 27	SD (log detect) = 0.16	Max (detect) = 52,000 J	Arithmetic SD = 5,800

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.03	0.07	–	–	–	–	547.798	550.39
Lognormal	0.48	0.33	–	–	–	–	543.783	546.375
Gamma	–	–	0.1387	0.174	0.4201	0.743	544.982	547.574

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Iron

Media:
Surface Sediment (0−15 cm)

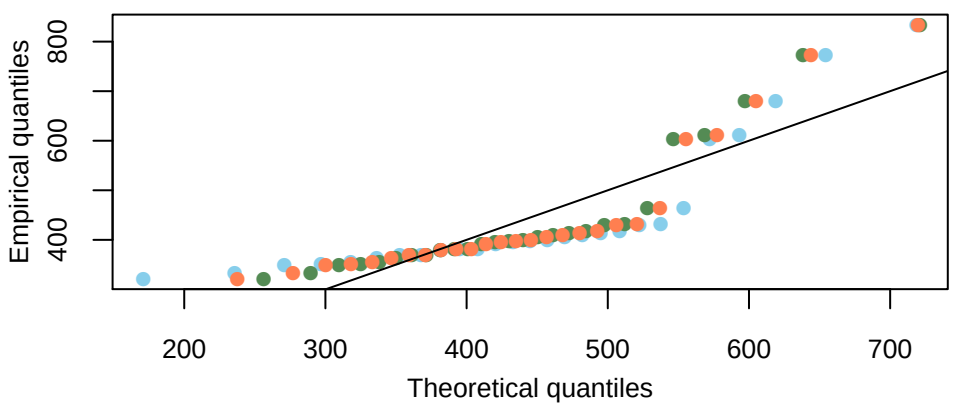
Exposure Unit:
LBC

Chemical (mg/kg):
Manganese

Legend

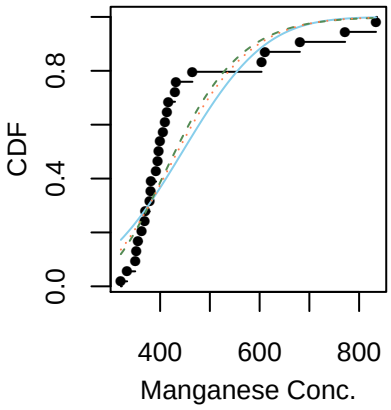
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

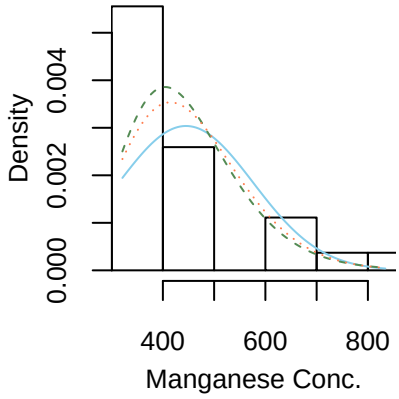


ECDF, Histogram & Q−Q (Detects Only)

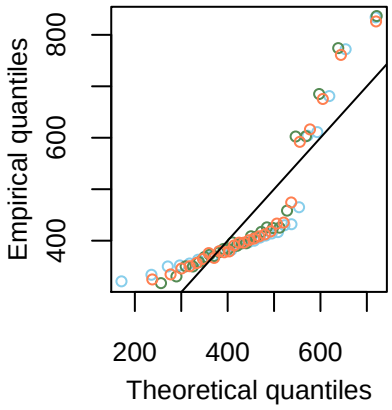
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 320 J	Arithmetic Mean = 450
N (detect) = 27	SD (log detect) = 0.25	Max (detect) = 830 J	Arithmetic SD = 130

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	1.6e−07	–	–	–	–	344.019	346.61
Lognormal	0.00014	2.2e−05	–	–	–	–	332.767	335.358
Gamma	–	–	0.2881	0.175	2.57	0.745	336.158	338.75

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Manganese

Media:
Surface Sediment (0−15 cm)

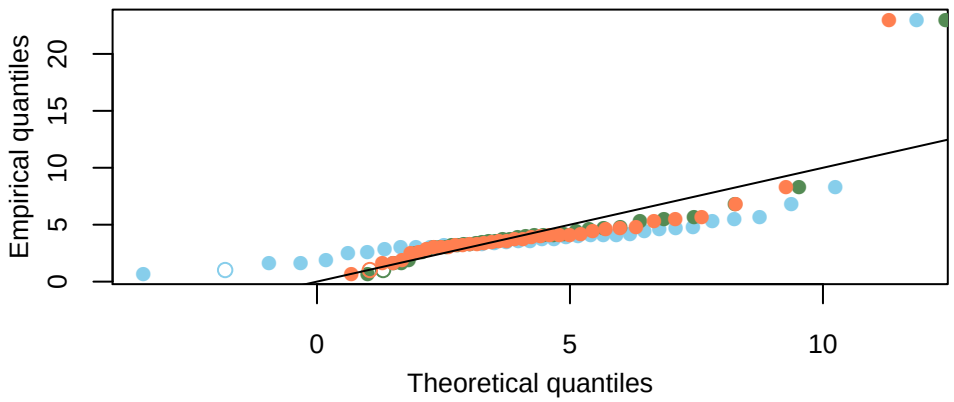
Exposure Unit:
LBC

Chemical (mg/kg):
Mercury

Legend

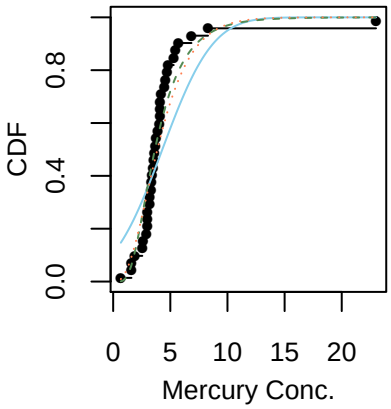
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

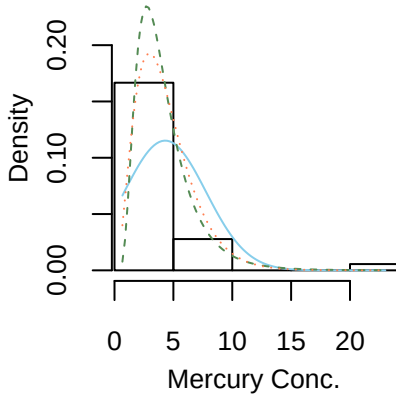


ECDF, Histogram & Q−Q (Detects Only)

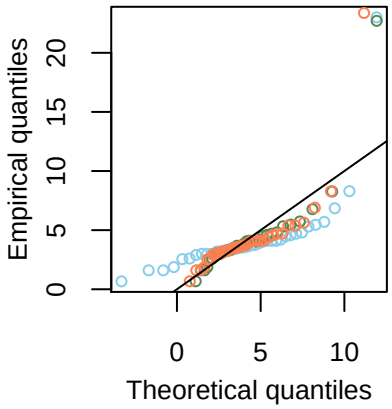
ECDF



Histogram



Q−Q



N = 37	FOD = 97%	Min (detect) = 0.67 J	Kaplan Meier Mean = 4
N (detect) = 36	SD (log detect) = 0.55	Max (detect) = 23 J	Kaplan Meier SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.2e−07	–	–	–	–	200.773	203.995
Lognormal	0.0025	0.0046	–	–	–	–	160.639	163.861
Gamma	–	–	0.1744	0.151	1.748	0.76	166.109	169.33

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.7e−07	–	–	–	–	195.577	198.744
Lognormal	0.0013	0.01	–	–	–	–	154.782	157.949
Gamma	–	–	0.1834	0.151	1.913	0.76	161.178	164.345

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Mercury

Media:
Surface Sediment (0−15 cm)

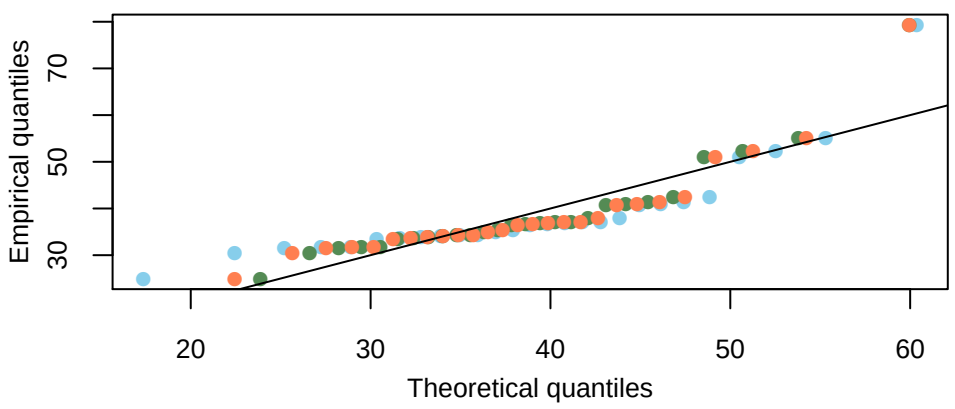
Exposure Unit:
LBC

Chemical (mg/kg):
Nickel

Legend

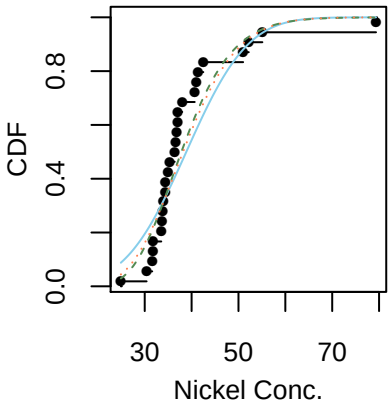
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

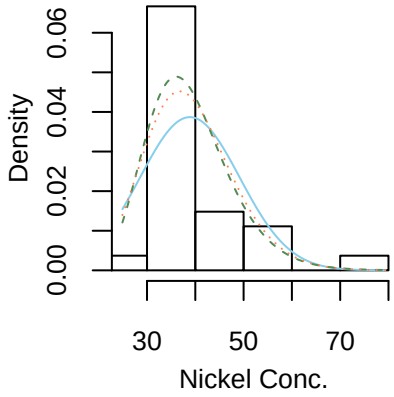


ECDF, Histogram & Q−Q (Detects Only)

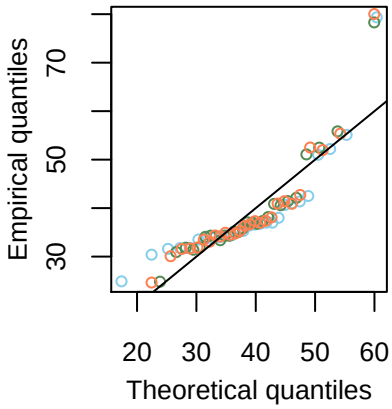
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 25 J	Arithmetic Mean = 39
N (detect) = 27	SD (log detect) = 0.23	Max (detect) = 79 J	Arithmetic SD = 11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−05	0.00042	–	–	–	–	206.61	209.202
Lognormal	0.0024	0.0047	–	–	–	–	195.263	197.855
Gamma	–	–	0.2196	0.175	1.612	0.745	198.484	201.076

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Nickel

Media:
Surface Sediment (0−15 cm)

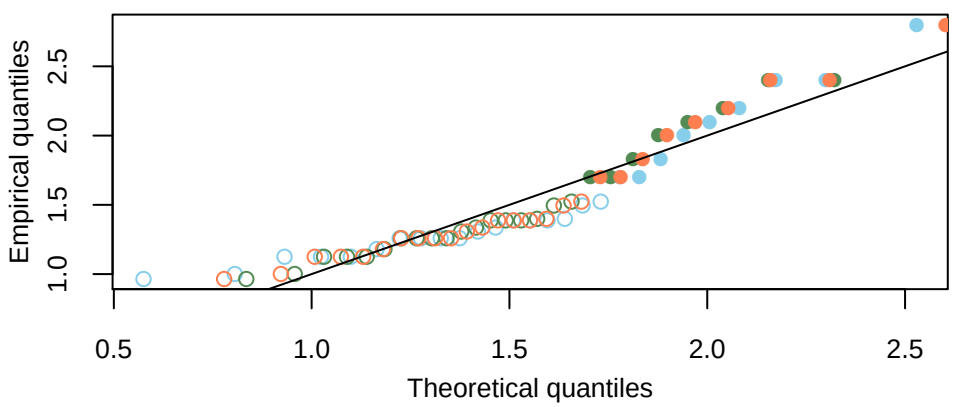
Exposure Unit:
LBC

Chemical (mg/kg):
Thallium

Legend

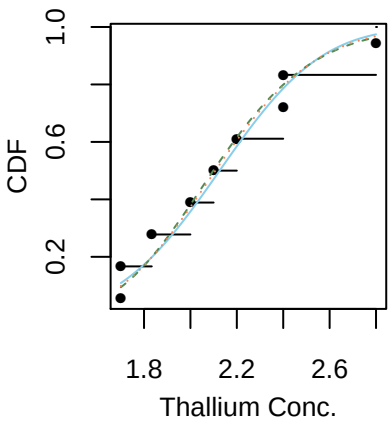
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

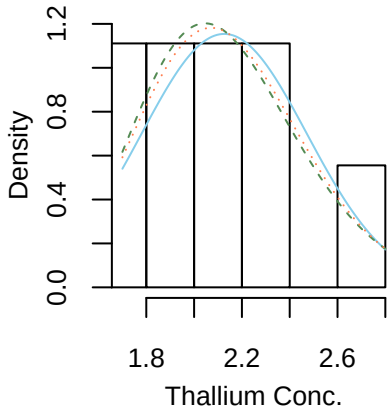


ECDF, Histogram & Q−Q (Detects Only)

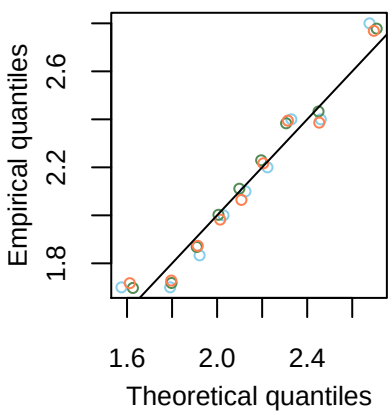
ECDF



Histogram



Q−Q



N = 27	FOD = 33%	Min (detect) = 1 J	Kaplan Meier Mean = 1
N (detect) = 9	SD (log detect) = 0.17	Max (detect) = 2 J	Kaplan Meier SD = 0.52

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0052	0.0019	–	–	–	–	39.6995	42.2912
Lognormal	0.11	0.023	–	–	–	–	33.0511	35.6427
Gamma	–	–	0.1972	0.175	0.8751	0.745	34.785	37.3767

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.59	0.96	–	–	–	–	10.4173	10.8117
Lognormal	0.68	0.97	–	–	–	–	9.90943	10.3039
Gamma	–	–	0.1347	0.279	0.2433	0.721	10.0275	10.422

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Thallium

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **162**

Media:
Surface Sediment (0−15 cm)

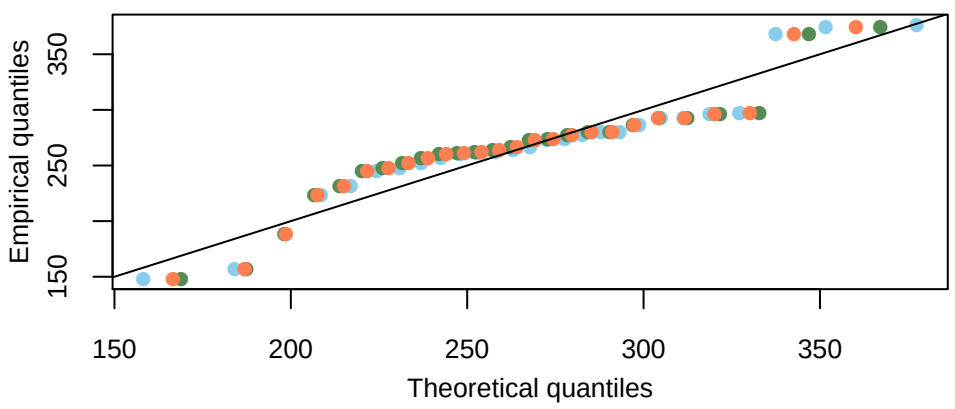
Exposure Unit:
LBC

Chemical (mg/kg):
Zinc

Legend

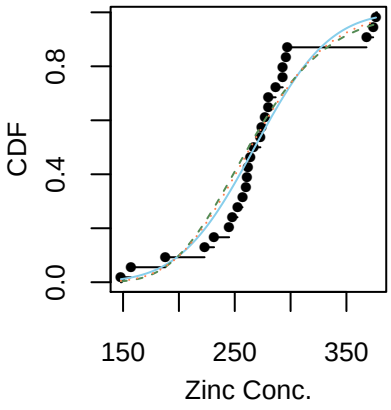
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

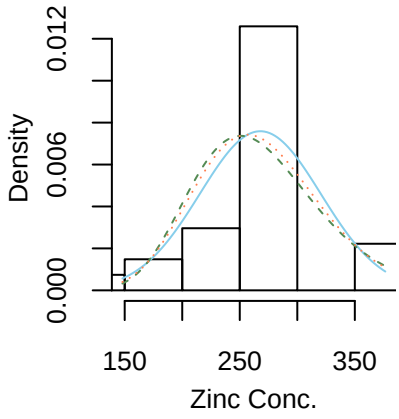


ECDF, Histogram & Q−Q (Detects Only)

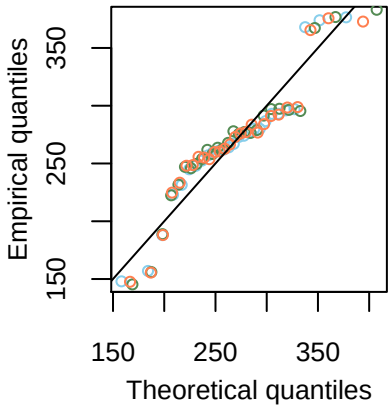
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 150 J	Arithmetic Mean = 270
N (detect) = 27	SD (log detect) = 0.22	Max (detect) = 380 J	Arithmetic SD = 54

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.029	0.022	–	–	–	–	294.571	297.162
Lognormal	0.0055	0.013	–	–	–	–	297.365	299.957
Gamma	–	–	0.1735	0.174	1.133	0.743	295.949	298.541

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Zinc

Media:
Surface Sediment (0−15 cm)

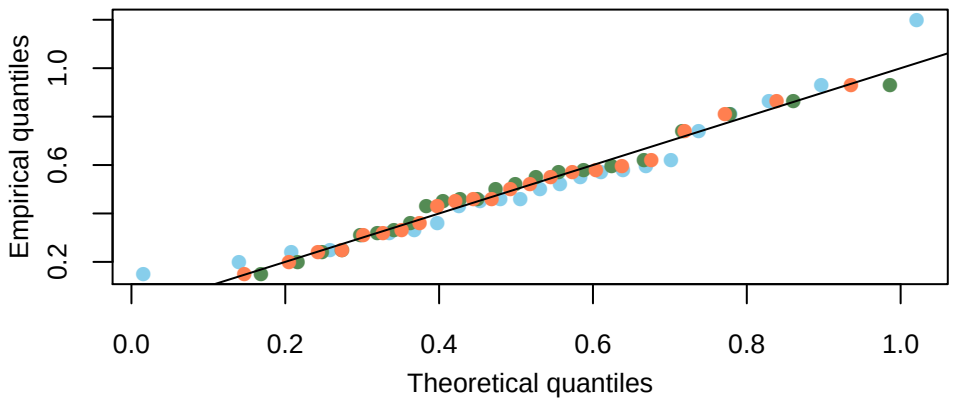
Exposure Unit:
LBC

Chemical (mg/kg):
Benz[a]anthracene

Legend

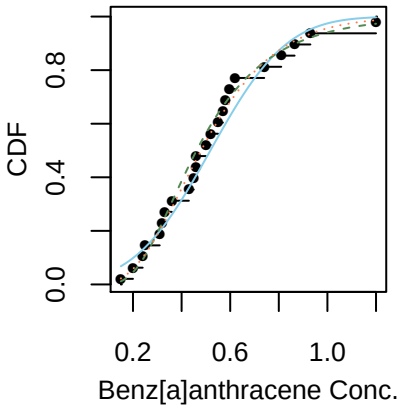
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

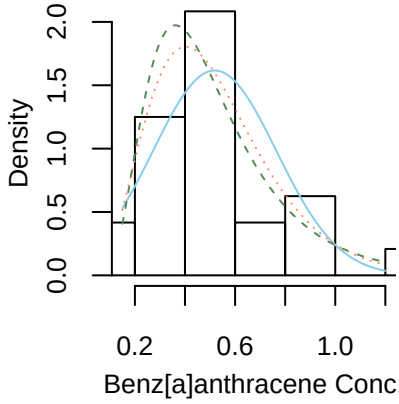


ECDF, Histogram & Q−Q (Detects Only)

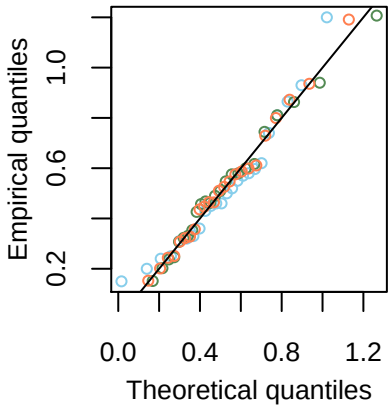
ECDF



Histogram



Q−Q



N = 24	FOD = 100%	Min (detect) = 0.15 J	Arithmetic Mean = 0.52
N (detect) = 24	SD (log detect) = 0.51	Max (detect) = 1 J	Arithmetic SD = 0.25

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.19	0.31	–	–	–	–	4.94849	7.3046
Lognormal	0.97	0.63	–	–	–	–	1.24308	3.59919
Gamma	–	–	0.08414	0.18	0.1413	0.755	0.833681	3.18979

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

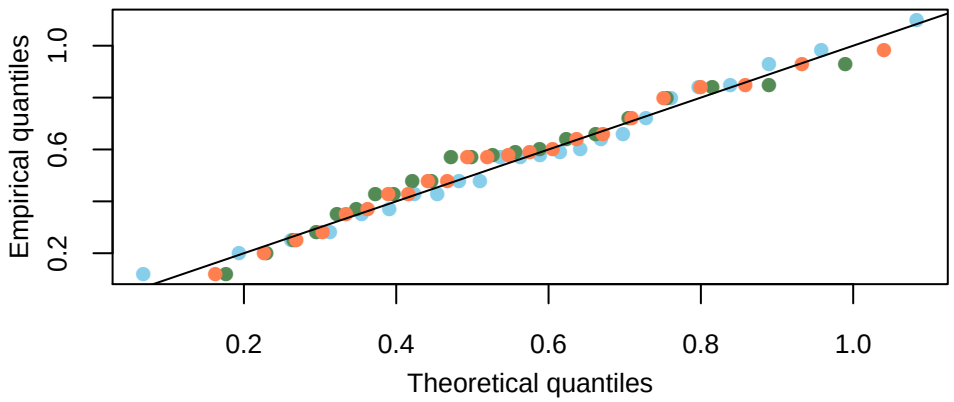
DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Benz[a]anthracene

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
LBC
Chemical (mg/kg):
Benzo[a]pyrene

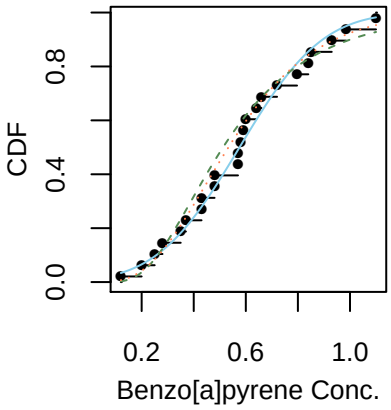
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

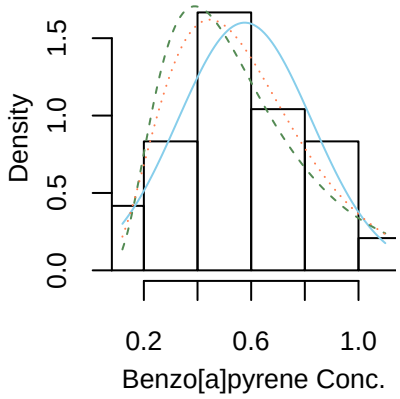


ECDF, Histogram & Q−Q (Detects Only)

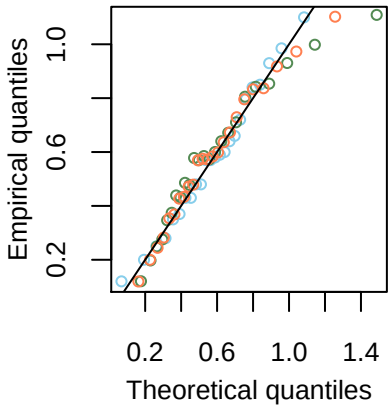
ECDF



Histogram



Q−Q



N = 24	FOD = 100%	Min (detect) = 0.12 J	Arithmetic Mean = 0.58
N (detect) = 24	SD (log detect) = 0.53	Max (detect) = 1 J	Arithmetic SD = 0.25

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.96	0.91	–	–	–	–	5.42517	7.78128
Lognormal	0.14	0.11	–	–	–	–	8.9194	11.2755
Gamma	–	–	0.1379	0.18	0.2518	0.755	6.00689	8.363

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Benzo[a]pyrene

Media:
Surface Sediment (0−15 cm)

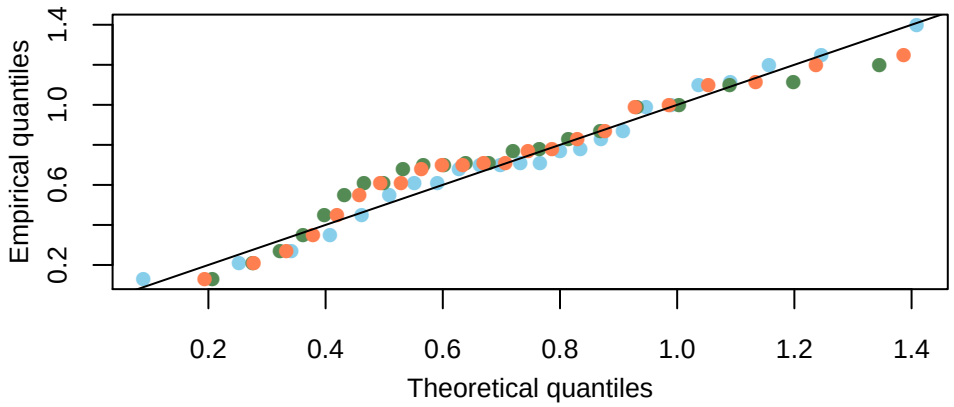
Exposure Unit:
LBC

Chemical (mg/kg):
Benzo[b]fluoranthene

Legend

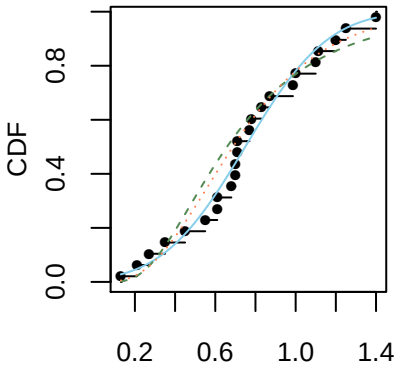
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

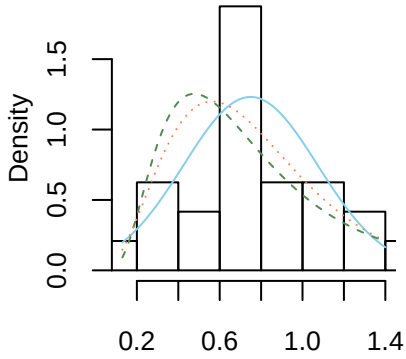


ECDF, Histogram & Q−Q (Detects Only)

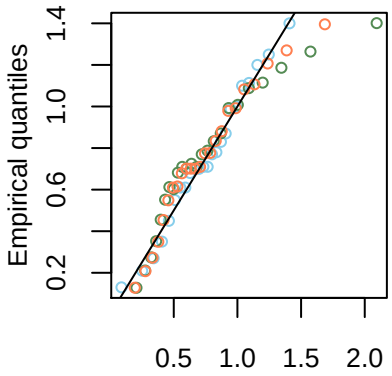
ECDF



Histogram



Q−Q



N = 24	FOD = 100%	Min (detect) = 0.13 J	Arithmetic Mean = 0.75
N (detect) = 24	SD (log detect) = 0.58	Max (detect) = 1 J	Arithmetic SD = 0.33

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.89	0.89	–	–	–	–	18.0066	20.3627
Lognormal	0.012	0.016	–	–	–	–	24.8919	27.2481
Gamma	–	–	0.1594	0.18	0.5602	0.755	20.5861	22.9422

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Benzo[b]fluoranthene

Media:
Surface Sediment (0−15 cm)

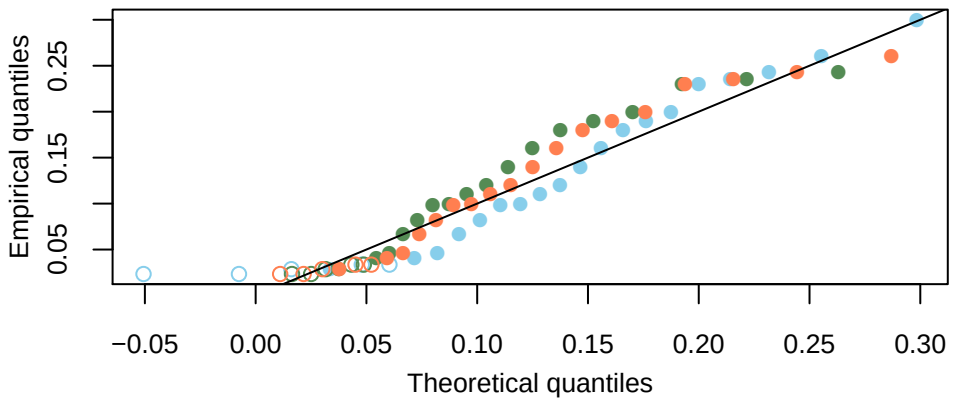
Exposure Unit:
LBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

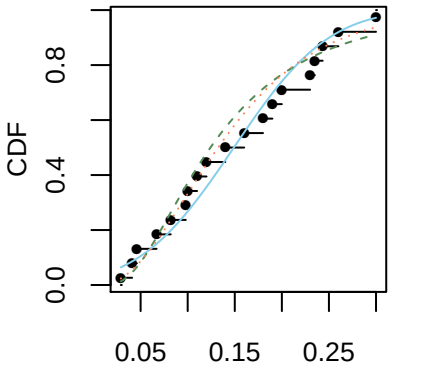
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

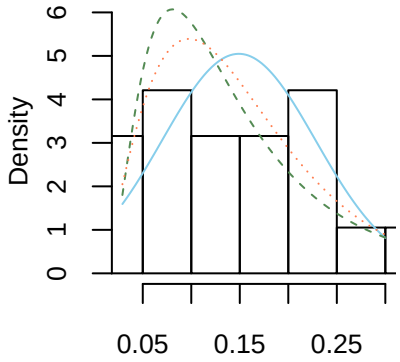


ECDF, Histogram & Q−Q (Detects Only)

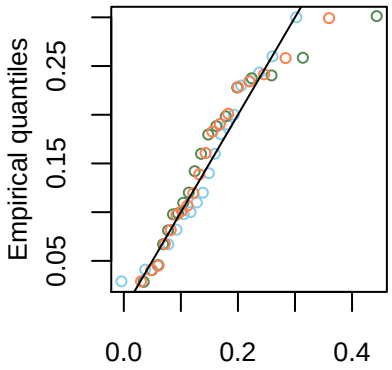
ECDF



Histogram



Q−Q



N = 24	FOD = 79%	Min (detect) = 0.029 J	Kaplan Meier Mean = 0.12
N (detect) = 19	SD (log detect) = 0.67	Max (detect) = 0.3 J	Kaplan Meier SD = 0.088

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.034	0.2	–	–	–	–	−45.8295	−43.4734
Lognormal	0.035	0.41	–	–	–	–	−51.0961	−48.74
Gamma	–	–	0.1404	0.183	0.6261	0.772	−52.2416	−49.8855

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.55	0.75	–	–	–	–	−38.521	−36.6321
Lognormal	0.19	0.54	–	–	–	–	−37.3445	−35.4556
Gamma	–	–	0.1217	0.201	0.3052	0.752	−39.3896	−37.5007

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Dibenz[a,h]anthracene

Media:
Surface Sediment (0−15 cm)

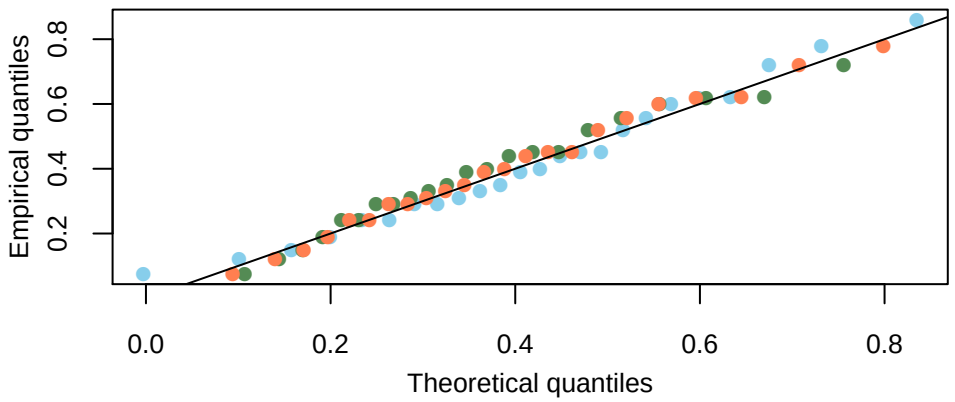
Exposure Unit:
LBC

Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

Legend

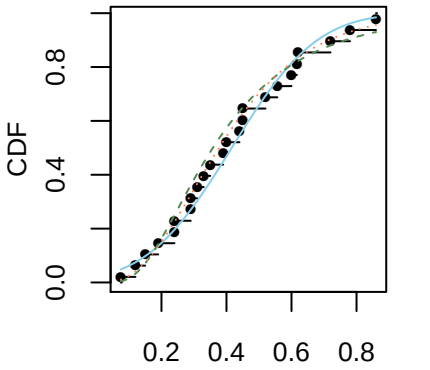
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

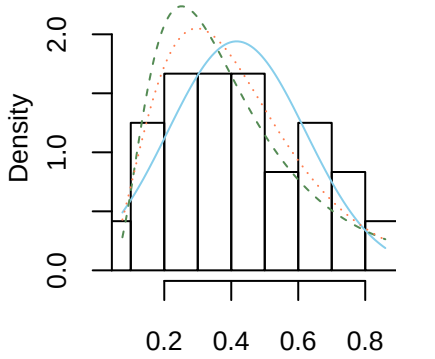


ECDF, Histogram & Q−Q (Detects Only)

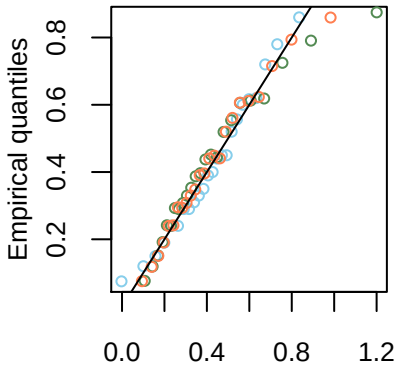
ECDF



Histogram



Q−Q



N = 24	FOD = 100%	Min (detect) = 0.075 J	Arithmetic Mean = 0.42
N (detect) = 24	SD (log detect) = 0.61	Max (detect) = 0.86 J	Arithmetic SD = 0.21

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.77	0.74	–	–	–	–	−3.81565	−1.45955
Lognormal	0.25	0.58	–	–	–	–	−2.20304	0.153065
Gamma	–	–	0.07566	0.18	0.1697	0.755	−4.8739	−2.51779

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Indeno[1,2,3−cd]pyrene

Media:
Surface Sediment (0−15 cm)

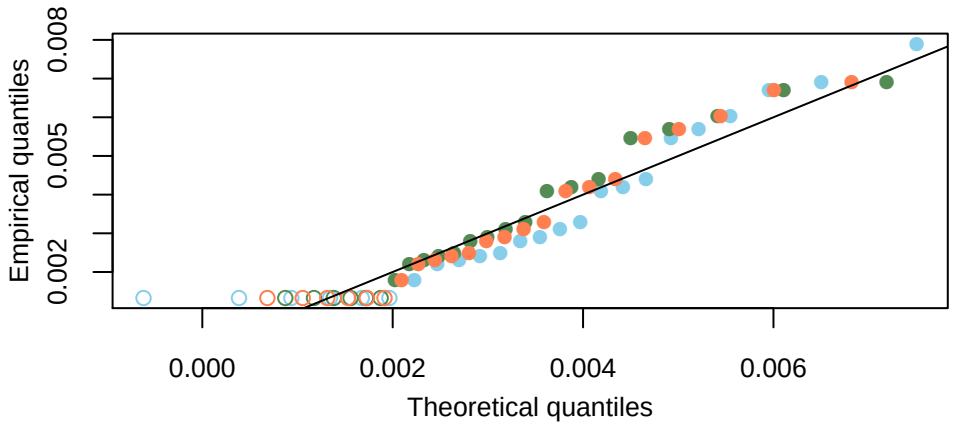
Exposure Unit:
LBC

Chemical (mg/kg):
Aldrin

Legend

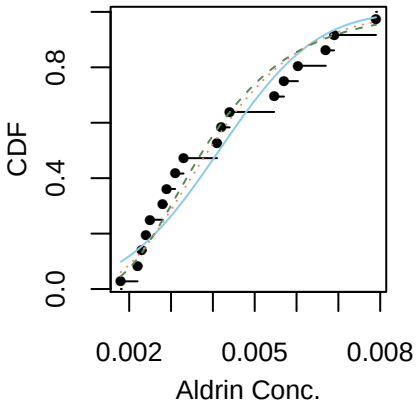
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

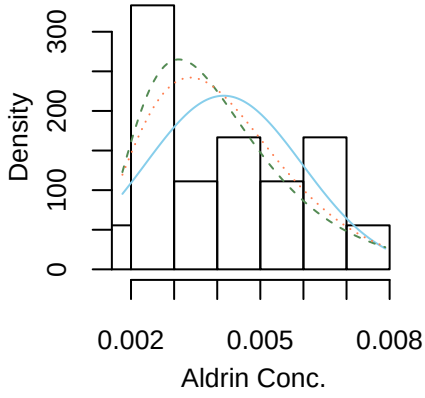


ECDF, Histogram & Q−Q (Detects Only)

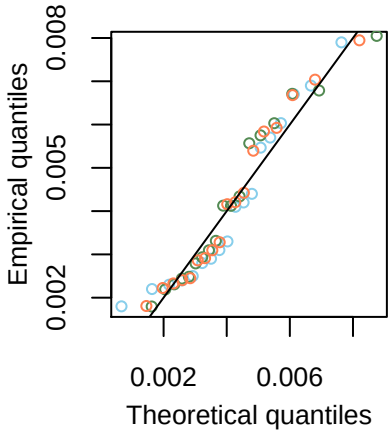
ECDF



Histogram



Q−Q



N = 24	FOD = 75%	Min (detect) = 0.0018 J	Kaplan Meier Mean = 0.0032
N (detect) = 18	SD (log detect) = 0.45	Max (detect) = 0.0079 J	Kaplan Meier SD = 0.0023

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.012	0.15	–	–	–	–	−226.329	−223.973
Lognormal	0.05	0.16	–	–	–	–	−233.541	−231.185
Gamma	–	–	0.1431	0.18	0.6182	0.755	−232.766	−230.41

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.11	0.15	–	–	–	–	−172.04	−170.259
Lognormal	0.42	0.61	–	–	–	–	−175.392	−173.612
Gamma	–	–	0.1422	0.204	0.4407	0.743	−174.935	−173.155

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Aldrin

Media:
Surface Sediment (0−15 cm)

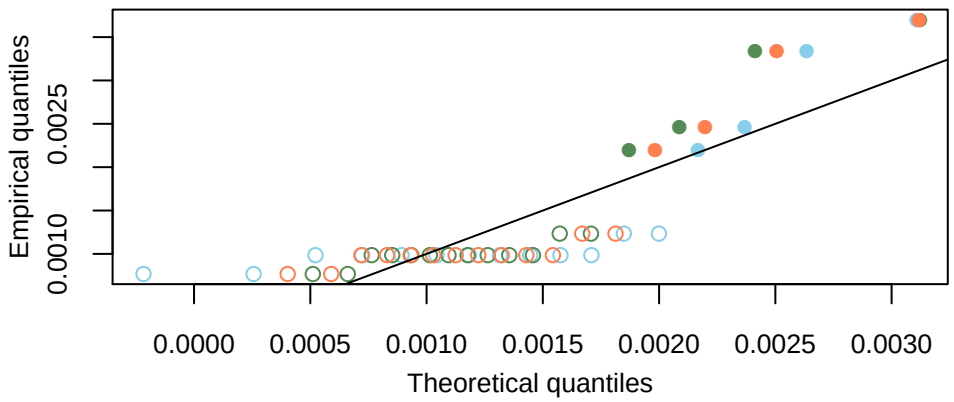
Exposure Unit:
LBC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

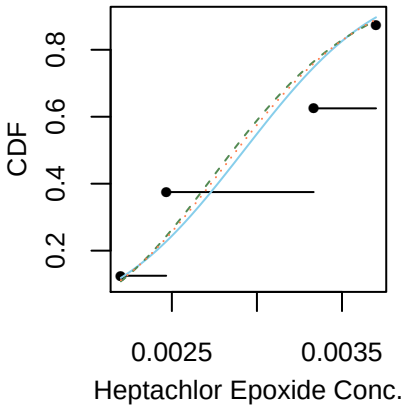
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

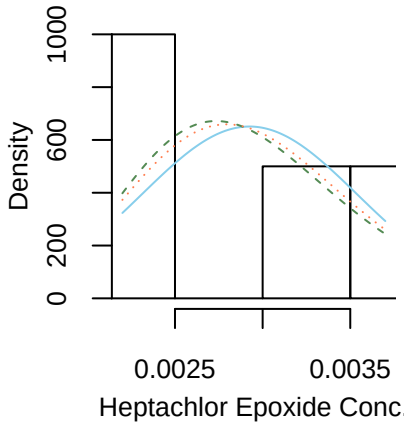


ECDF, Histogram & Q−Q (Detects Only)

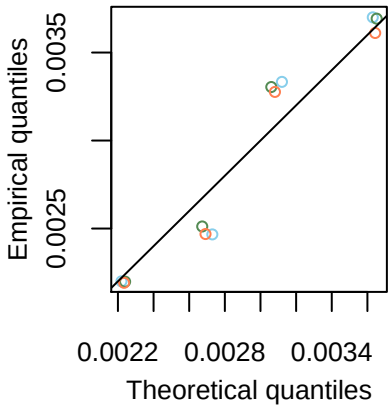
ECDF



Histogram



Q−Q



N = 17	FOD = 24%	Min (detect) = 0.0022 J	Kaplan Meier Mean = 8e−04
N (detect) = 4	SD (log detect) = 0.25	Max (detect) = 0.0037 J	Kaplan Meier SD = 0.0012

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	6e−05	3e−06	–	–	–	–	−186.962	−185.296
Lognormal	0.00048	1.3e−05	–	–	–	–	−199.706	−198.04
Gamma	–	–	NA	NA	NA	NA	−196.173	−194.507

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.53	N<5	–	–	–	–	−43.8257	−45.0531
Lognormal	0.53	N<5	–	–	–	–	−43.8967	−45.1241
Gamma	–	–	NA	NA	NA	NA	−43.8981	−45.1255

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−Heptachlor Epoxide

Media:
Surface Sediment (0−15 cm)

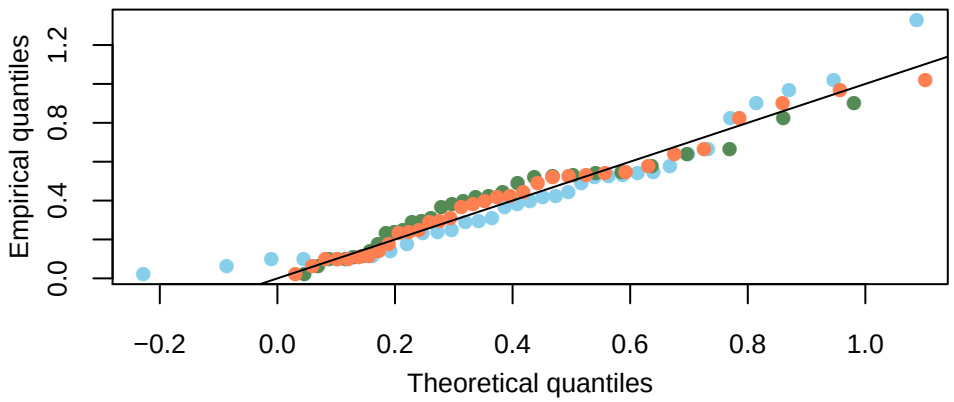
Exposure Unit:
LBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

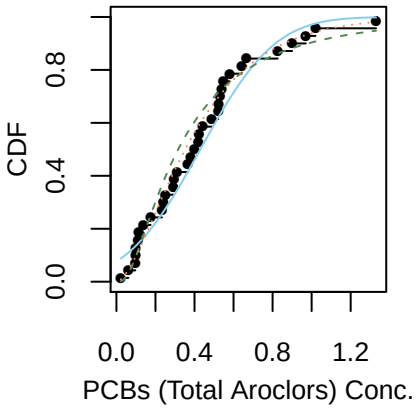
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

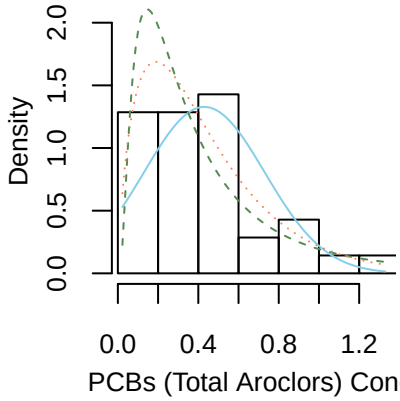


ECDF, Histogram & Q−Q (Detects Only)

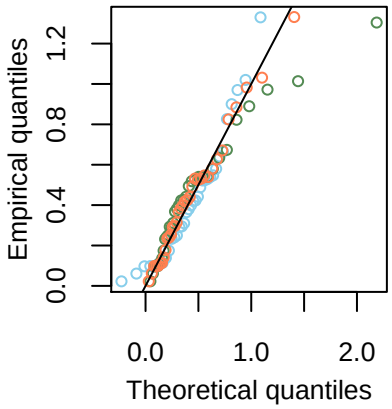
ECDF



Histogram



Q−Q



N = 35	FOD = 100%	Min (detect) = 0.023 J	Arithmetic Mean = 0.43
N (detect) = 35	SD (log detect) = 0.9	Max (detect) = 1 J	Arithmetic SD = 0.3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.017	0.22	–	–	–	–	19.1364	22.2471
Lognormal	0.054	0.11	–	–	–	–	14.0619	17.1726
Gamma	–	–	0.08844	0.153	0.3025	0.776	9.03537	12.1461

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−PCBs (Total Aroclors)

Media:
Surface Sediment (0−15 cm)

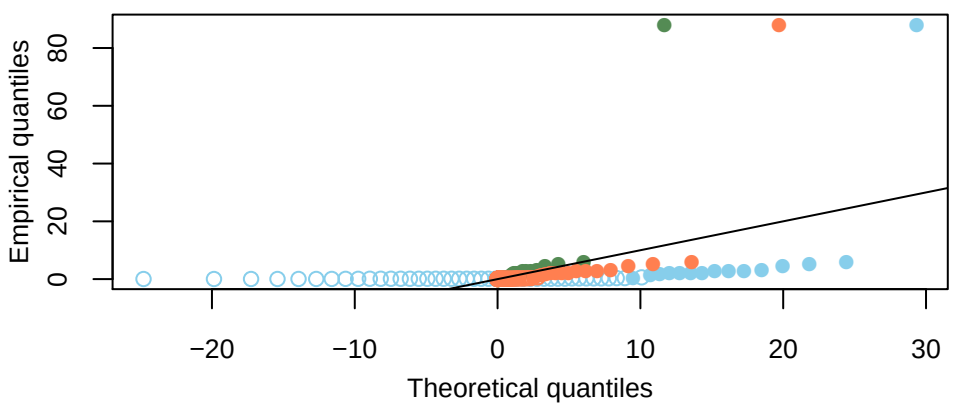
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Antimony

Legend

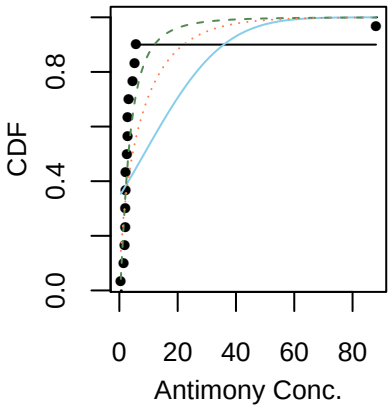
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

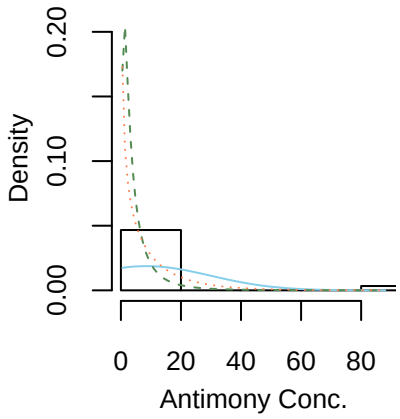


ECDF, Histogram & Q−Q (Detects Only)

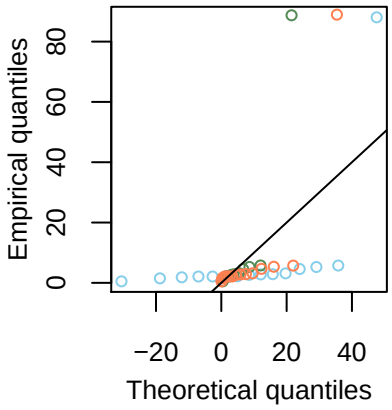
ECDF



Histogram



Q−Q



N = 59	FOD = 25%	Min (detect) = 0.5 J	Kaplan Meier Mean = 2
N (detect) = 15	SD (log detect) = 1.1	Max (detect) = 88 J	Kaplan Meier SD = 11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.9e−30	–	–	–	–	457.965	462.121
Lognormal	0	2.7e−09	–	–	–	–	83.0689	87.224
Gamma	–	–	0.3183	0.139	8.797	0.9121	143.567	147.722

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.3e−10	–	–	–	–	138.335	139.752
Lognormal	0.0019	0.036	–	–	–	–	82.1514	83.5675
Gamma	–	–	0.3721	0.234	2.78	0.793	95.2323	96.6484

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Antimony

Exhibit 2: EPC Program and Results
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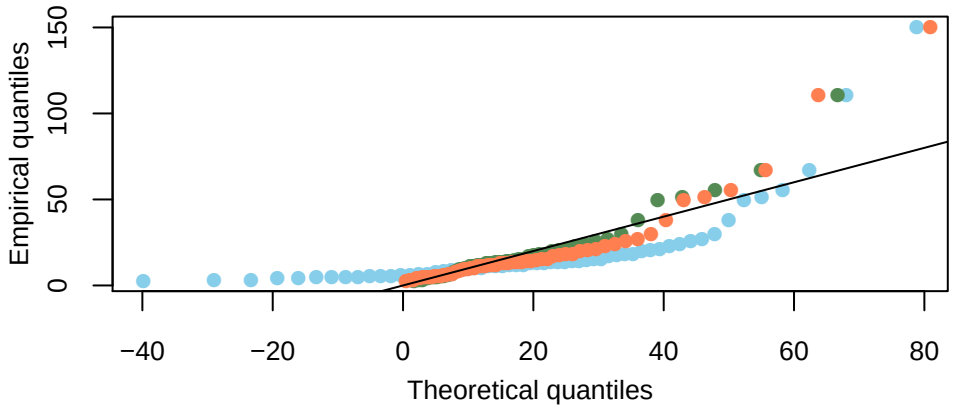
Berry's Creek Study Area Remedial Investigation

Figure **172**

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Arsenic

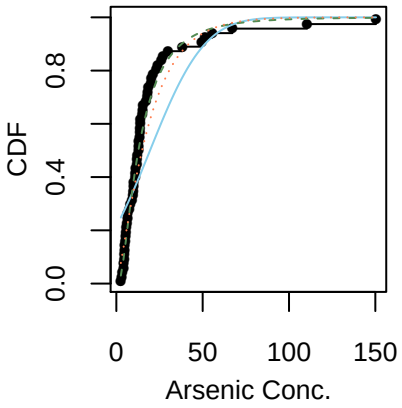
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

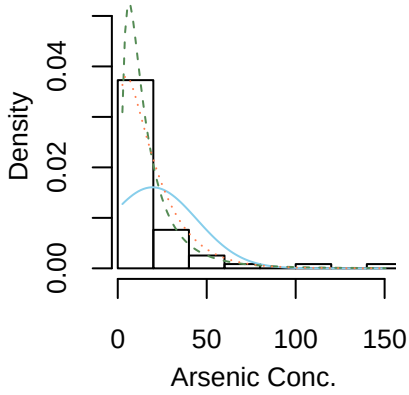


ECDF, Histogram & Q−Q (Detects Only)

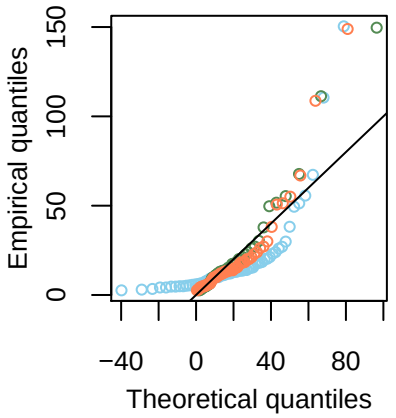
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 20
N (detect) = 59	SD (log detect) = 0.85	Max (detect) = 150 J	Arithmetic SD = 25

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−11	–	–	–	–	550.552	554.707
Lognormal	0.1	0.28	–	–	–	–	452.358	456.513
Gamma	–	–	0.1622	0.129	2.157	0.78	469.967	474.122

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Arsenic

Media:
Surface Sediment (0−15 cm)

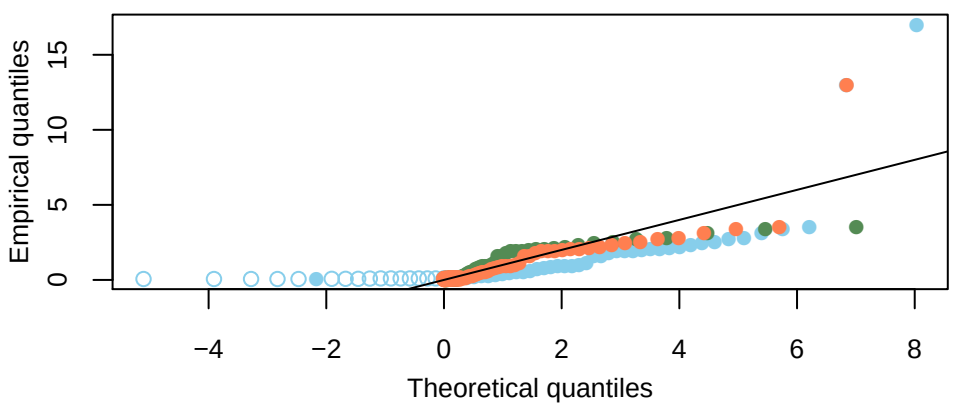
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Cadmium

Legend

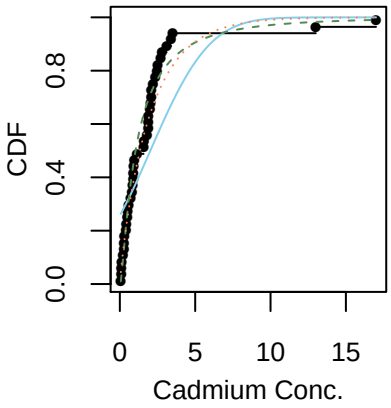
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

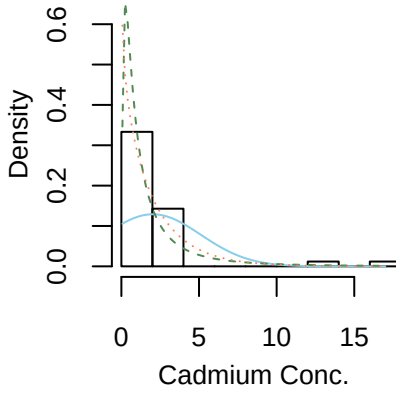


ECDF, Histogram & Q−Q (Detects Only)

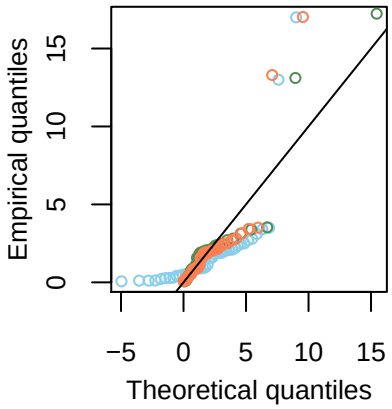
ECDF



Histogram



Q−Q



N = 59	FOD = 71%	Min (detect) = 0.065 J	Kaplan Meier Mean = 1
N (detect) = 42	SD (log detect) = 1.2	Max (detect) = 17 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.9e−15	–	–	–	–	290.89	295.045
Lognormal	4e−04	6.4e−05	–	–	–	–	140.258	144.413
Gamma	–	–	0.1674	0.132	2.01	0.814	152.427	156.582

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.7e−09	–	–	–	–	217.99	221.465
Lognormal	0.13	0.055	–	–	–	–	141.382	144.858
Gamma	–	–	0.1339	0.148	1.009	0.813	146.761	150.237

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Cadmium

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **174**

Media:
Surface Sediment (0−15 cm)

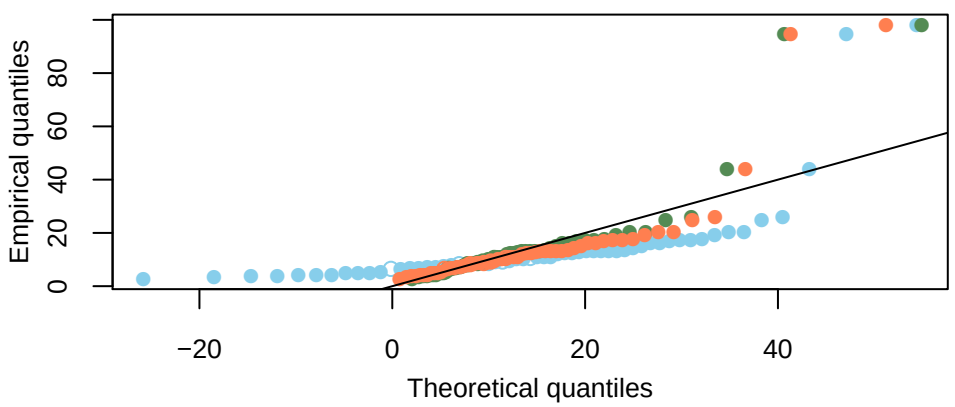
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Cobalt

Legend

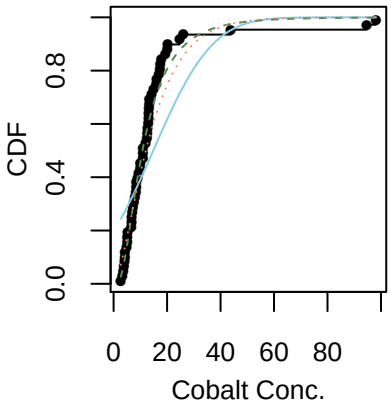
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

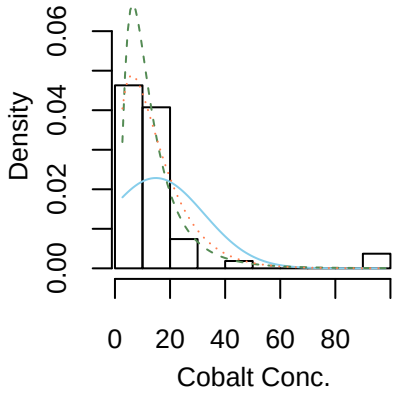


ECDF, Histogram & Q−Q (Detects Only)

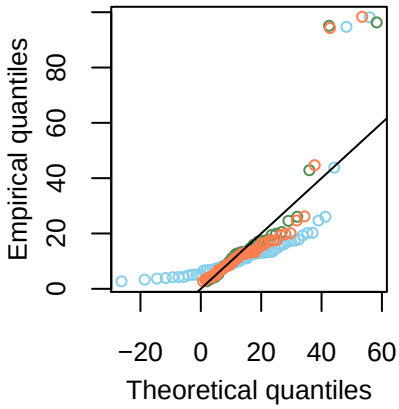
ECDF



Histogram



Q−Q



N = 59	FOD = 92%	Min (detect) = 2 J	Kaplan Meier Mean = 14
N (detect) = 54	SD (log detect) = 0.72	Max (detect) = 98 J	Kaplan Meier SD = 17

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.5e−13	–	–	–	–	504.323	508.478
Lognormal	0.0066	0.2	–	–	–	–	405.881	410.037
Gamma	–	–	0.1631	0.129	2.454	0.78	425.706	429.861

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.3e−12	–	–	–	–	466.109	470.087
Lognormal	0.014	0.21	–	–	–	–	377.994	381.972
Gamma	–	–	0.1603	0.129	2.149	0.78	395.173	399.151

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

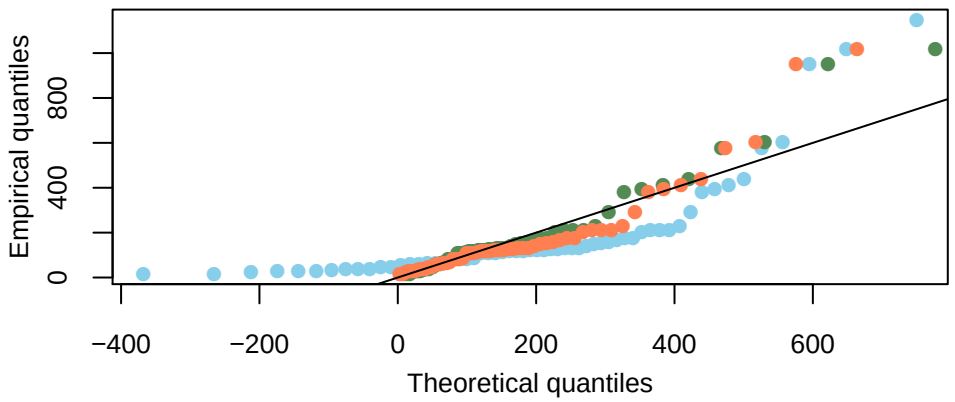
Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Cobalt

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Copper

Legend

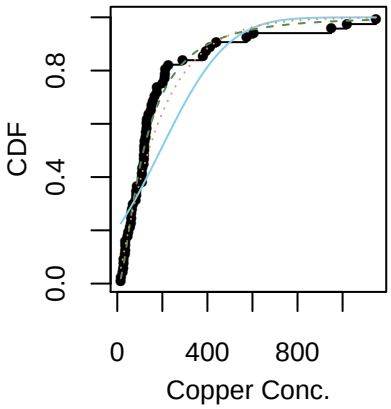
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

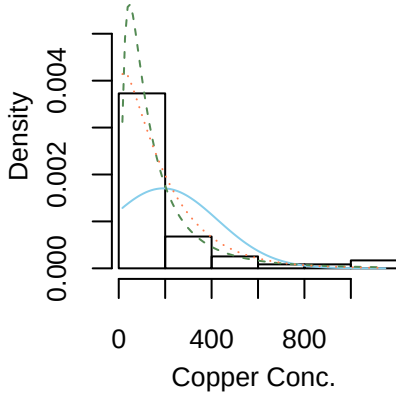


ECDF, Histogram & Q−Q (Detects Only)

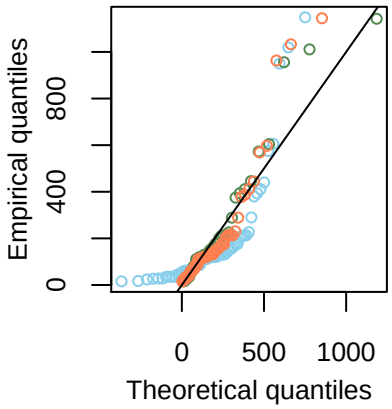
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 16	Arithmetic Mean = 190
N (detect) = 59	SD (log detect) = 0.98	Max (detect) = 1,100 J	Arithmetic SD = 240

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.5e−12	–	–	–	–	815.205	819.36
Lognormal	0.29	0.12	–	–	–	–	729.455	733.61
Gamma	–	–	0.1538	0.129	1.719	0.78	741.366	745.521

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Copper

Media:
Surface Sediment (0−15 cm)

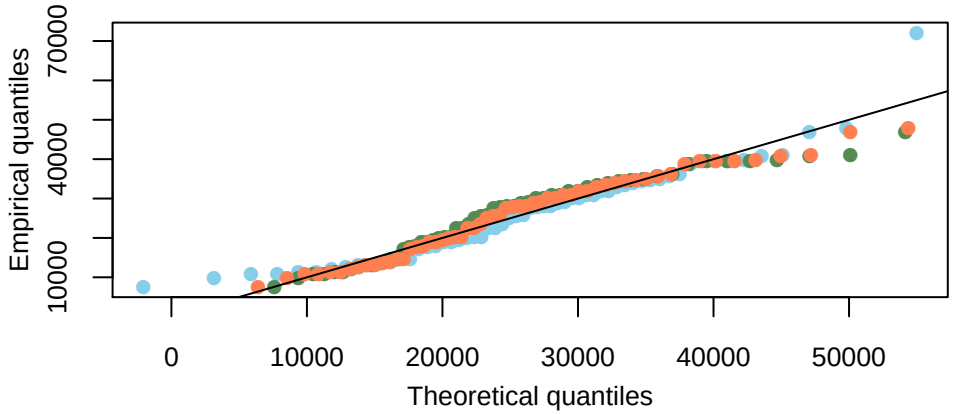
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Iron

Legend

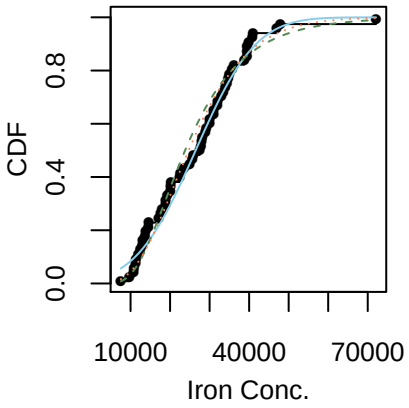
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

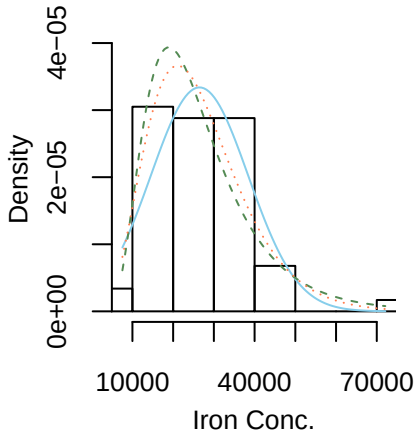


ECDF, Histogram & Q−Q (Detects Only)

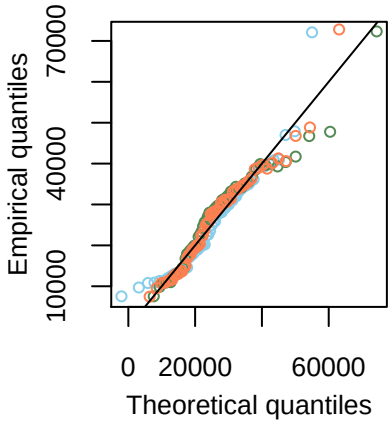
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 7,500 J	Arithmetic Mean = 26,000
N (detect) = 59	SD (log detect) = 0.48	Max (detect) = 72,000 J	Arithmetic SD = 12,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0041	0.3	–	–	–	–	1279.26	1283.41
Lognormal	0.076	0.019	–	–	–	–	1273.25	1277.4
Gamma	–	–	0.1015	0.127	0.6674	0.763	1271.58	1275.73

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Iron

Media:
Surface Sediment (0−15 cm)

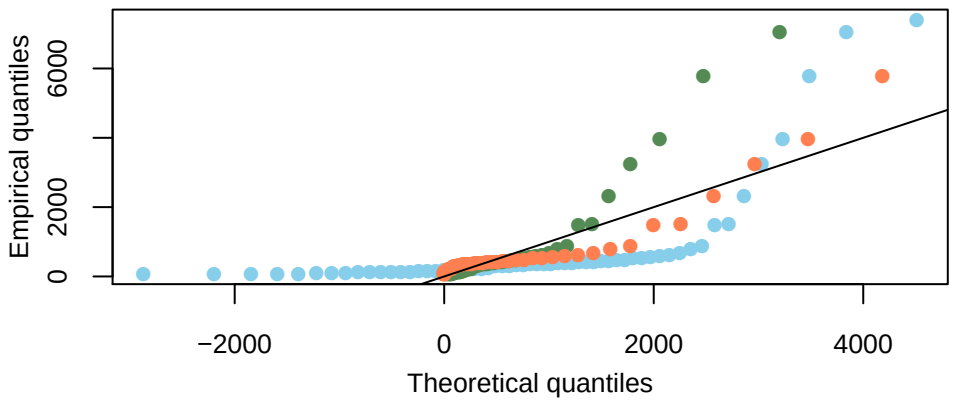
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Manganese

Legend

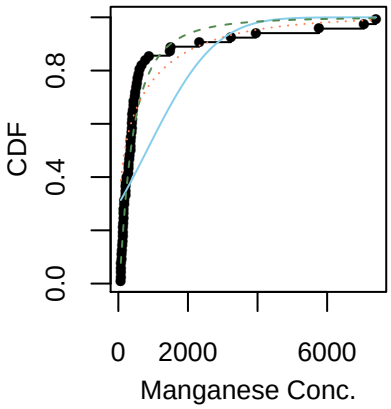
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

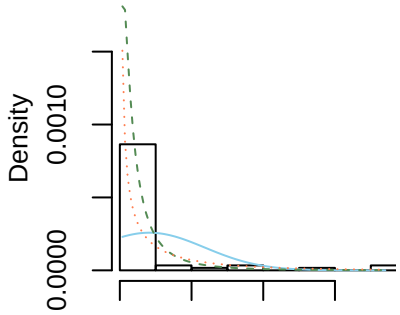


ECDF, Histogram & Q−Q (Detects Only)

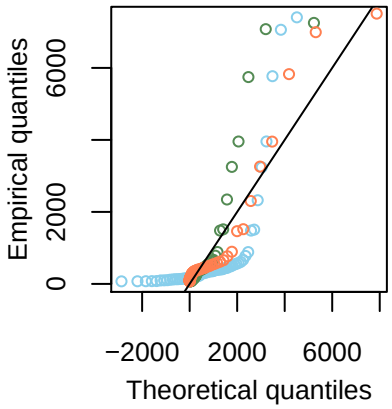
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 71 J	Arithmetic Mean = 820
N (detect) = 59	SD (log detect) = 1.1	Max (detect) = 7,400 J	Arithmetic SD = 1,600

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.3e−22	–	–	–	–	1037.94	1042.1
Lognormal	0.00053	0.017	–	–	–	–	878.132	882.287
Gamma	–	–	0.3881	0.139	9.421	0.9121	936.879	941.035

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Manganese

Media:
Surface Sediment (0−15 cm)

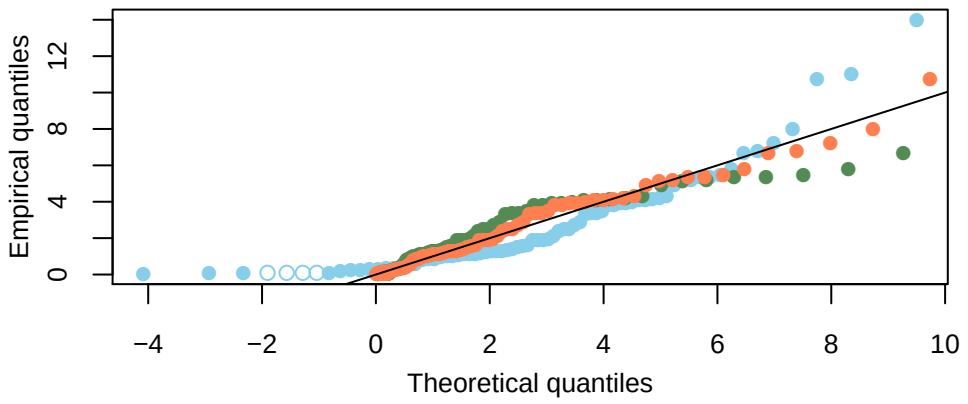
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Mercury

Legend

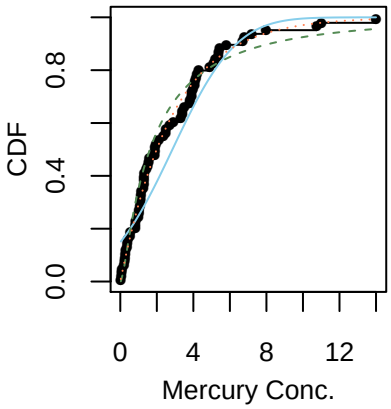
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

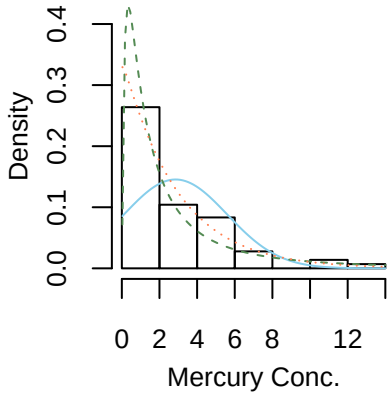


ECDF, Histogram & Q−Q (Detects Only)

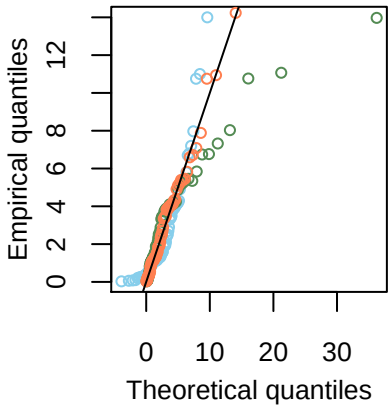
ECDF



Histogram



Q−Q



N = 76	FOD = 95%	Min (detect) = 0.03 J	Kaplan Meier Mean = 2
N (detect) = 72	SD (log detect) = 1.3	Max (detect) = 14 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.2e−05	–	–	–	–	372.867	377.528
Lognormal	6e−04	0.006	–	–	–	–	319.656	324.317
Gamma	–	–	0.07563	0.113	0.4203	0.817	306.766	311.428

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00016	–	–	–	–	353.603	358.157
Lognormal	0.0016	0.03	–	–	–	–	311.476	316.029
Gamma	–	–	0.07347	0.11	0.2953	0.78	299.102	303.655

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Mercury

Media:
Surface Sediment (0−15 cm)

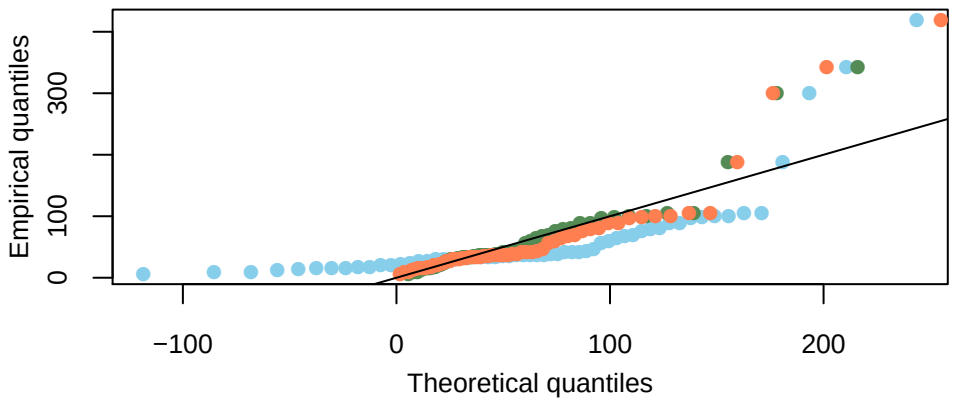
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Nickel

Legend

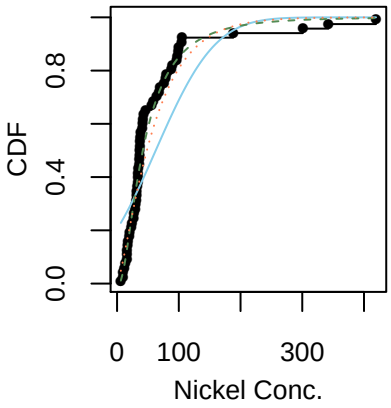
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

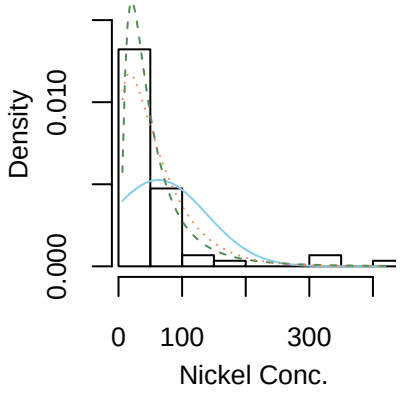


ECDF, Histogram & Q−Q (Detects Only)

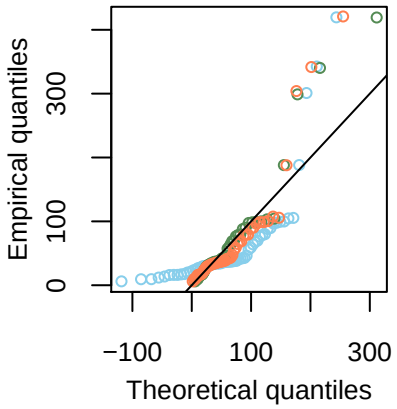
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 6 J	Arithmetic Mean = 63
N (detect) = 59	SD (log detect) = 0.85	Max (detect) = 420 J	Arithmetic SD = 76

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−09	–	–	–	–	682.186	686.341
Lognormal	0.11	0.014	–	–	–	–	591.386	595.541
Gamma	–	–	0.1927	0.129	2.208	0.78	606.868	611.023

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Nickel

Media:
Surface Sediment (0−15 cm)

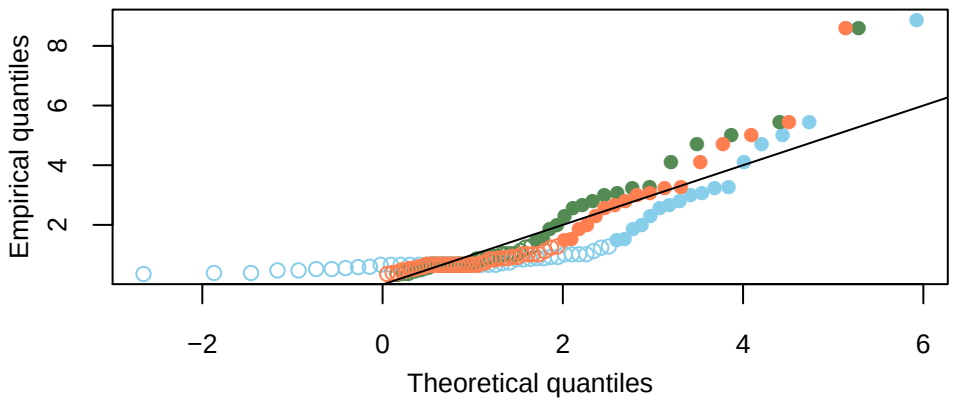
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Thallium

Legend

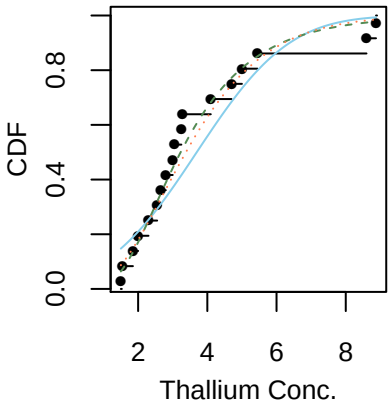
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

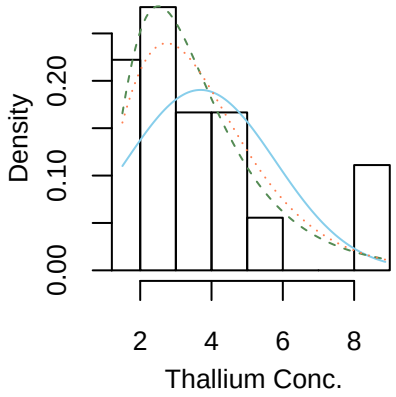


ECDF, Histogram & Q−Q (Detects Only)

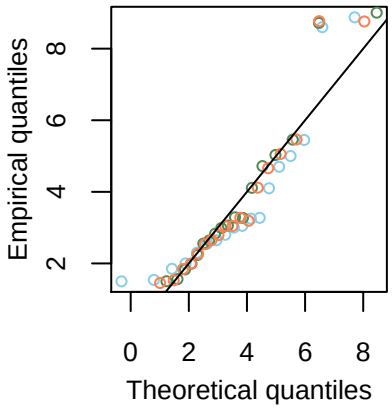
ECDF



Histogram



Q−Q



N = 59	FOD = 31%	Min (detect) = 1	Kaplan Meier Mean = 1
N (detect) = 18	SD (log detect) = 0.52	Max (detect) = 8 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2e−12	–	–	–	–	240.574	244.729
Lognormal	7e−05	1.1e−05	–	–	–	–	157.657	161.812
Gamma	–	–	0.2414	0.129	4.046	0.78	175.591	179.746

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0034	0.0059	–	–	–	–	81.7077	83.4884
Lognormal	0.49	0.3	–	–	–	–	72.5584	74.3391
Gamma	–	–	0.1906	0.206	0.4962	0.753	74.4518	76.2325

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Thallium

Exhibit 2: EPC Program and Results
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Berry's Creek Study Area Remedial Investigation

Figure **181**

Media:
Surface Sediment (0−15 cm)

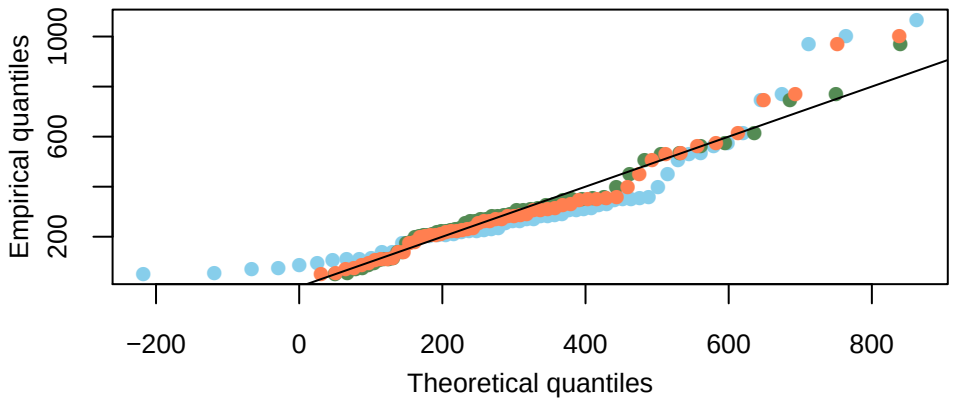
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Zinc

Legend

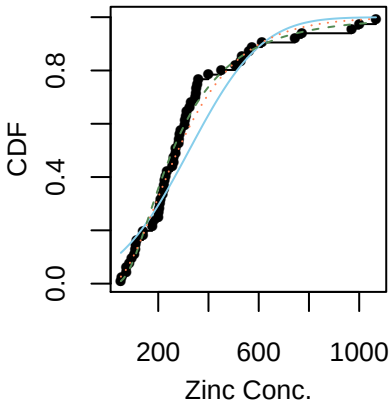
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

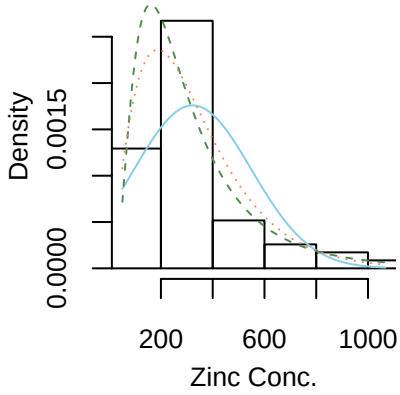


ECDF, Histogram & Q−Q (Detects Only)

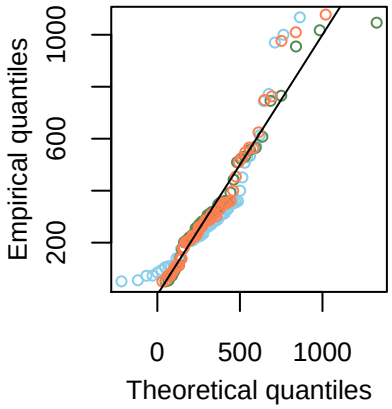
ECDF



Histogram



Q−Q



N = 58	FOD = 100%	Min (detect) = 51 J	Arithmetic Mean = 320
N (detect) = 58	SD (log detect) = 0.69	Max (detect) = 1,100 J	Arithmetic SD = 230

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7e−07	–	–	–	–	797.796	801.917
Lognormal	0.28	0.049	–	–	–	–	769.302	773.423
Gamma	–	–	0.1258	0.127	0.6447	0.763	770.527	774.648

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

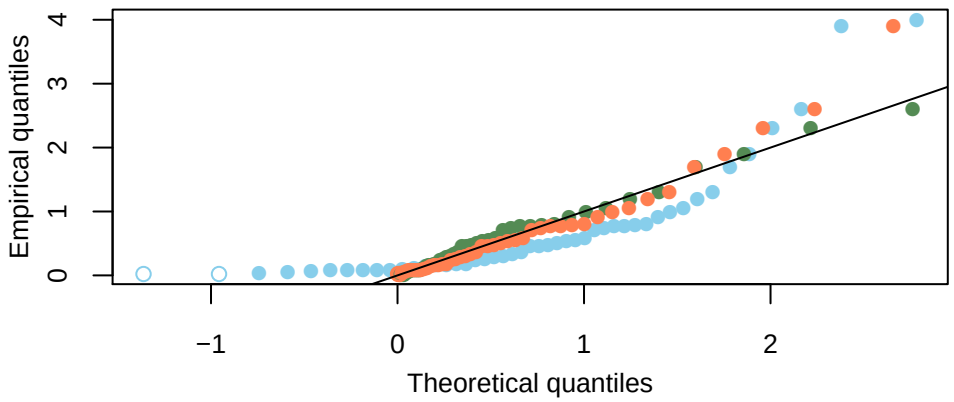
Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Zinc

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Benz[a]anthracene

Legend

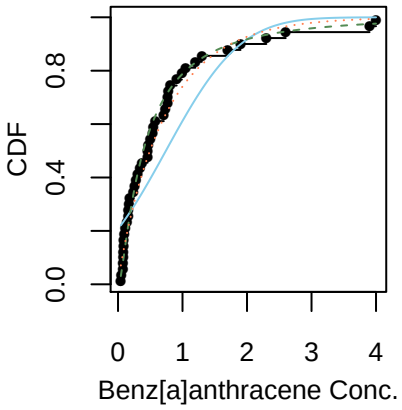
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

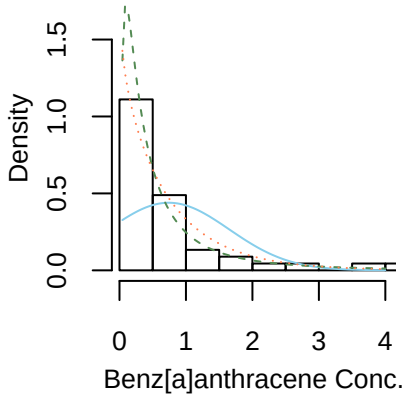


ECDF, Histogram & Q−Q (Detects Only)

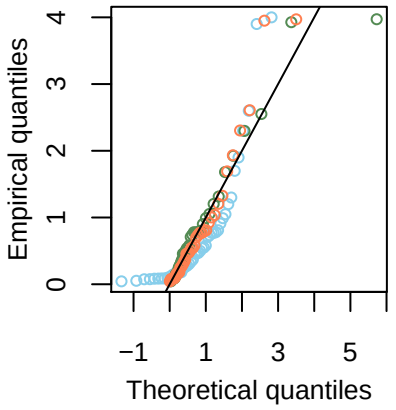
ECDF



Histogram



Q−Q



N = 47	FOD = 96%	Min (detect) = 0.044 J	Kaplan Meier Mean = 0.71
N (detect) = 45	SD (log detect) = 1.2	Max (detect) = 4	Kaplan Meier SD = 0.9

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.8e−06	–	–	–	–	127.495	131.195
Lognormal	0.56	0.32	–	–	–	–	61.2496	64.9499
Gamma	–	–	0.09334	0.139	0.5443	0.813	64.6709	68.3712

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.2e−06	–	–	–	–	123.008	126.621
Lognormal	0.35	0.51	–	–	–	–	61.5574	65.1707
Gamma	–	–	0.09687	0.139	0.6878	0.813	66.8747	70.488

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Benz[a]anthracene

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **183**

Media:
Surface Sediment (0−15 cm)

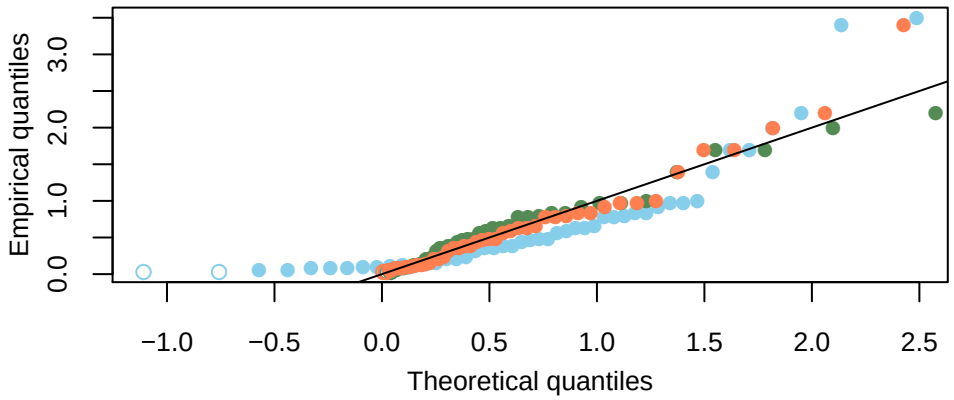
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Benzo[a]pyrene

Legend

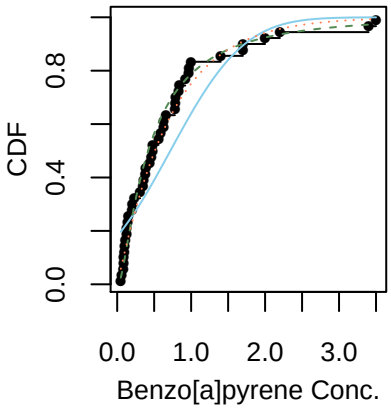
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

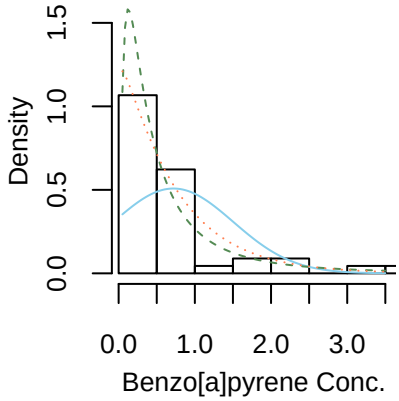


ECDF, Histogram & Q−Q (Detects Only)

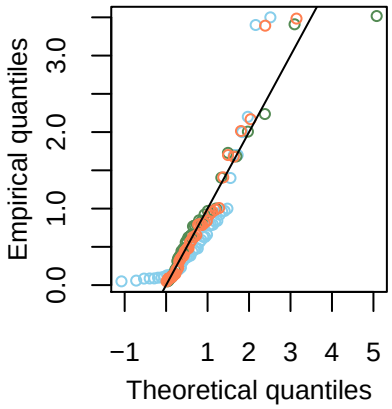
ECDF



Histogram



Q−Q



N = 47	FOD = 96%	Min (detect) = 0.049 J	Kaplan Meier Mean = 0.69
N (detect) = 45	SD (log detect) = 1.1	Max (detect) = 3 J	Kaplan Meier SD = 0.78

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.3e−05	–	–	–	–	114.147	117.848
Lognormal	0.34	0.35	–	–	–	–	61.6545	65.3548
Gamma	–	–	0.09071	0.139	0.4344	0.813	62.9808	66.6811

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.9e−05	–	–	–	–	109.964	113.577
Lognormal	0.3	0.47	–	–	–	–	61.1988	64.8121
Gamma	–	–	0.09307	0.136	0.5353	0.777	64.2122	67.8255

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

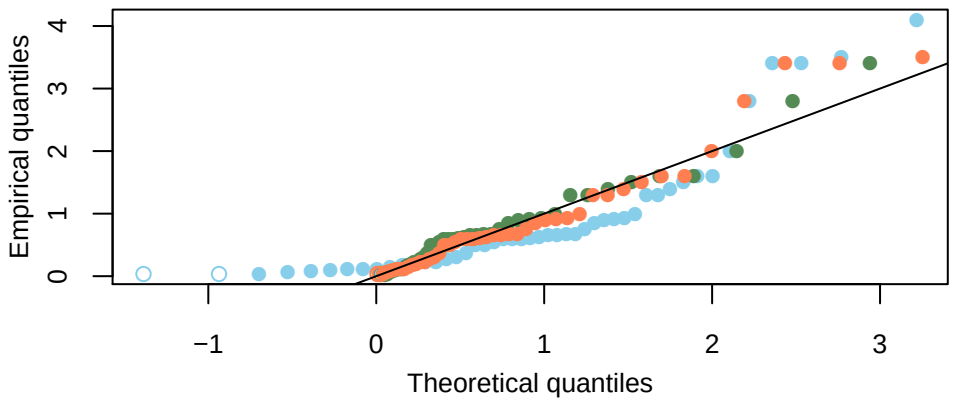
DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Benzo[a]pyrene

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Benzo[b]fluoranthene

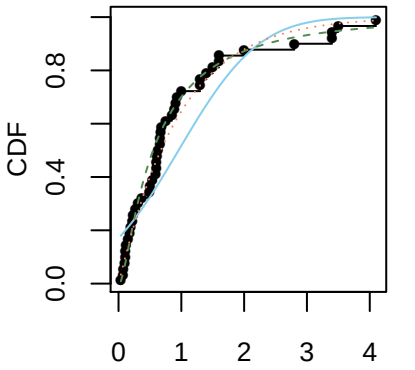
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

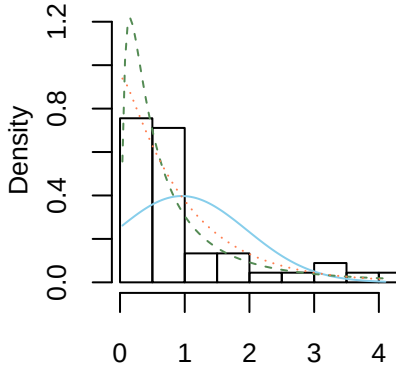


ECDF, Histogram & Q−Q (Detects Only)

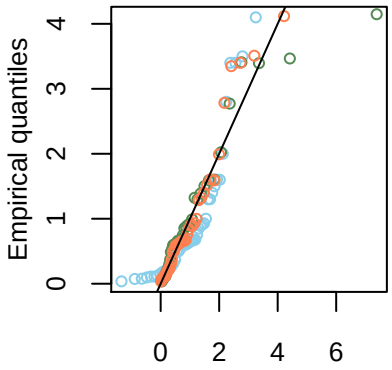
ECDF



Histogram



Q−Q



N = 47	FOD = 96%	Min (detect) = 0.037 J	Kaplan Meier Mean = 0.92
N (detect) = 45	SD (log detect) = 1.1	Max (detect) = 4	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.5e−06	–	–	–	–	137.356	141.057
Lognormal	0.11	0.024	–	–	–	–	90.6067	94.307
Gamma	–	–	0.08395	0.139	0.4509	0.813	89.6484	93.3487

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.8e−06	–	–	–	–	132.056	135.669
Lognormal	0.3	0.069	–	–	–	–	89.3838	92.9972
Gamma	–	–	0.09619	0.136	0.5107	0.777	89.8923	93.5056

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Benzo[b]fluoranthene

Media:
Surface Sediment (0−15 cm)

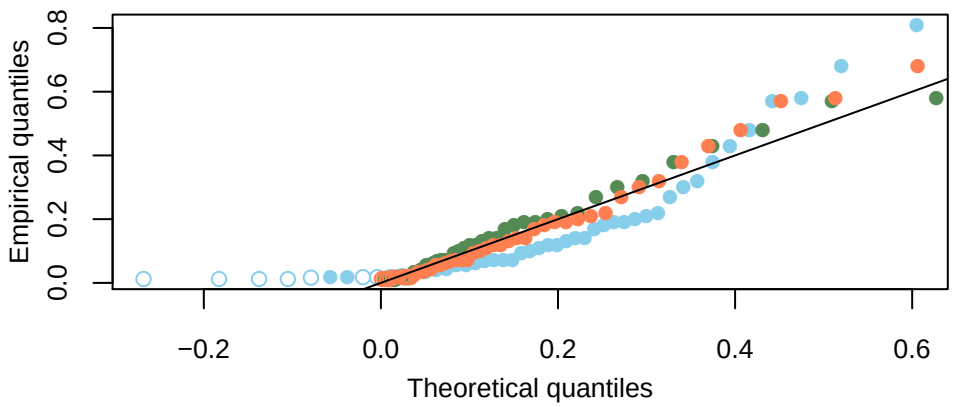
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

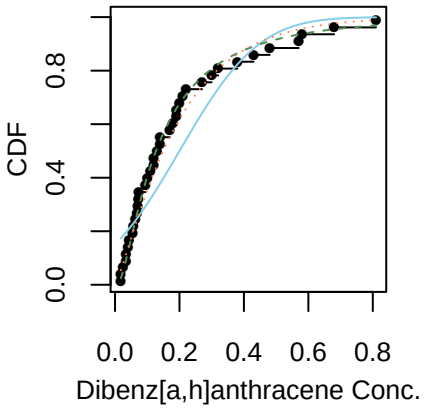
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

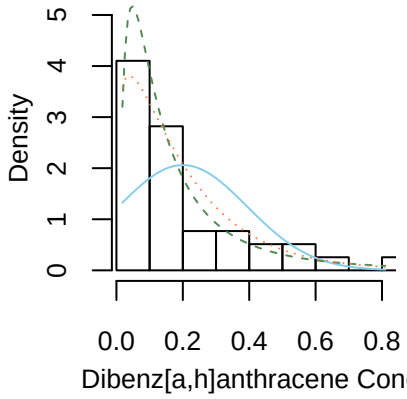


ECDF, Histogram & Q−Q (Detects Only)

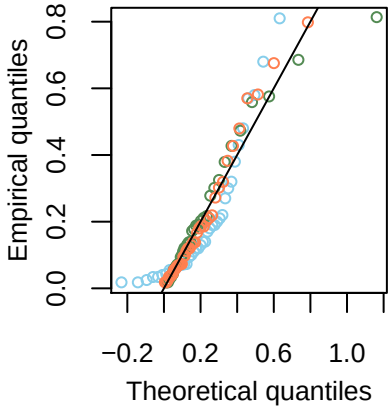
ECDF



Histogram



Q−Q



N = 47	FOD = 83%	Min (detect) = 0.018 J	Kaplan Meier Mean = 0.17
N (detect) = 39	SD (log detect) = 1	Max (detect) = 0.81 J	Kaplan Meier SD = 0.19

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.6e−05	–	–	–	–	−18.9216	−15.2213
Lognormal	0.071	0.14	–	–	–	–	−72.6235	−68.9232
Gamma	–	–	0.09547	0.139	0.6227	0.813	−69.6891	−65.9888

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.00031	–	–	–	–	−13.3868	−10.0597
Lognormal	0.74	0.92	–	–	–	–	−46.8657	−43.5385
Gamma	–	–	0.09889	0.153	0.4264	0.776	−44.5611	−41.234

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Dibenz[a,h]anthracene

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **186**

Media:
Surface Sediment (0−15 cm)

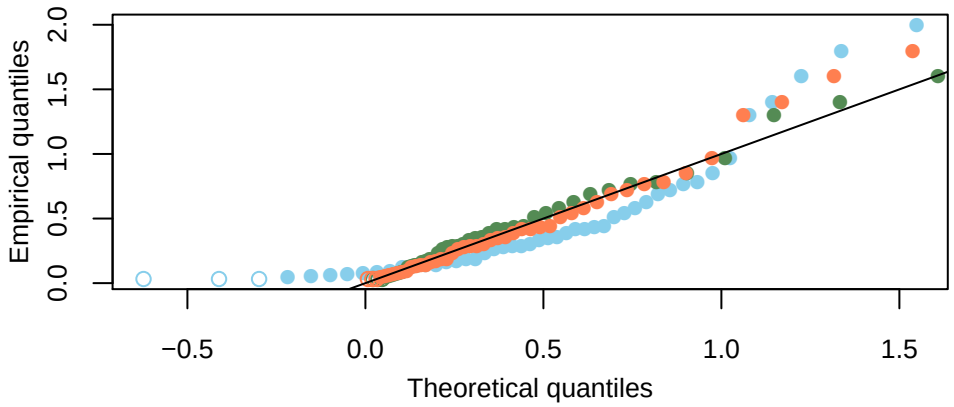
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

Legend

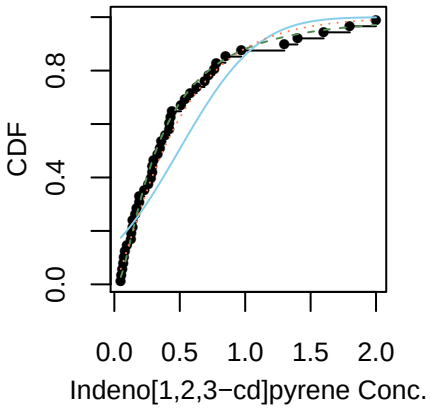
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

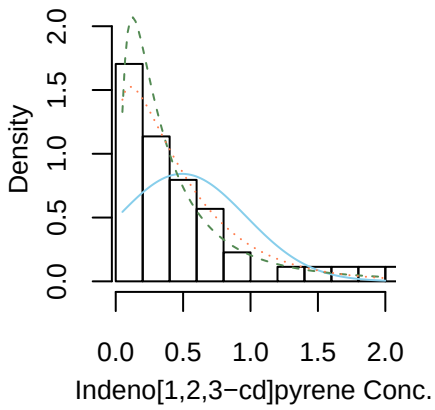


ECDF, Histogram & Q−Q (Detects Only)

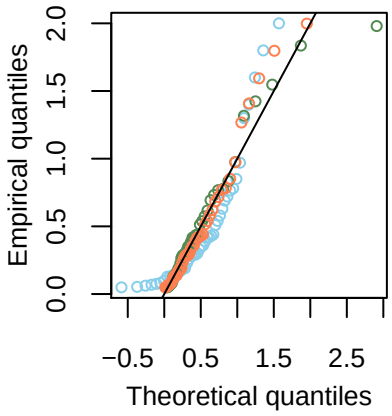
ECDF



Histogram



Q−Q



N = 47	FOD = 94%	Min (detect) = 0.049 J	Kaplan Meier Mean = 0.46
N (detect) = 44	SD (log detect) = 0.98	Max (detect) = 2 J	Kaplan Meier SD = 0.47

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.2e−05	–	–	–	–	66.7352	70.4355
Lognormal	0.36	0.61	–	–	–	–	24.4047	28.105
Gamma	–	–	0.07399	0.136	0.3138	0.777	25.3628	29.0631

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	9.6e−05	–	–	–	–	63.0553	66.6237
Lognormal	0.58	0.94	–	–	–	–	25.4987	29.0671
Gamma	–	–	0.08963	0.144	0.4002	0.779	28.0414	31.6098

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Indeno[1,2,3−cd]pyrene

Media:
Surface Sediment (0−15 cm)

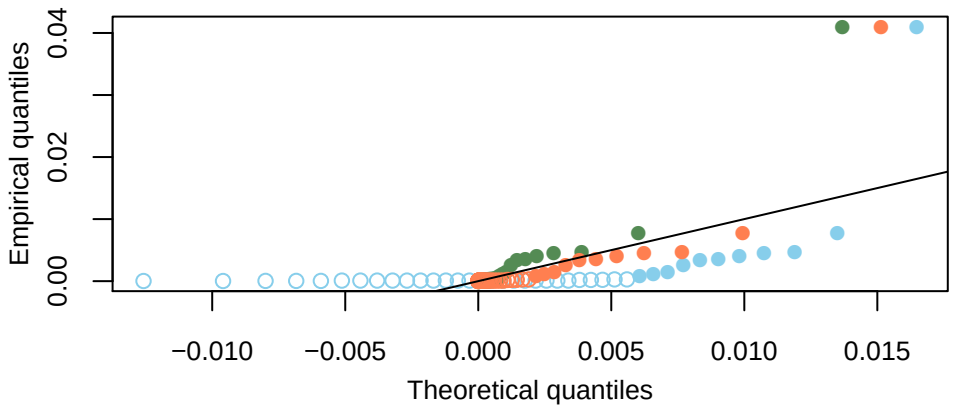
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Aldrin

Legend

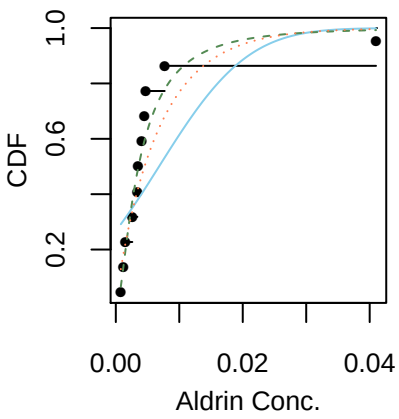
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

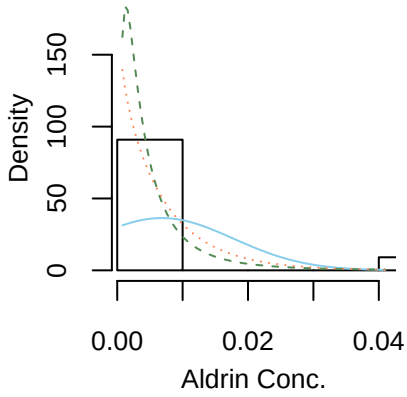


ECDF, Histogram & Q−Q (Detects Only)

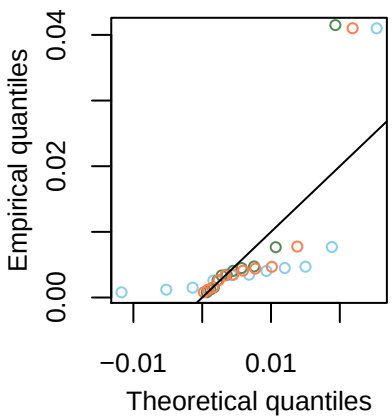
ECDF



Histogram



Q−Q



N = 40	FOD = 28%	Min (detect) = 0.00079 J	Kaplan Meier Mean = 0.0019
N (detect) = 11	SD (log detect) = 1	Max (detect) = 0.041 J	Kaplan Meier SD = 0.0065

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.1e−16	−	−	−	−	−285.555	−282.177
Lognormal	2e−05	2.2e−10	−	−	−	−	−498.842	−495.465
Gamma	−	−	0.3213	0.1547	5.217	0.9096	−469.232	−465.854

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.1e−05	−	−	−	−	−64.0624	−63.2666
Lognormal	0.29	0.17	−	−	−	−	−88.7735	−87.9777
Gamma	−	−	0.3056	0.281	1.016	0.777	−83.8408	−83.045

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Aldrin

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **188**

Media:
Surface Sediment (0−15 cm)

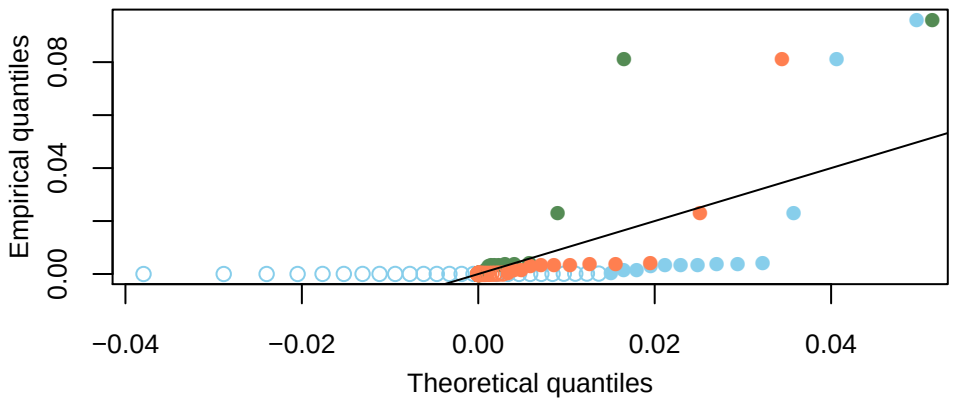
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Heptachlor Epoxide

Legend

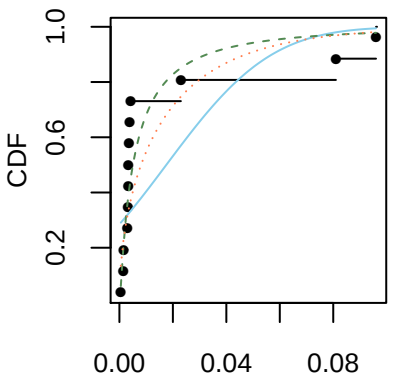
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

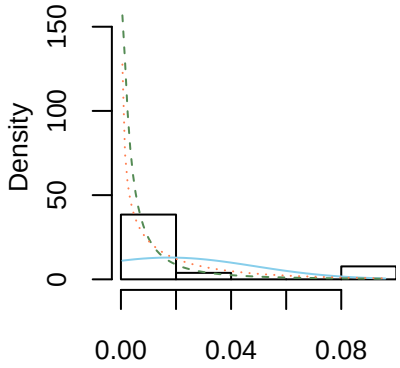


ECDF, Histogram & Q−Q (Detects Only)

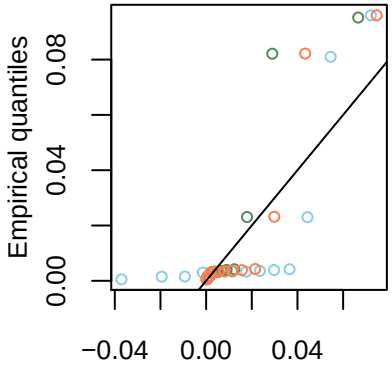
ECDF



Histogram



Q−Q



N = 39	FOD = 33%	Min (detect) = 0.00053 J	Kaplan Meier Mean = 0.0059
N (detect) = 13	SD (log detect) = 1.5	Max (detect) = 0.096 J	Kaplan Meier SD = 0.02

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.1e−23	–	–	–	–	−191.869	−188.542
Lognormal	6e−05	2.1e−08	–	–	–	–	−473.843	−470.516
Gamma	–	–	0.3039	0.1651	5.21	0.9073	−443.63	−440.303

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	3e−05	2.8e−07	–	–	–	–	−49.5265	−48.3966
Lognormal	0.027	0.00085	–	–	–	–	−86.828	−85.6981
Gamma	–	–	0.3977	0.281	1.718	0.777	−80.4437	−79.3138

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−Heptachlor Epoxide

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **189**

Media:
Surface Sediment (0−15 cm)

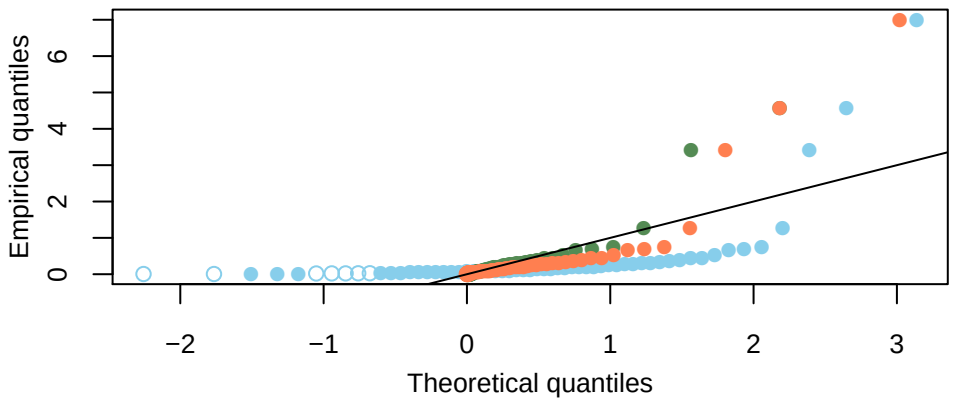
Exposure Unit:
Reference Sites

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

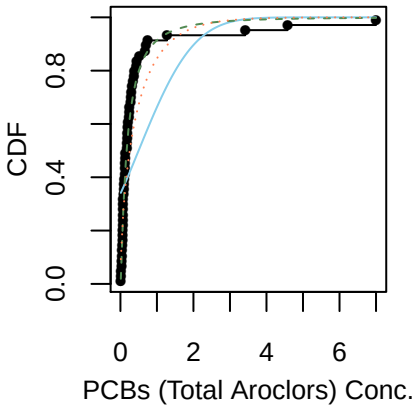
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

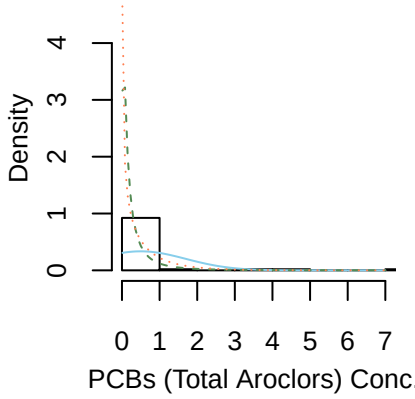


ECDF, Histogram & Q−Q (Detects Only)

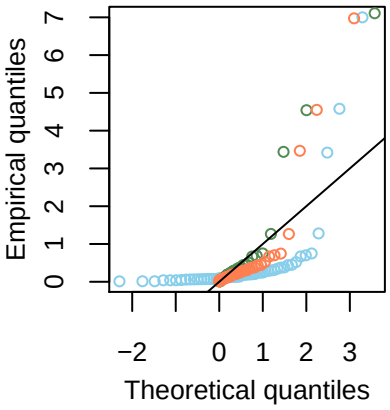
ECDF



Histogram



Q−Q



N = 59	FOD = 88%	Min (detect) = 0.011 J	Kaplan Meier Mean = 0.44
N (detect) = 52	SD (log detect) = 1.3	Max (detect) = 7 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−21	–	–	–	–	185.842	189.997
Lognormal	0.41	0.86	–	–	–	–	−27.0813	−22.9263
Gamma	–	–	0.1863	0.132	3.513	0.814	1.89904	6.05411

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.3e−19	–	–	–	–	169.848	173.75
Lognormal	0.082	0.63	–	–	–	–	−5.91866	−2.01617
Gamma	–	–	0.2071	0.132	3.763	0.814	22.1117	26.0142

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−PCBs (Total Aroclors)

Media:
Marsh Sediment All Depths

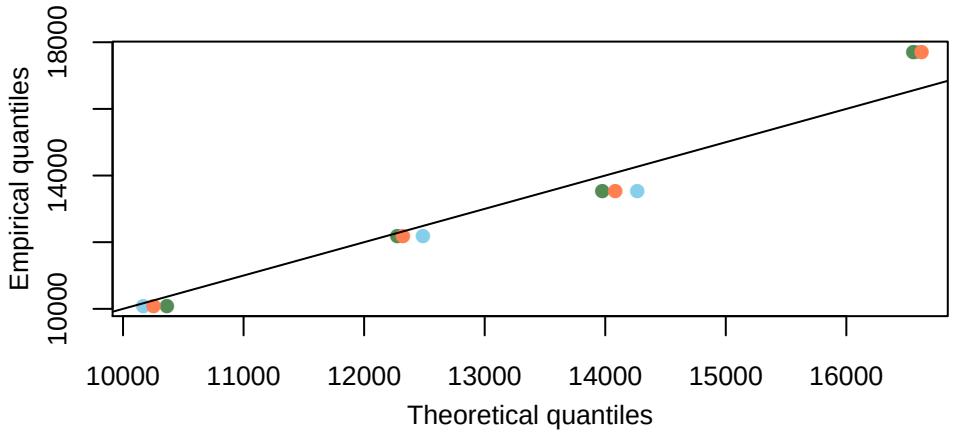
Exposure Unit:
Nevertouch Marsh

Chemical (mg/kg):
Aluminum

Legend

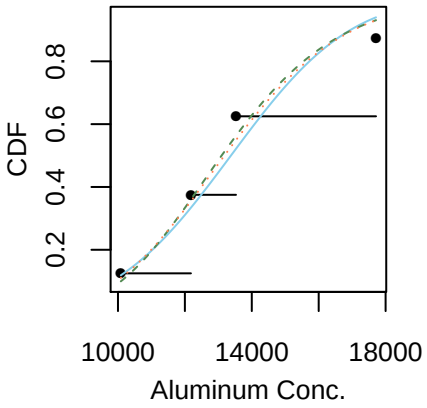
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

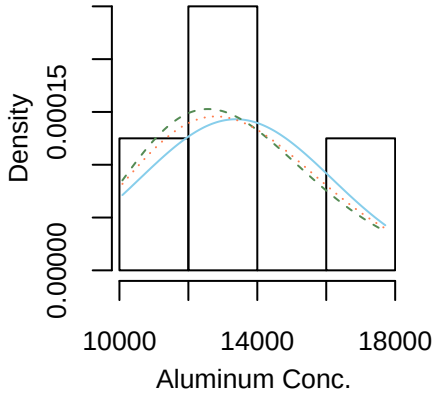


ECDF, Histogram & Q−Q (Detects Only)

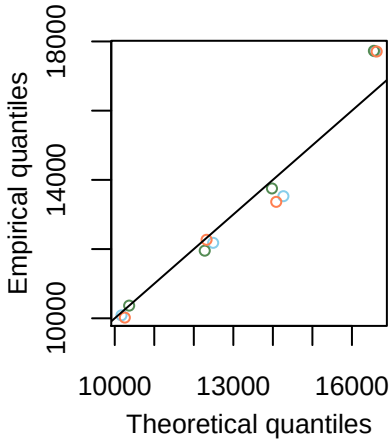
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 10,000 J	Arithmetic Mean = 13,000
N (detect) = 4	SD (log detect) = 0.24	Max (detect) = 18,000 J	Arithmetic SD = 3,200

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.79	N<5	–	–	–	–	78.8168	77.5894
Lognormal	0.94	N<5	–	–	–	–	78.4599	77.2325
Gamma	–	–	NA	NA	NA	NA	78.5489	77.3215

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Aluminum

Media:
Marsh Sediment All Depths

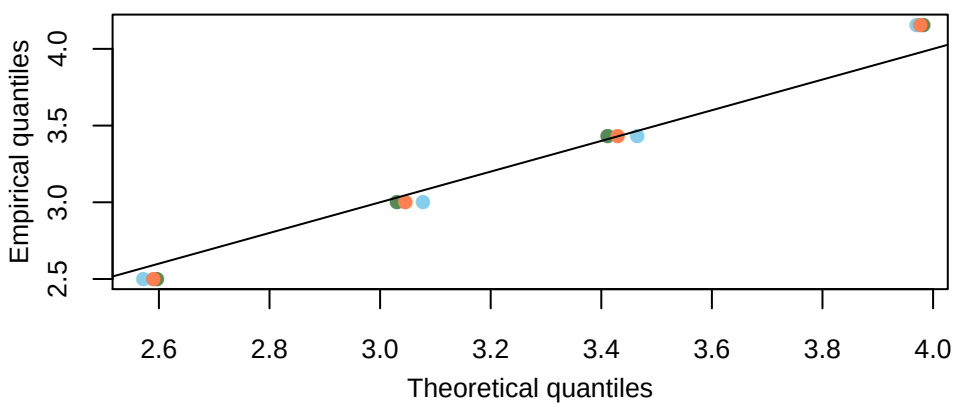
Exposure Unit:
Nevertouch Marsh

Chemical (mg/kg):
Antimony

Legend

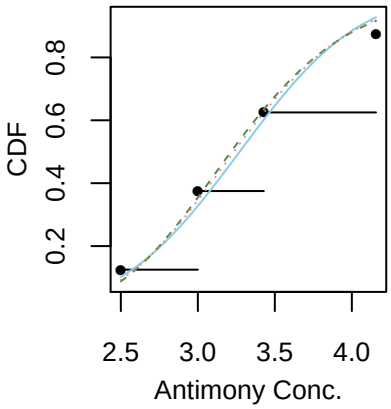
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

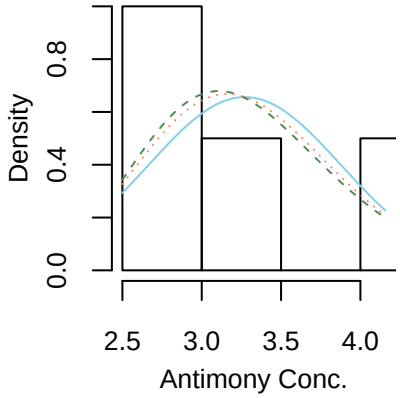


ECDF, Histogram & Q−Q (Detects Only)

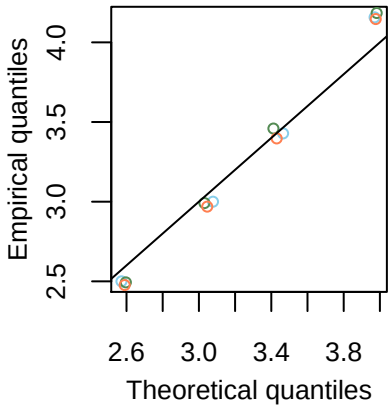
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 3
N (detect) = 4	SD (log detect) = 0.21	Max (detect) = 4 J	Arithmetic SD = 0.7

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.96	N<5	–	–	–	–	11.369	10.1416
Lognormal	1	N<5	–	–	–	–	11.2352	10.0078
Gamma	–	–	NA	NA	NA	NA	11.2529	10.0255

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

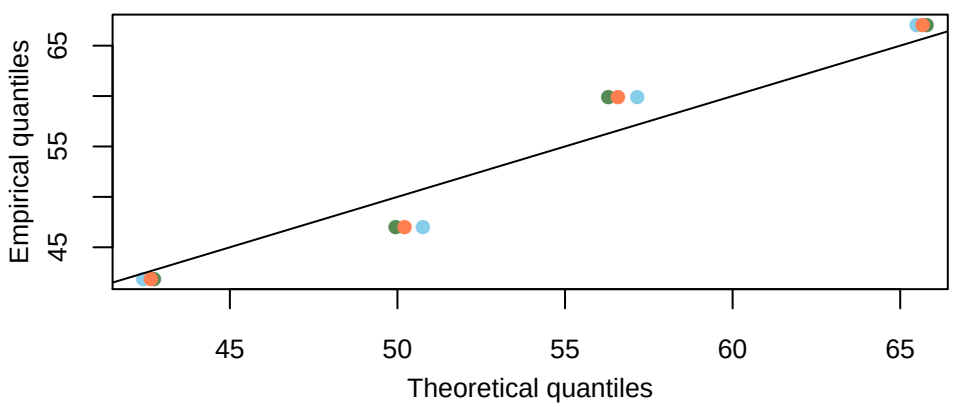
DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Antimony

Media:
Marsh Sediment All Depths
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Arsenic

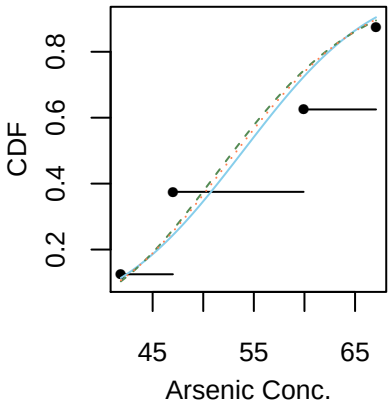
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

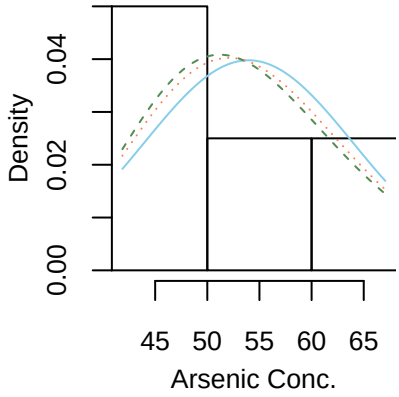


ECDF, Histogram & Q−Q (Detects Only)

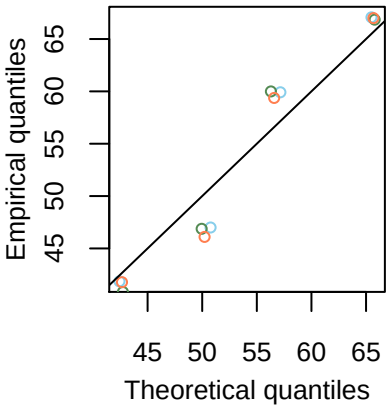
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 42 J	Arithmetic Mean = 54
N (detect) = 4	SD (log detect) = 0.22	Max (detect) = 67 J	Arithmetic SD = 12

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.67	N<5	–	–	–	–	33.795	32.5676
Lognormal	0.68	N<5	–	–	–	–	33.7258	32.4984
Gamma	–	–	NA	NA	NA	NA	33.728	32.5006

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

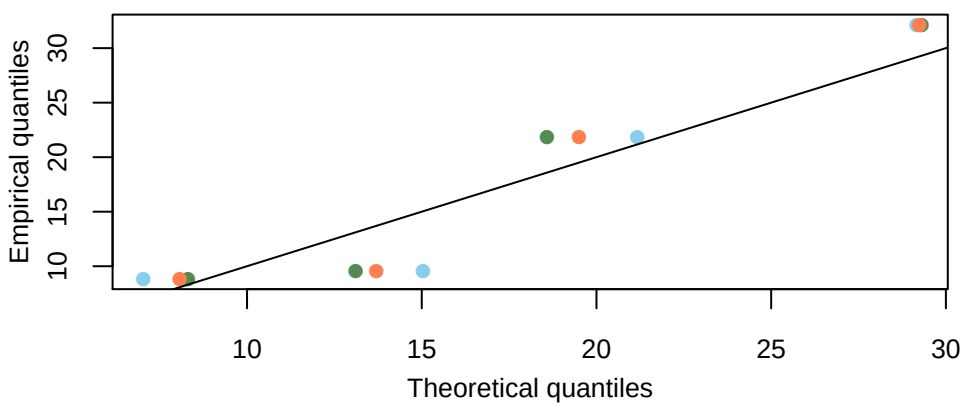
DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Arsenic

Media:
Marsh Sediment All Depths
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Cadmium

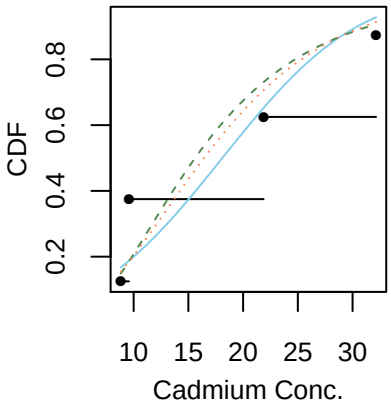
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

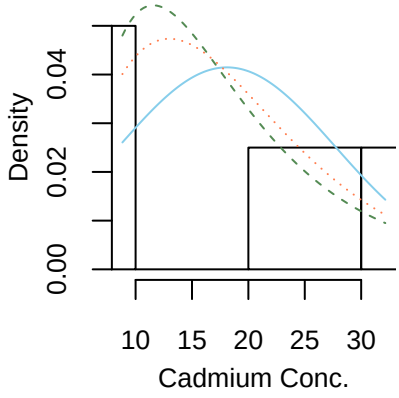


ECDF, Histogram & Q−Q (Detects Only)

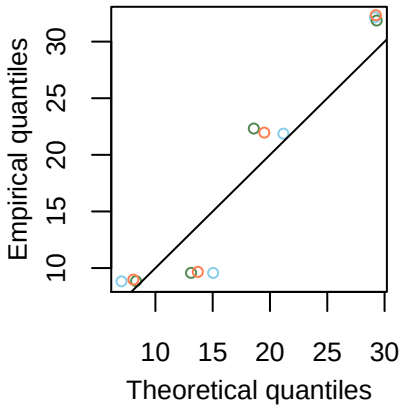
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 8 J	Arithmetic Mean = 18
N (detect) = 4	SD (log detect) = 0.63	Max (detect) = 32 J	Arithmetic SD = 11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.35	N<5	–	–	–	–	33.4617	32.2342
Lognormal	0.33	N<5	–	–	–	–	32.5182	31.2908
Gamma	–	–	NA	NA	NA	NA	32.6605	31.4331

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Cadmium

Media:
Marsh Sediment All Depths

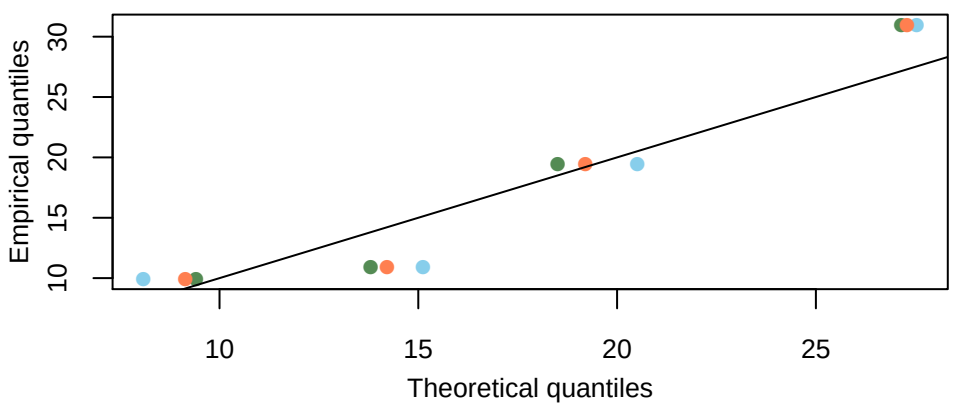
Exposure Unit:
Nevertouch Marsh

Chemical (mg/kg):
Cobalt

Legend

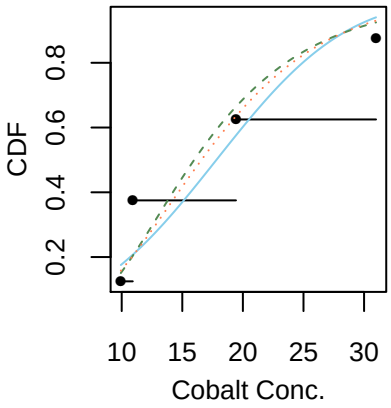
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

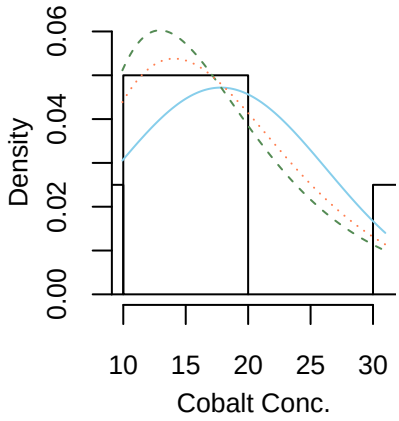


ECDF, Histogram & Q−Q (Detects Only)

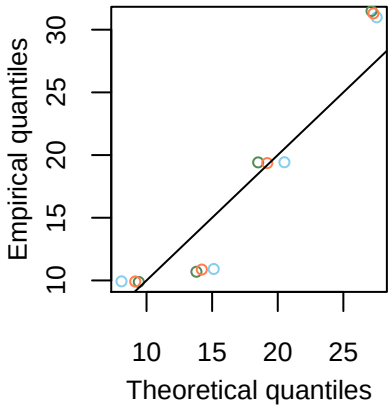
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 9 J	Arithmetic Mean = 18
N (detect) = 4	SD (log detect) = 0.53	Max (detect) = 31 J	Arithmetic SD = 9

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.35	N<5	–	–	–	–	32.4287	31.2013
Lognormal	0.48	N<5	–	–	–	–	31.3209	30.0935
Gamma	–	–	NA	NA	NA	NA	31.5559	30.3285

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Cobalt

Media:
Marsh Sediment All Depths

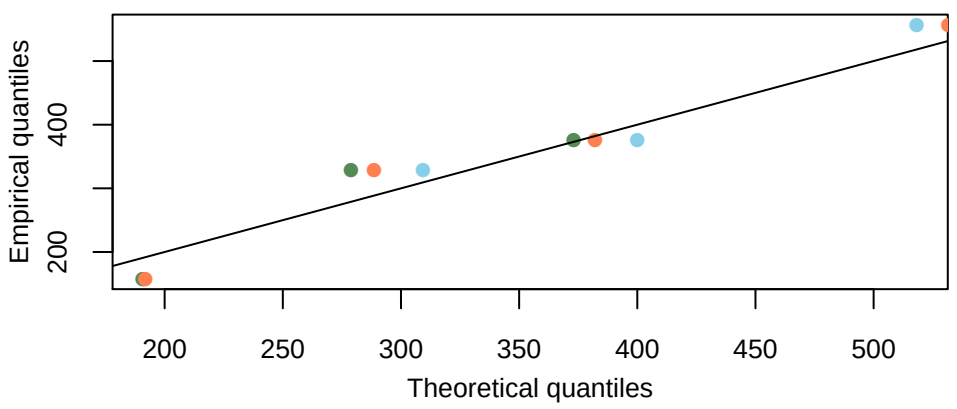
Exposure Unit:
Nevertouch Marsh

Chemical (mg/kg):
Copper

Legend

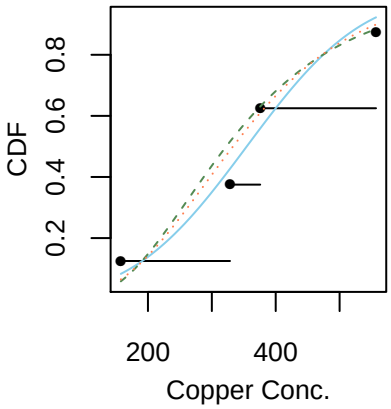
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

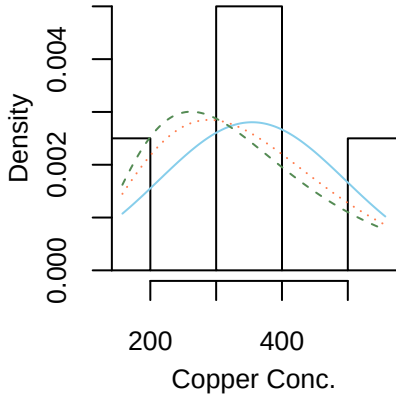


ECDF, Histogram & Q−Q (Detects Only)

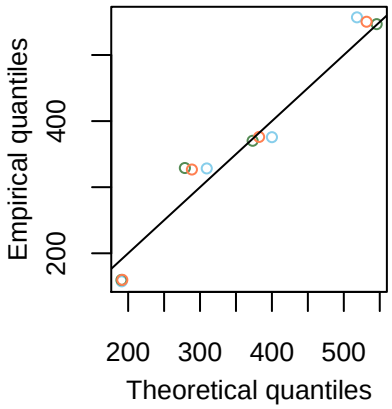
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 160 J	Arithmetic Mean = 350
N (detect) = 4	SD (log detect) = 0.53	Max (detect) = 560 J	Arithmetic SD = 160

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.93	N<5	–	–	–	–	55.011	53.7836
Lognormal	0.71	N<5	–	–	–	–	55.2974	54.07
Gamma	–	–	NA	NA	NA	NA	55.0363	53.8089

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Copper

Media:
Marsh Sediment All Depths

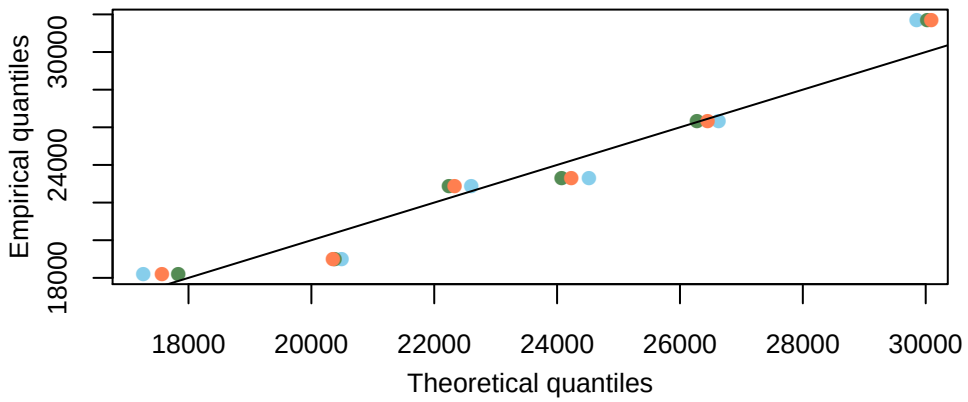
Exposure Unit:
Nevertouch Marsh

Chemical (mg/kg):
Iron

Legend

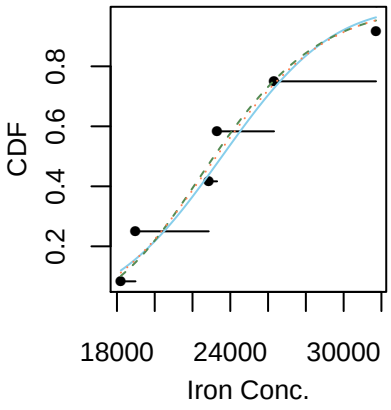
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

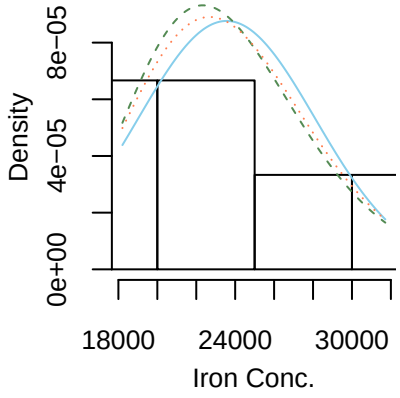


ECDF, Histogram & Q−Q (Detects Only)

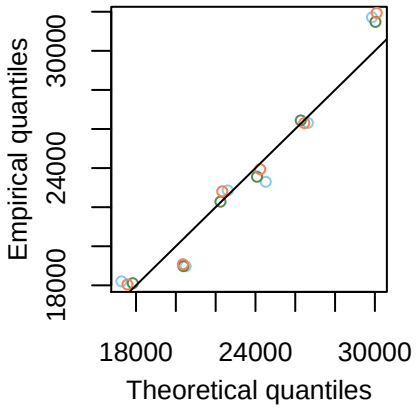
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 18,000 J	Arithmetic Mean = 24,000
N (detect) = 6	SD (log detect) = 0.21	Max (detect) = 32,000 J	Arithmetic SD = 5,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.62	0.73	–	–	–	–	122.105	121.688
Lognormal	0.76	0.88	–	–	–	–	121.586	121.17
Gamma	–	–	NA	NA	NA	NA	121.719	121.302

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Iron

Media:
Marsh Sediment All Depths

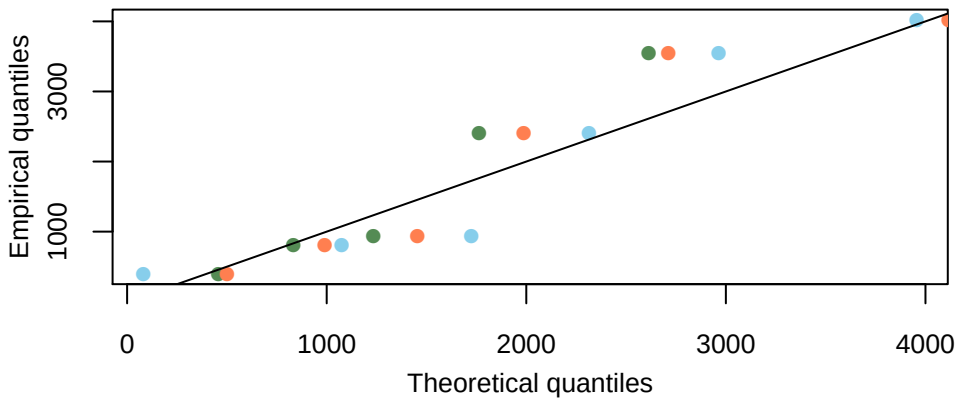
Exposure Unit:
Nevertouch Marsh

Chemical (mg/kg):
Manganese

Legend

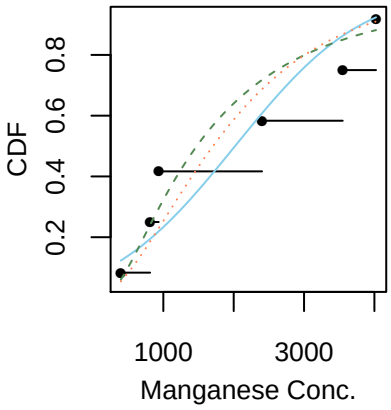
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

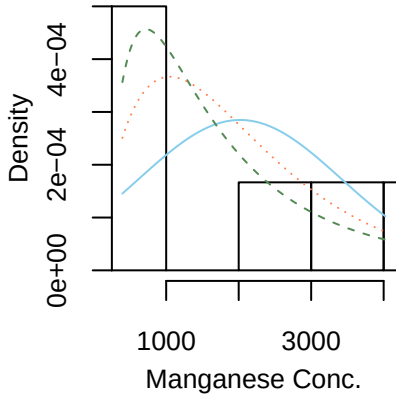


ECDF, Histogram & Q−Q (Detects Only)

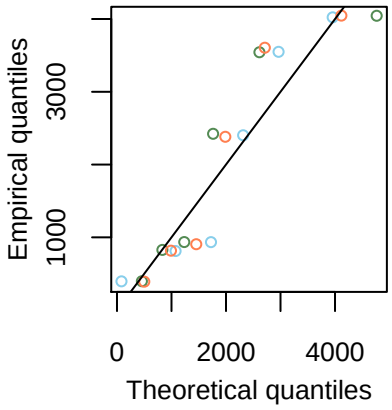
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 400 J	Arithmetic Mean = 2,000
N (detect) = 6	SD (log detect) = 0.93	Max (detect) = 4,000 J	Arithmetic SD = 1,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.3	0.23	–	–	–	–	107.965	107.548
Lognormal	0.48	0.63	–	–	–	–	106.603	106.186
Gamma	–	–	NA	NA	NA	NA	106.509	106.092

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Manganese

Media:
Marsh Sediment All Depths

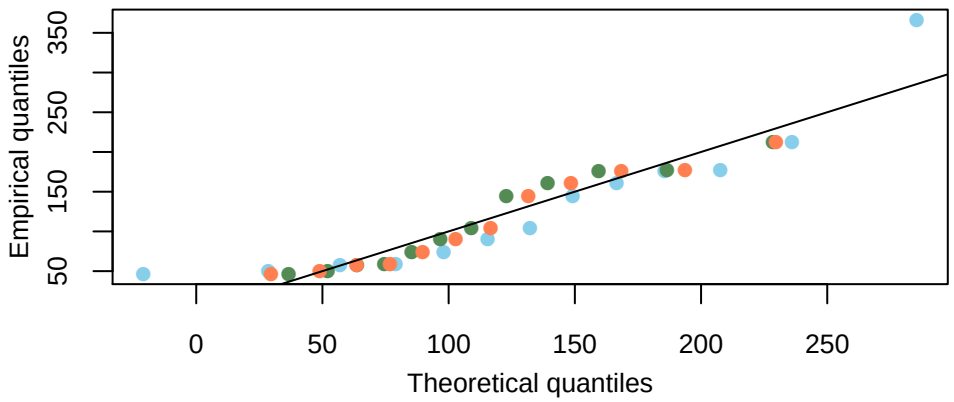
Exposure Unit:
Nevertouch Marsh

Chemical (mg/kg):
Mercury

Legend

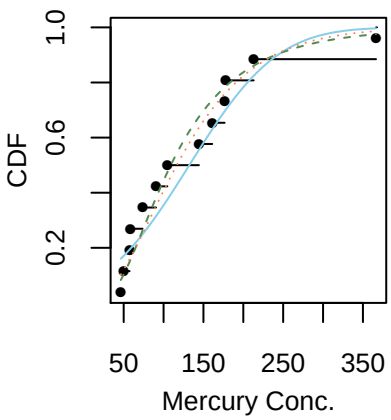
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

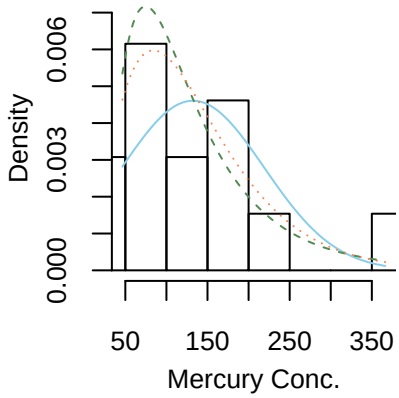


ECDF, Histogram & Q−Q (Detects Only)

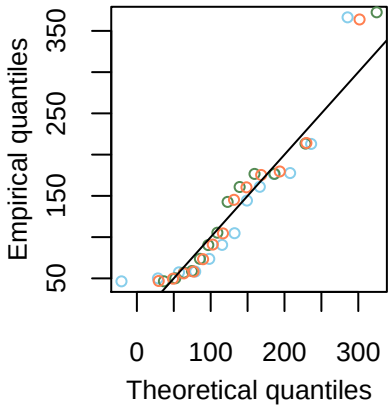
ECDF



Histogram



Q−Q



N = 13	FOD = 100%	Min (detect) = 46 J	Arithmetic Mean = 130
N (detect) = 13	SD (log detect) = 0.64	Max (detect) = 370 J	Arithmetic SD = 90

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.026	0.38	–	–	–	–	156.887	158.017
Lognormal	0.51	0.66	–	–	–	–	150.332	151.462
Gamma	–	–	0.1444	0.27	0.3677	0.736	151.338	152.468

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Mercury

Media:
Marsh Sediment All Depths

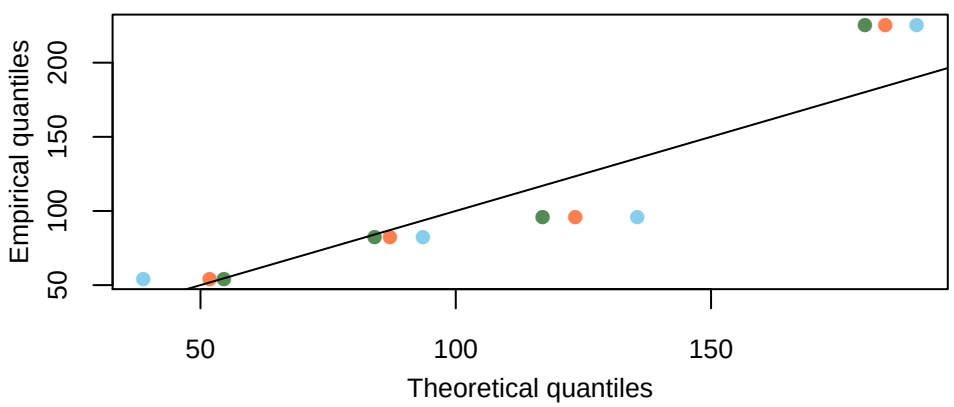
Exposure Unit:
Nevertouch Marsh

Chemical (mg/kg):
Nickel

Legend

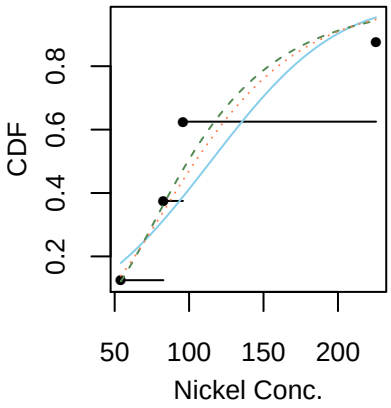
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

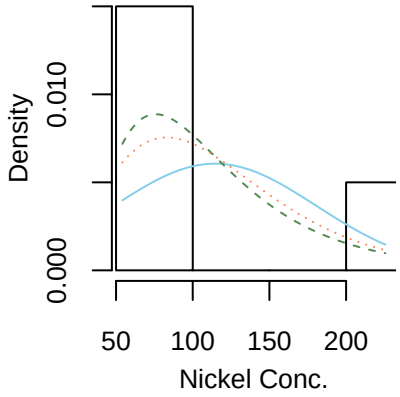


ECDF, Histogram & Q−Q (Detects Only)

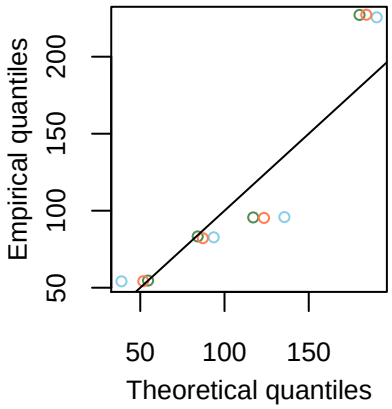
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 54 J	Arithmetic Mean = 110
N (detect) = 4	SD (log detect) = 0.6	Max (detect) = 230 J	Arithmetic SD = 76

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.17	N<5	–	–	–	–	48.8485	47.6211
Lognormal	0.65	N<5	–	–	–	–	46.8755	45.6481
Gamma	–	–	NA	NA	NA	NA	47.3386	46.1112

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Nickel

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **200**

Media:
Marsh Sediment All Depths
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 4	FOD = 75%	Min (detect) = 3 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 4 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Thallium

Media:
Marsh Sediment All Depths

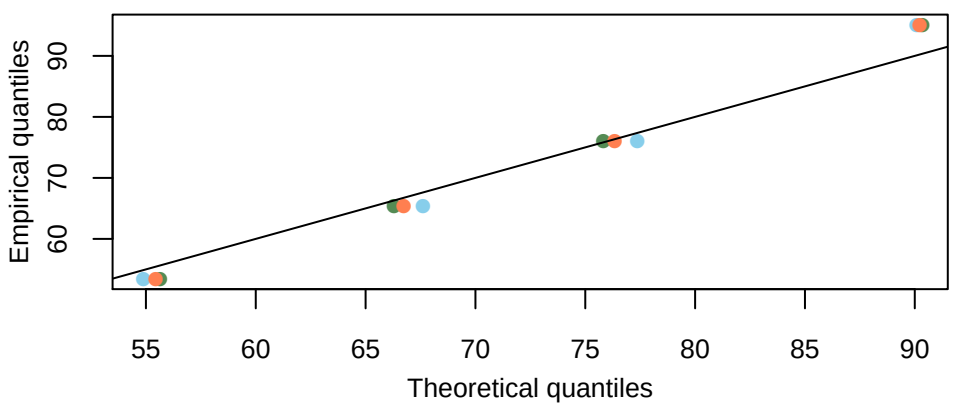
Exposure Unit:
Nevertouch Marsh

Chemical (mg/kg):
Vanadium

Legend

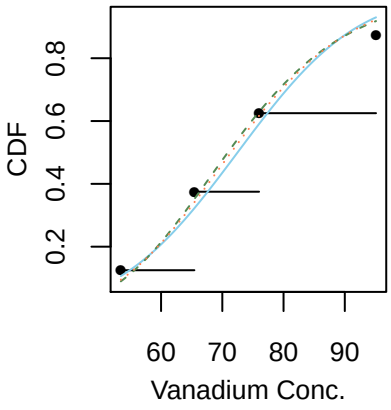
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

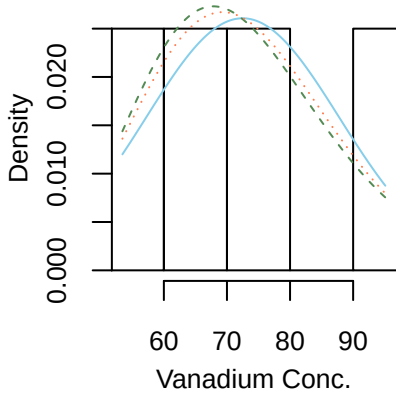


ECDF, Histogram & Q−Q (Detects Only)

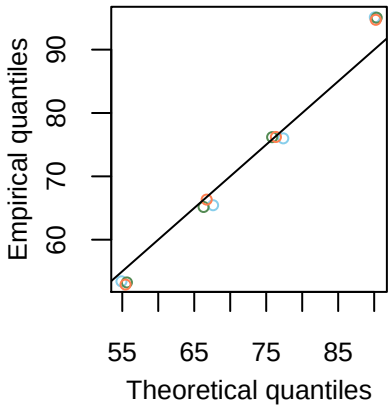
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 53 J	Arithmetic Mean = 72
N (detect) = 4	SD (log detect) = 0.24	Max (detect) = 95 J	Arithmetic SD = 18

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.94	N<5	–	–	–	–	37.1751	35.9477
Lognormal	1	N<5	–	–	–	–	36.9821	35.7546
Gamma	–	–	NA	NA	NA	NA	37.0118	35.7844

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Vanadium

Media:
Marsh Sediment All Depths

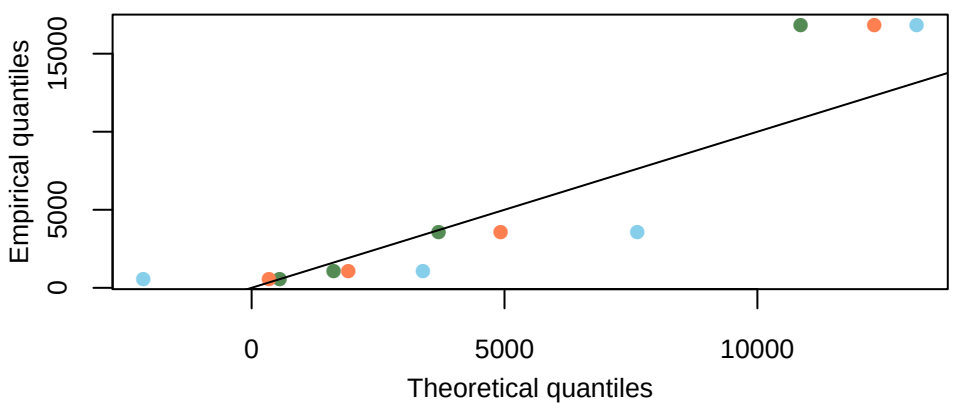
Exposure Unit:
Nevertouch Marsh

Chemical (mg/kg):
Zinc

Legend

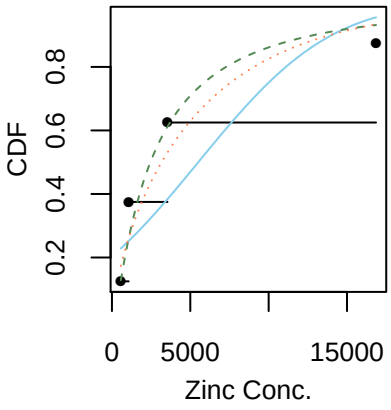
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

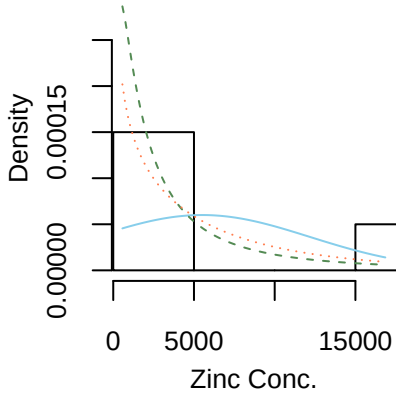


ECDF, Histogram & Q−Q (Detects Only)

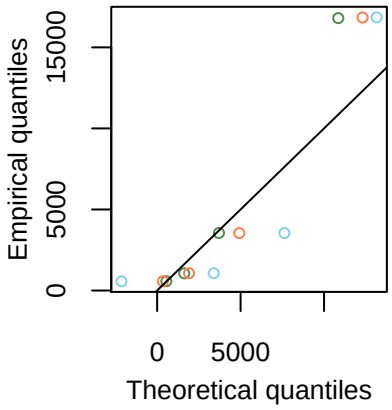
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 570 J	Arithmetic Mean = 5,500
N (detect) = 4	SD (log detect) = 1.5	Max (detect) = 17,000 J	Arithmetic SD = 7,700

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.05	N<5	–	–	–	–	85.7655	84.5381
Lognormal	0.77	N<5	–	–	–	–	79.8459	78.6185
Gamma	–	–	NA	NA	NA	NA	80.6608	79.4334

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Zinc

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **203**

Media:
Marsh Sediment All Depths
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Benzo[a]pyrene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 0.11 J	Arithmetic Mean = 0.13
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.14 J	Arithmetic SD = 0.024

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Benzo[a]pyren

Media:
Marsh Sediment All Depths
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 0.012 J	Arithmetic Mean = 0.017
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.022 J	Arithmetic SD = 0.007

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Dibenz[a,h]anthracene

Media:
Marsh Sediment All Depths
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 50%	Min (detect) = 0.26 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.26 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Aldrin

Media:
Marsh Sediment All Depths
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 50%	Min (detect) = 0.21 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.21 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Heptachlor

Media:
Marsh Sediment All Depths
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 0.009 J	Arithmetic Mean = 0.15
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.29 J	Arithmetic SD = 0.2

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Heptachlor Epo

Media:
Marsh Sediment All Depths

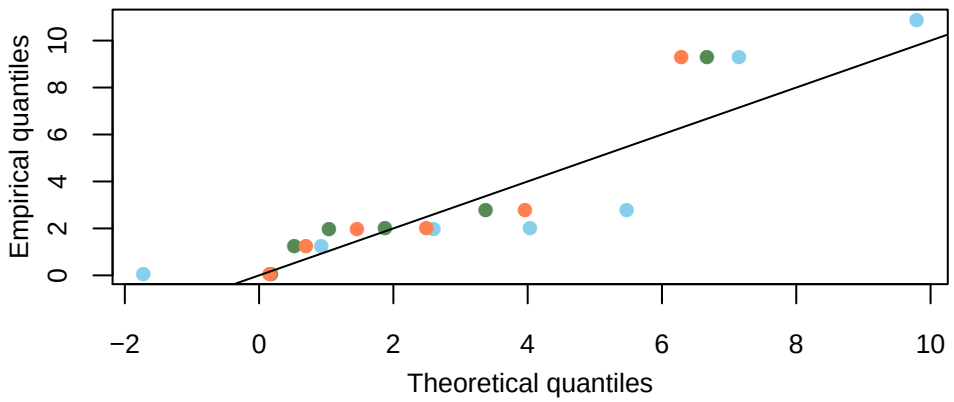
Exposure Unit:
Nevertouch Marsh

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

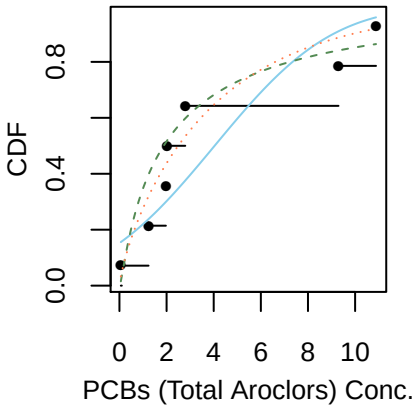
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

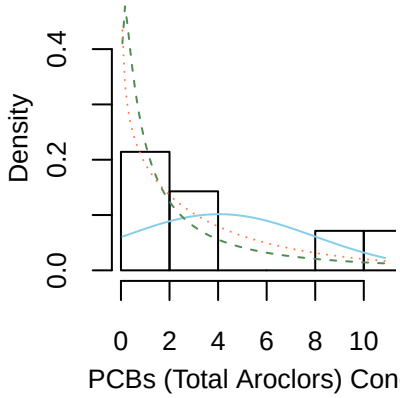


ECDF, Histogram & Q−Q (Detects Only)

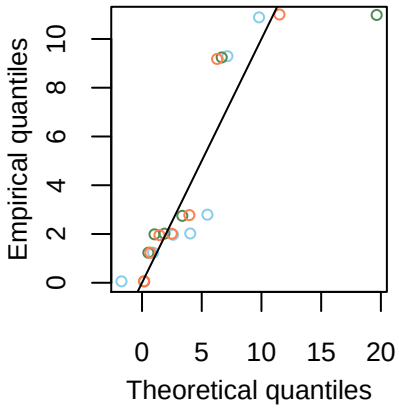
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 0.059 J	Arithmetic Mean = 4
N (detect) = 7	SD (log detect) = 1.7	Max (detect) = 11 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.042	0.021	–	–	–	–	43.027	42.9188
Lognormal	0.13	0.16	–	–	–	–	39.2797	39.1715
Gamma	–	–	NA	NA	NA	NA	37.2166	37.1084

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−PCBs (Total Aroclors)

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **209**

Media:
Marsh Sediment All Depths
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Nevertouch Marsh−Trichloroethen

Media:
Marsh Sediment All Depths

Exposure Unit:
Eight Day Swamp

Chemical (mg/kg):
Aluminum

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 9,600 J	Arithmetic Mean = 11,000
N (detect) = 2	SD (log detect) = 0	Max (detect) = 13,000 J	Arithmetic SD = 2,400

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Aluminum

Media:
Marsh Sediment All Depths
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 2
N (detect) = 2	SD (log detect) = 0	Max (detect) = 2 J	Arithmetic SD = 0.091

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Antimony

Media:
Marsh Sediment All Depths
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Arsenic

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 34 J	Arithmetic Mean = 38
N (detect) = 2	SD (log detect) = 0	Max (detect) = 41 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Arsenic

Media:
Marsh Sediment All Depths
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Cadmium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 11 J	Arithmetic Mean = 13
N (detect) = 2	SD (log detect) = 0	Max (detect) = 16 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Cadmium

Media:
Marsh Sediment All Depths
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Cobalt

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 17 J	Arithmetic Mean = 20
N (detect) = 2	SD (log detect) = 0	Max (detect) = 24 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Cobalt

Media:
Marsh Sediment All Depths

Exposure Unit:
Eight Day Swamp

Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 300 J	Arithmetic Mean = 440
N (detect) = 2	SD (log detect) = 0	Max (detect) = 580 J	Arithmetic SD = 190

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Copper

Media:
Marsh Sediment All Depths

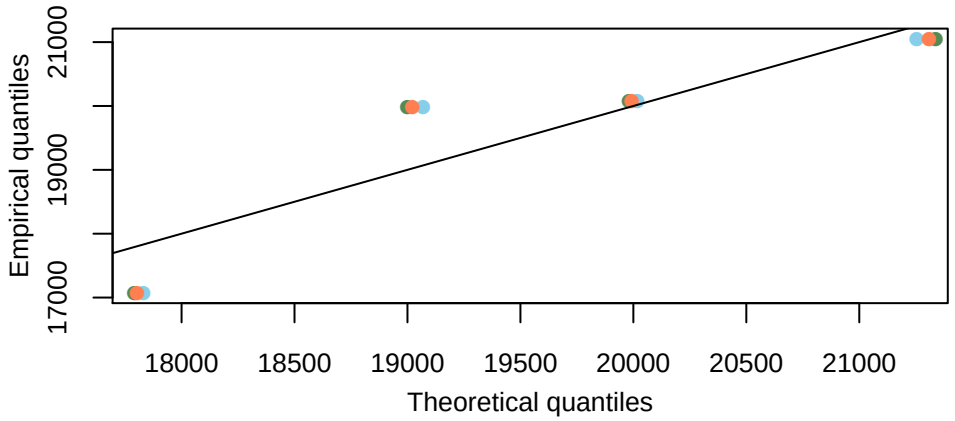
Exposure Unit:
Eight Day Swamp

Chemical (mg/kg):
Iron

Legend

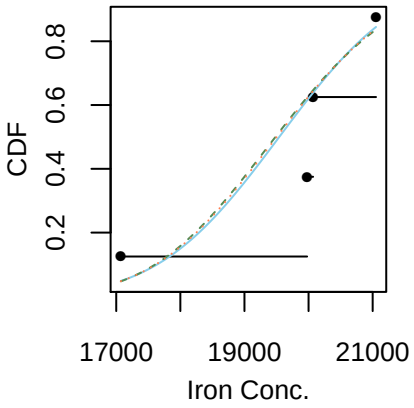
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

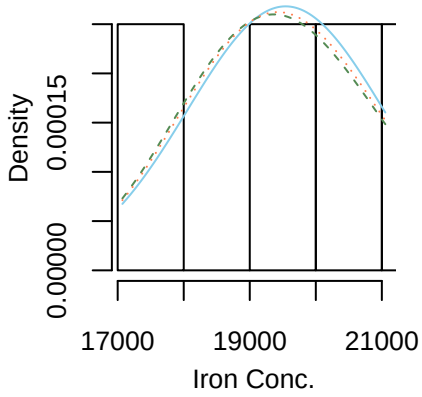


ECDF, Histogram & Q−Q (Detects Only)

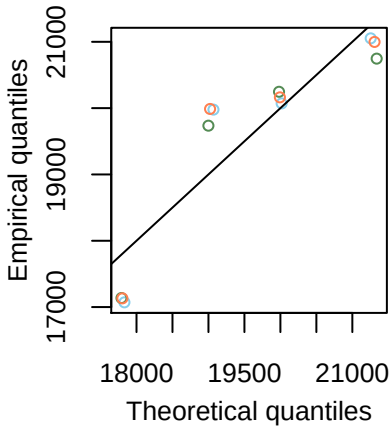
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 17,000 J	Arithmetic Mean = 20,000
N (detect) = 4	SD (log detect) = 0.091	Max (detect) = 21,000 J	Arithmetic SD = 1,700

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.24	N<5	–	–	–	–	73.7927	72.5653
Lognormal	0.2	N<5	–	–	–	–	74.066	72.8386
Gamma	–	–	NA	NA	NA	NA	73.9711	72.7437

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Iron

Media:
Marsh Sediment All Depths

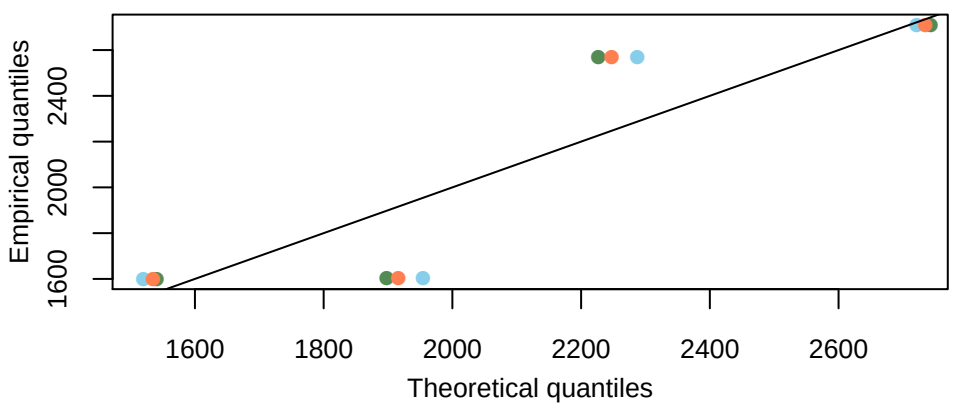
Exposure Unit:
Eight Day Swamp

Chemical (mg/kg):
Manganese

Legend

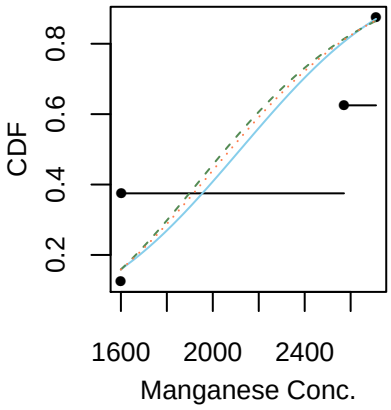
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

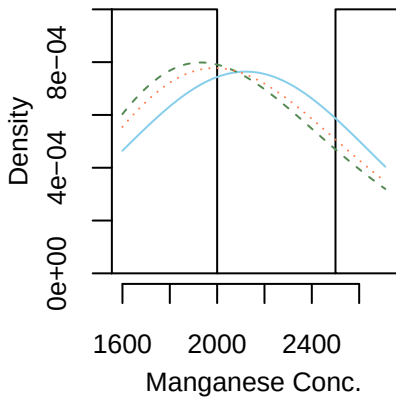


ECDF, Histogram & Q−Q (Detects Only)

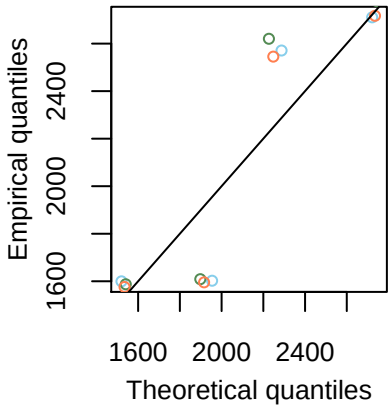
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 1,600 J	Arithmetic Mean = 2,100
N (detect) = 4	SD (log detect) = 0.29	Max (detect) = 2,700 J	Arithmetic SD = 600

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.076	N<5	–	–	–	–	65.4165	64.1891
Lognormal	0.063	N<5	–	–	–	–	65.3126	64.0852
Gamma	–	–	NA	NA	NA	NA	65.3185	64.0911

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Manganese

Media:
Marsh Sediment All Depths

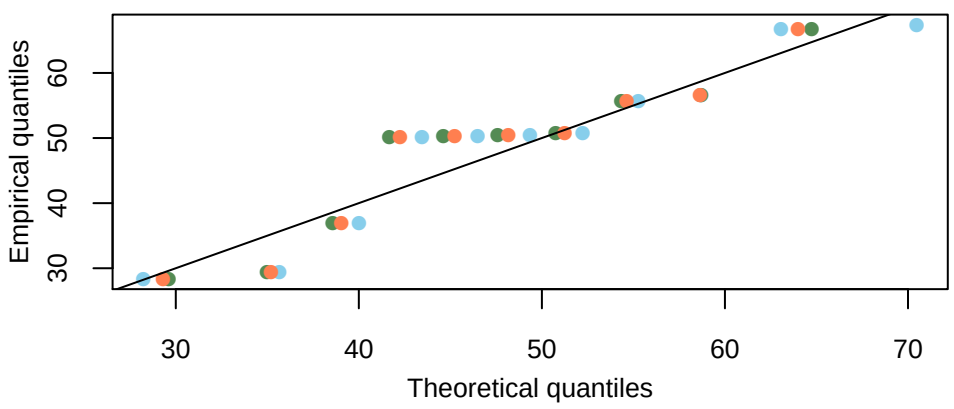
Exposure Unit:
Eight Day Swamp

Chemical (mg/kg):
Mercury

Legend

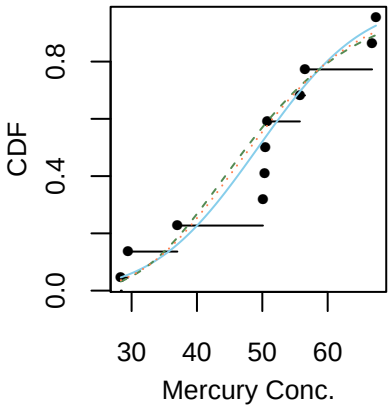
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

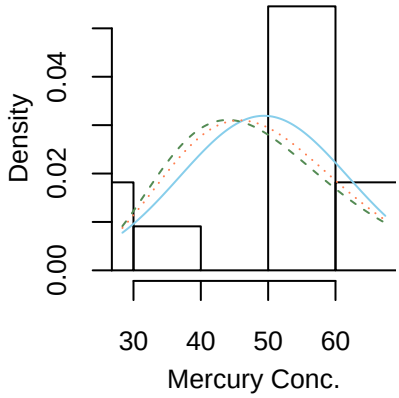


ECDF, Histogram & Q−Q (Detects Only)

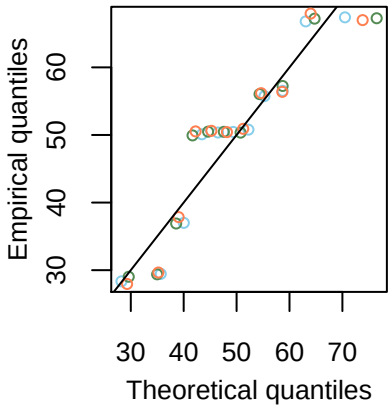
ECDF



Histogram



Q−Q



N = 11	FOD = 100%	Min (detect) = 28 J	Arithmetic Mean = 49
N (detect) = 11	SD (log detect) = 0.29	Max (detect) = 67 J	Arithmetic SD = 13

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.24	0.054	–	–	–	–	90.7729	91.5687
Lognormal	0.078	0.0076	–	–	–	–	92.2368	93.0326
Gamma	–	–	0.285	0.267	0.6228	0.725	91.572	92.3678

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Mercury

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **219**

Media:
Marsh Sediment All Depths

Exposure Unit:
Eight Day Swamp

Chemical (mg/kg):
Nickel

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 130 J	Arithmetic Mean = 160
N (detect) = 2	SD (log detect) = 0	Max (detect) = 180 J	Arithmetic SD = 34

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Nickel

Media:
Marsh Sediment All Depths

Exposure Unit:
Eight Day Swamp

Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 3 J	Arithmetic Mean = 4
N (detect) = 2	SD (log detect) = 0	Max (detect) = 5 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Thallium

Media:
Marsh Sediment All Depths

Exposure Unit:
Eight Day Swamp

Chemical (mg/kg):
Vanadium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 74 J	Arithmetic Mean = 75
N (detect) = 2	SD (log detect) = 0	Max (detect) = 75 J	Arithmetic SD = 0.81

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Vanadium

Media:
Marsh Sediment All Depths

Exposure Unit:
Eight Day Swamp

Chemical (mg/kg):
Zinc

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 1,200 J	Arithmetic Mean = 1,300
N (detect) = 2	SD (log detect) = 0	Max (detect) = 1,400 J	Arithmetic SD = 110

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Zinc

Media:
Marsh Sediment All Depths
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Benzo[a]pyrene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 0.13 J	Arithmetic Mean = 0.16
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.18 J	Arithmetic SD = 0.034

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Benzo[a]pyrene

Media:
Marsh Sediment All Depths
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 0.012 J	Arithmetic Mean = 0.021
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.03 J	Arithmetic SD = 0.013

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Dibenz[a,h]anthracene

Media:
Marsh Sediment All Depths
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 0.013 J	Arithmetic Mean = 0.017
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.02 J	Arithmetic SD = 0.0052

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Aldrin

Media:
Marsh Sediment All Depths
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 50%	Min (detect) = 0.012 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.012 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Heptachlor

Media:
Marsh Sediment All Depths

Exposure Unit:
Eight Day Swamp

Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.016 J	Arithmetic Mean = 0.016
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.016 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Heptachlor Epo

Media:
Marsh Sediment All Depths

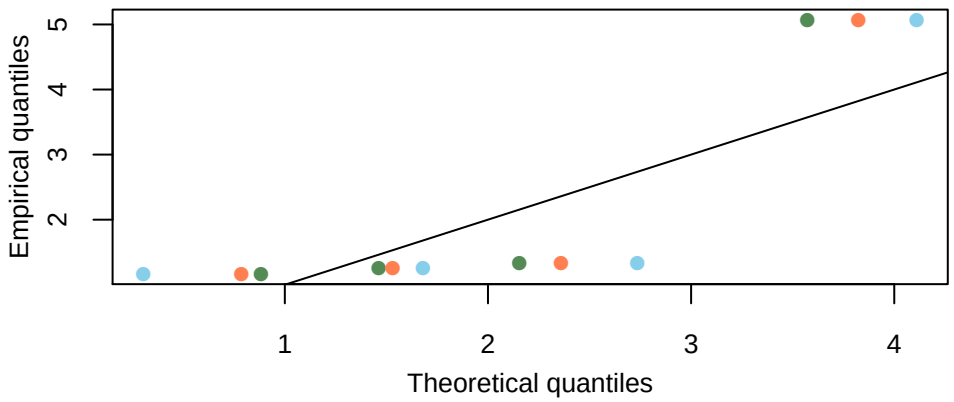
Exposure Unit:
Eight Day Swamp

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

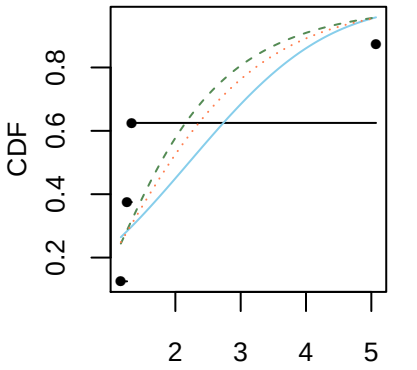
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

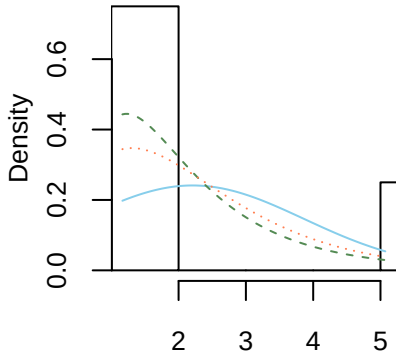


ECDF, Histogram & Q−Q (Detects Only)

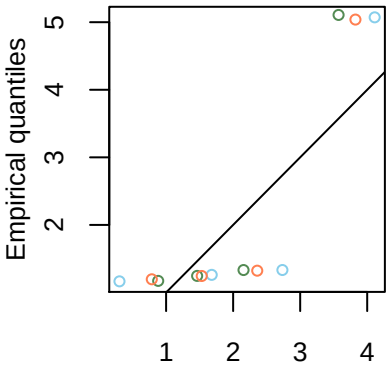
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 2
N (detect) = 4	SD (log detect) = 0.7	Max (detect) = 5 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0041	N<5	–	–	–	–	19.38	18.1526
Lognormal	0.013	N<5	–	–	–	–	15.962	14.7346
Gamma	–	–	NA	NA	NA	NA	16.9024	15.675

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−PCBs (Total Aroclors)

Media:
Marsh Sediment All Depths
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Eight Day Swamp−Trichloroethene

Media:
Marsh Sediment All Depths

Exposure Unit:
Paterson Plank Marsh

Chemical (mg/kg):
Aluminum

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 11,000 J	Arithmetic Mean = 11,000
N (detect) = 1	SD (log detect) = 0	Max (detect) = 11,000 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−Aluminum

Media:
Marsh Sediment All Depths
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 3 J	Arithmetic Mean = 3
N (detect) = 1	SD (log detect) = 0	Max (detect) = 3 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−Antimony

Media:
Marsh Sediment All Depths
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Arsenic

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 40 J	Arithmetic Mean = 40
N (detect) = 1	SD (log detect) = 0	Max (detect) = 40 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−Arsenic

Media:
Marsh Sediment All Depths
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Cadmium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 8 J	Arithmetic Mean = 8
N (detect) = 1	SD (log detect) = 0	Max (detect) = 8 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−Cadmium

Media:
Marsh Sediment All Depths

Exposure Unit:
Paterson Plank Marsh

Chemical (mg/kg):
Cobalt

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 39 J	Arithmetic Mean = 39
N (detect) = 1	SD (log detect) = 0	Max (detect) = 39 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−Cobalt

Media:
Marsh Sediment All Depths
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 230 J	Arithmetic Mean = 230
N (detect) = 1	SD (log detect) = 0	Max (detect) = 230 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−Copper

Media:
Marsh Sediment All Depths
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 22,000 J	Arithmetic Mean = 23,000
N (detect) = 2	SD (log detect) = 0	Max (detect) = 25,000 J	Arithmetic SD = 2,100

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−Iron

Media:
Marsh Sediment All Depths

Exposure Unit:
Paterson Plank Marsh

Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 1,100 J	Arithmetic Mean = 4,000
N (detect) = 2	SD (log detect) = 0	Max (detect) = 6,900 J	Arithmetic SD = 4,100

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−Manganese

Media:
Marsh Sediment All Depths

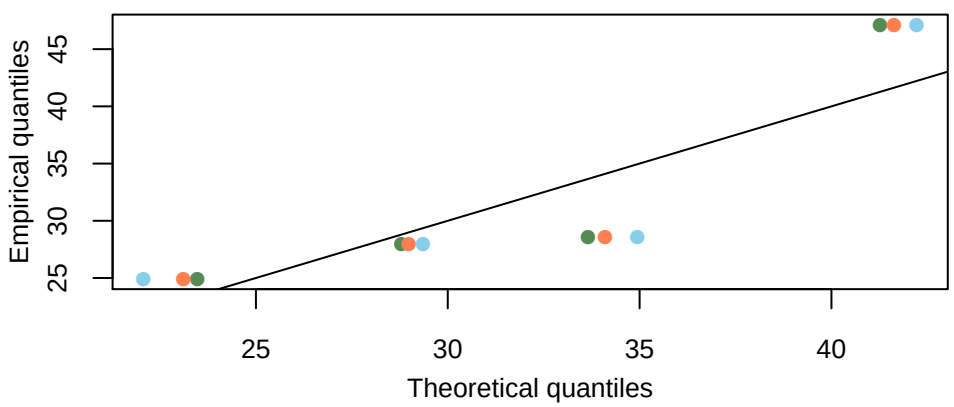
Exposure Unit:
Paterson Plank Marsh

Chemical (mg/kg):
Mercury

Legend

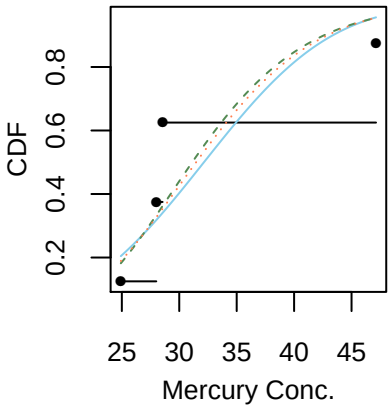
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

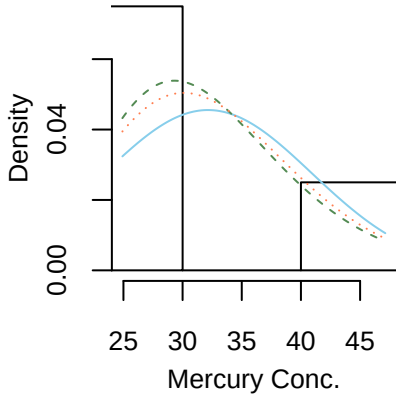


ECDF, Histogram & Q−Q (Detects Only)

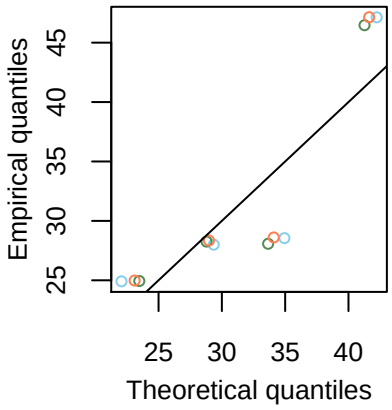
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 25 J	Arithmetic Mean = 32
N (detect) = 4	SD (log detect) = 0.28	Max (detect) = 47 J	Arithmetic SD = 10

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.057	N<5	–	–	–	–	32.7139	31.4864
Lognormal	0.12	N<5	–	–	–	–	31.6087	30.3813
Gamma	–	–	NA	NA	NA	NA	31.9434	30.716

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−Mercury

Media:
Marsh Sediment All Depths

Exposure Unit:
Paterson Plank Marsh

Chemical (mg/kg):
Nickel

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 200 J	Arithmetic Mean = 200
N (detect) = 1	SD (log detect) = 0	Max (detect) = 200 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−Nickel

Media:
Marsh Sediment All Depths
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 5 J	Arithmetic Mean = 5
N (detect) = 1	SD (log detect) = 0	Max (detect) = 5 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−Thallium

Media:
Marsh Sediment All Depths

Exposure Unit:
Paterson Plank Marsh

Chemical (mg/kg):
Vanadium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 91 J	Arithmetic Mean = 91
N (detect) = 1	SD (log detect) = 0	Max (detect) = 91 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−Vanadium

Media:
Marsh Sediment All Depths
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Zinc

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 1,300 J	Arithmetic Mean = 1,300
N (detect) = 1	SD (log detect) = 0	Max (detect) = 1,300 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−Zinc

Media:
Marsh Sediment All Depths
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 2
N (detect) = 2	SD (log detect) = 0	Max (detect) = 3 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Paterson Plank Marsh−PCBs (Total Aroclors)

Media:
Marsh Sediment All Depths

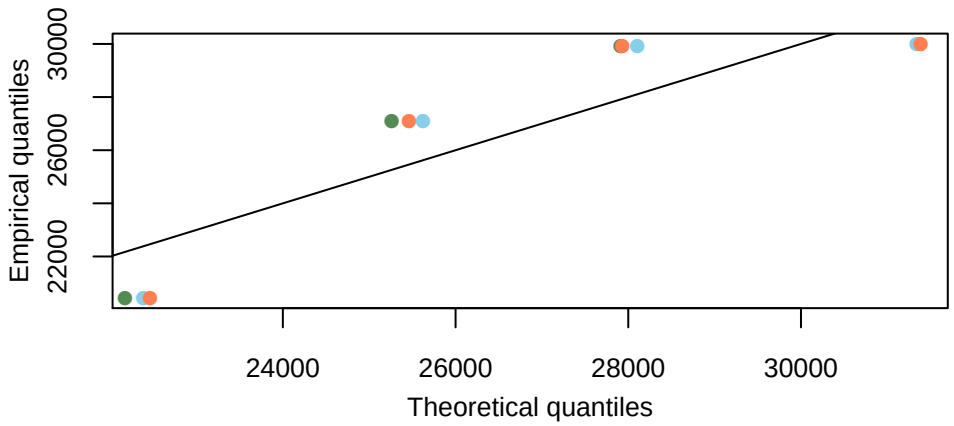
Exposure Unit:
UPIC Marsh

Chemical (mg/kg):
Iron

Legend

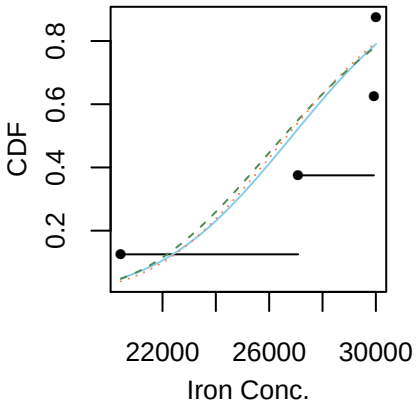
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

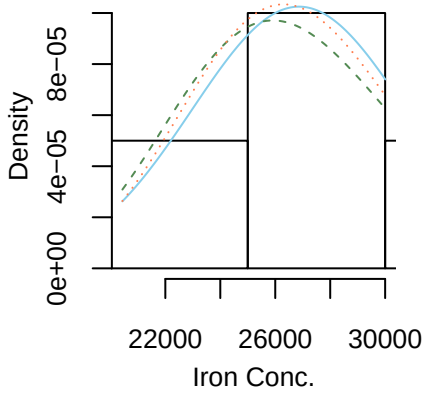


ECDF, Histogram & Q−Q (Detects Only)

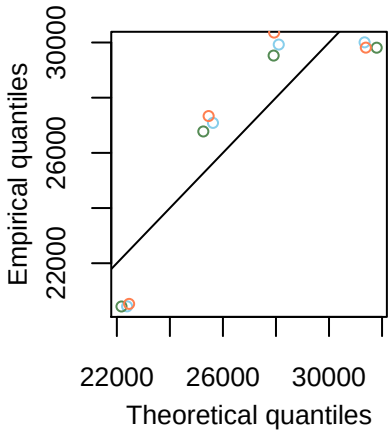
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 20,000 J	Arithmetic Mean = 27,000
N (detect) = 4	SD (log detect) = 0.18	Max (detect) = 30,000 J	Arithmetic SD = 4,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.14	N<5	–	–	–	–	81.4858	80.2583
Lognormal	0.11	N<5	–	–	–	–	82.0175	80.7901
Gamma	–	–	NA	NA	NA	NA	81.8479	80.6205

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Upper Peach Island Creek Marsh−I

Media:
Marsh Sediment All Depths

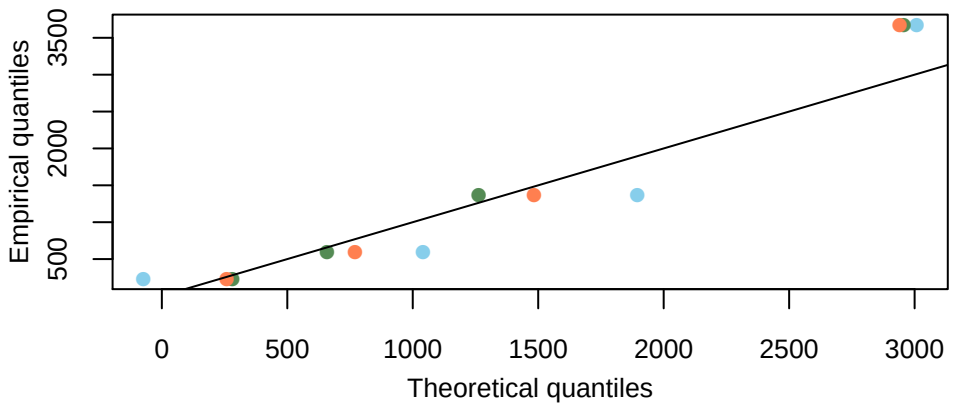
Exposure Unit:
UPIC Marsh

Chemical (mg/kg):
Manganese

Legend

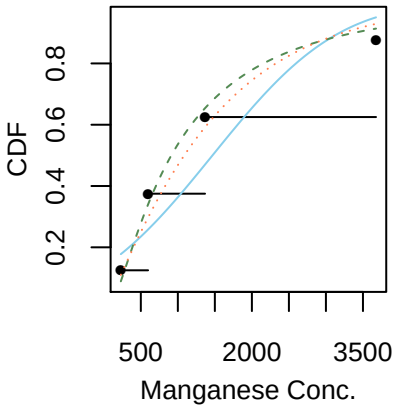
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

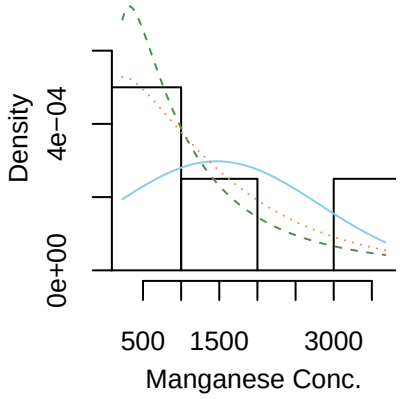


ECDF, Histogram & Q−Q (Detects Only)

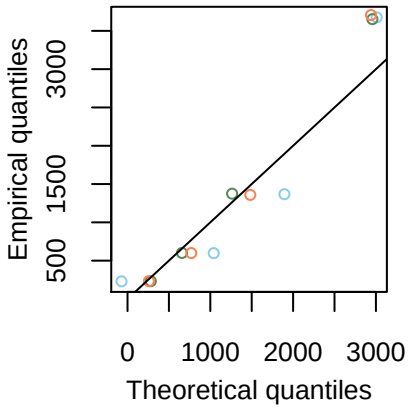
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 230 J	Arithmetic Mean = 1,500
N (detect) = 4	SD (log detect) = 1.2	Max (detect) = 3,700 J	Arithmetic SD = 1,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.29	N<5	–	–	–	–	72.9524	71.725
Lognormal	0.99	N<5	–	–	–	–	70.0552	68.8278
Gamma	–	–	NA	NA	NA	NA	70.2621	69.0347

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Upper Peach Island Creek Marsh−Manganese

Media:
Marsh Sediment All Depths

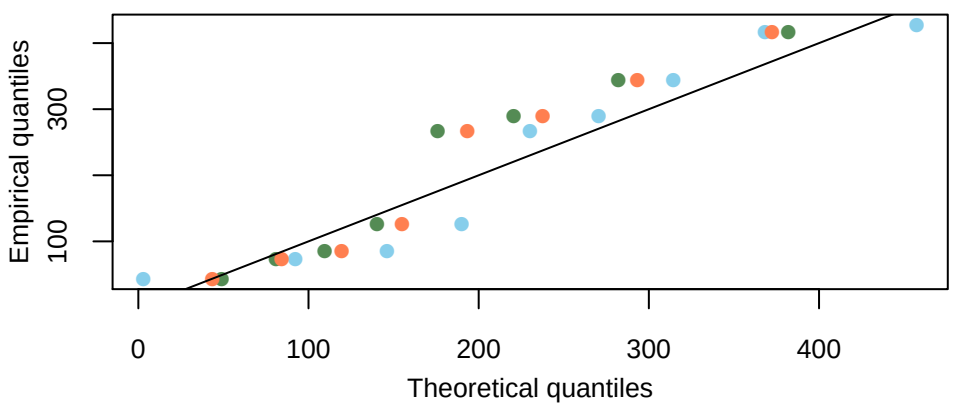
Exposure Unit:
UPIC Marsh

Chemical (mg/kg):
Mercury

Legend

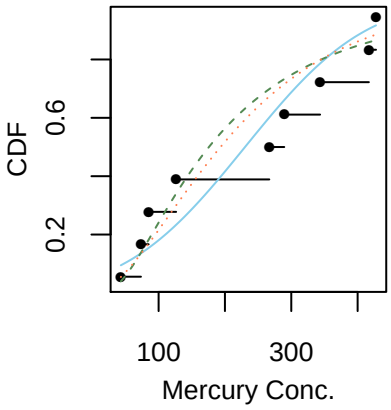
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

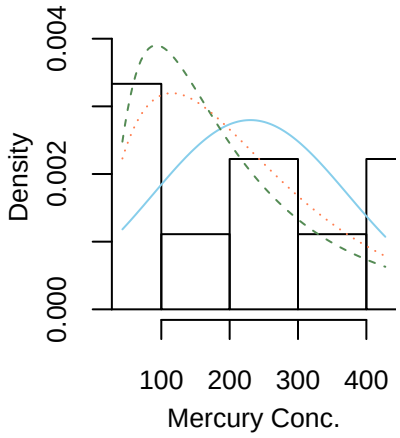


ECDF, Histogram & Q−Q (Detects Only)

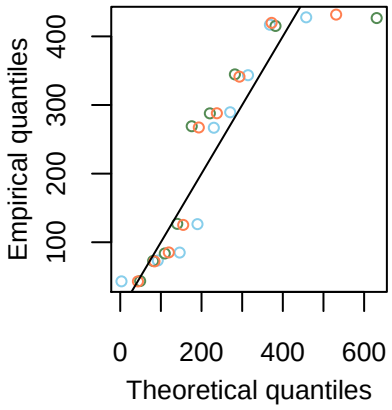
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 43 J	Arithmetic Mean = 230
N (detect) = 9	SD (log detect) = 0.85	Max (detect) = 430	Arithmetic SD = 150

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.22	0.39	–	–	–	–	118.824	119.218
Lognormal	0.2	0.13	–	–	–	–	118.618	119.013
Gamma	–	–	0.2288	0.282	0.4703	0.73	117.807	118.201

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Upper Peach Island Creek Marsh−Mercury

Media:
Marsh Sediment All Depths

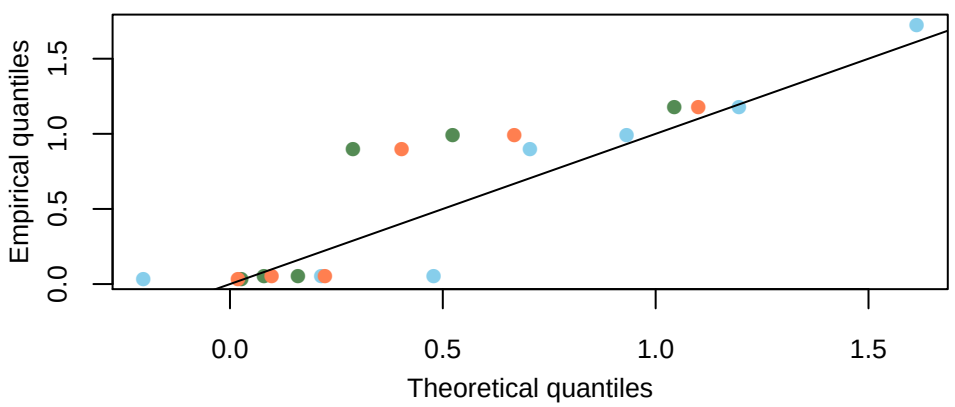
Exposure Unit:
UPIC Marsh

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

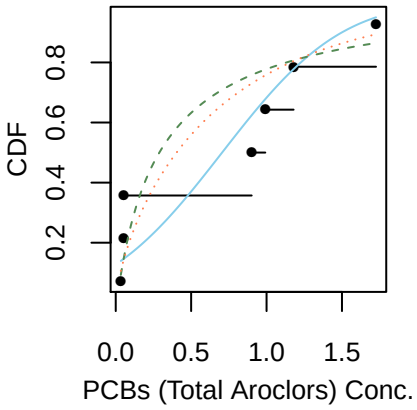
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

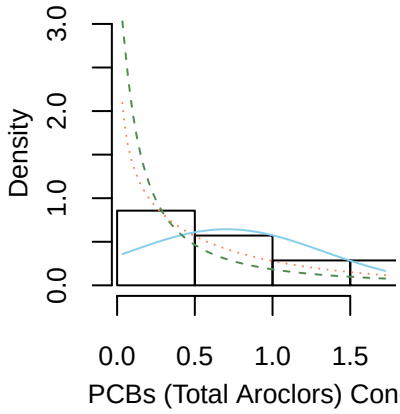


ECDF, Histogram & Q−Q (Detects Only)

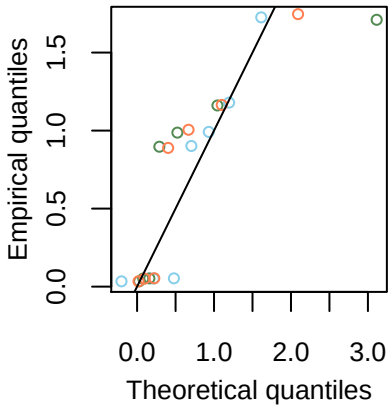
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 0.034 J	Arithmetic Mean = 0.71
N (detect) = 7	SD (log detect) = 1.8	Max (detect) = 1 J	Arithmetic SD = 0.67

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.18	0.15	–	–	–	–	17.1709	17.0627
Lognormal	0.031	0.037	–	–	–	–	13.2665	13.1584
Gamma	–	–	NA	NA	NA	NA	12.3113	12.2031

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Upper Peach Island Creek Marsh−PCBs (Total Aroclors)

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **248**

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Aluminum

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 6,900 J	Arithmetic Mean = 7,900
N (detect) = 3	SD (log detect) = 0	Max (detect) = 8,500 J	Arithmetic SD = 920

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Aluminum

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 3 J	Arithmetic Mean = 4
N (detect) = 3	SD (log detect) = 0	Max (detect) = 5 J	Arithmetic SD = 0.87

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Antimony

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Arsenic

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 24 J	Arithmetic Mean = 37
N (detect) = 3	SD (log detect) = 0	Max (detect) = 47 J	Arithmetic SD = 12

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Arsenic

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Cadmium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 4 J	Arithmetic Mean = 6
N (detect) = 3	SD (log detect) = 0	Max (detect) = 11 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Cadmium

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Cobalt

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 13 J	Arithmetic Mean = 24
N (detect) = 3	SD (log detect) = 0	Max (detect) = 38 J	Arithmetic SD = 13

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Cobalt

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 110 J	Arithmetic Mean = 140
N (detect) = 3	SD (log detect) = 0	Max (detect) = 190 J	Arithmetic SD = 38

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Copper

Media:
Marsh Sediment All Depths

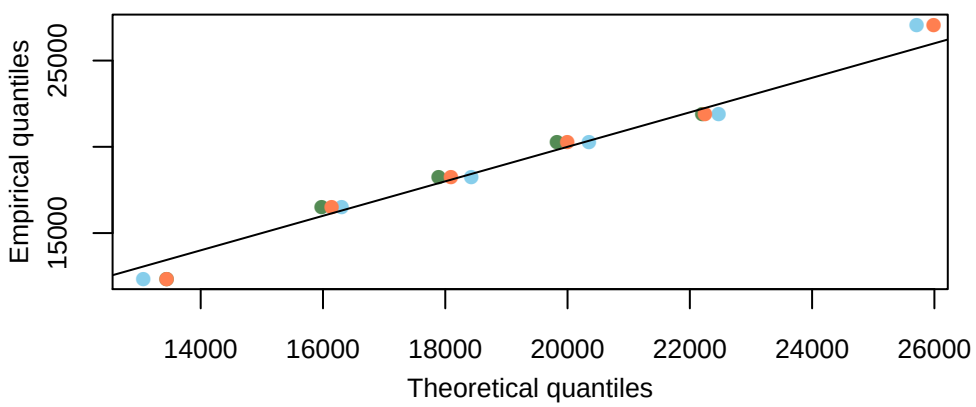
Exposure Unit:
Walden Swamp

Chemical (mg/kg):
Iron

Legend

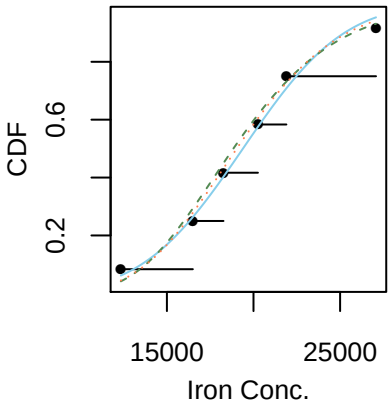
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

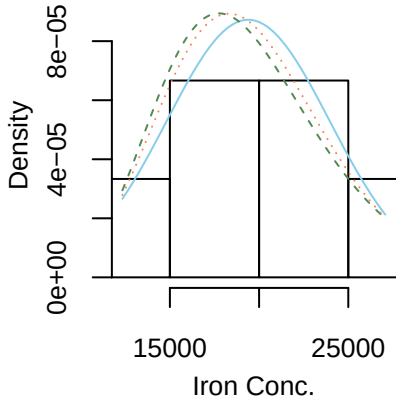


ECDF, Histogram & Q−Q (Detects Only)

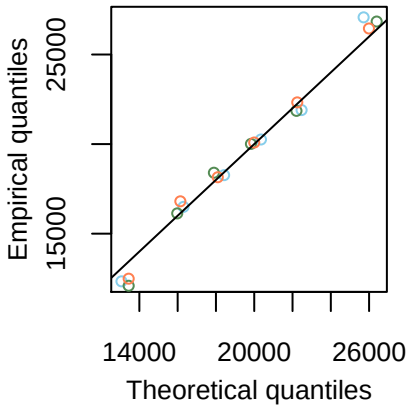
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 12,000 J	Arithmetic Mean = 19,000
N (detect) = 6	SD (log detect) = 0.27	Max (detect) = 27,000 J	Arithmetic SD = 5,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1	0.97	–	–	–	–	122.162	121.745
Lognormal	0.98	0.96	–	–	–	–	122.221	121.805
Gamma	–	–	NA	NA	NA	NA	122.114	121.698

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Iron

Media:
Marsh Sediment All Depths

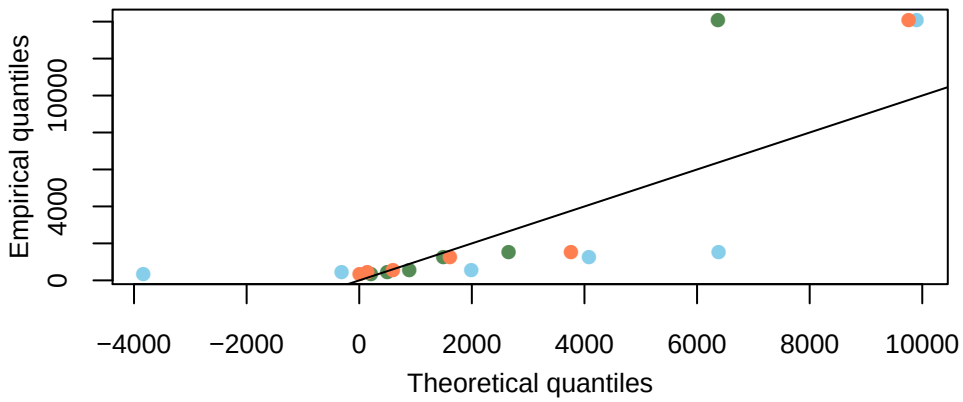
Exposure Unit:
Walden Swamp

Chemical (mg/kg):
Manganese

Legend

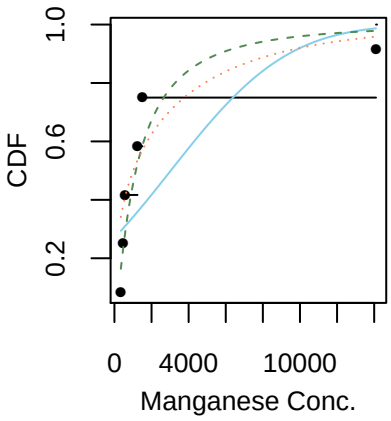
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

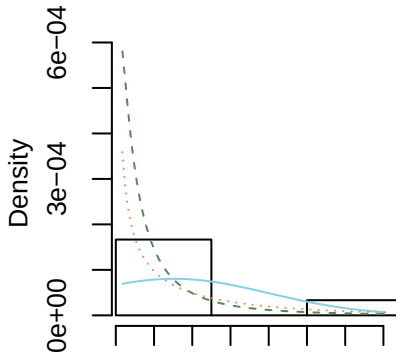


ECDF, Histogram & Q−Q (Detects Only)

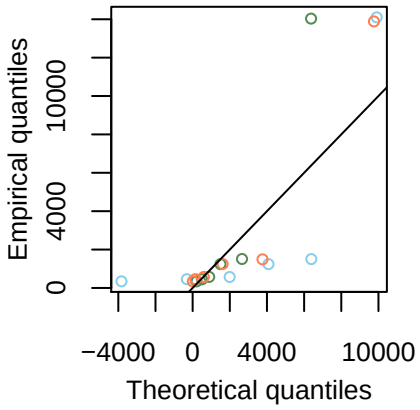
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 340 J	Arithmetic Mean = 3,000
N (detect) = 6	SD (log detect) = 1.4	Max (detect) = 14,000 J	Arithmetic SD = 5,400

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00021	0.00048	–	–	–	–	123.151	122.735
Lognormal	0.16	0.25	–	–	–	–	108.179	107.763
Gamma	–	–	NA	NA	NA	NA	112.249	111.832

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Manganese

Media:
Marsh Sediment All Depths

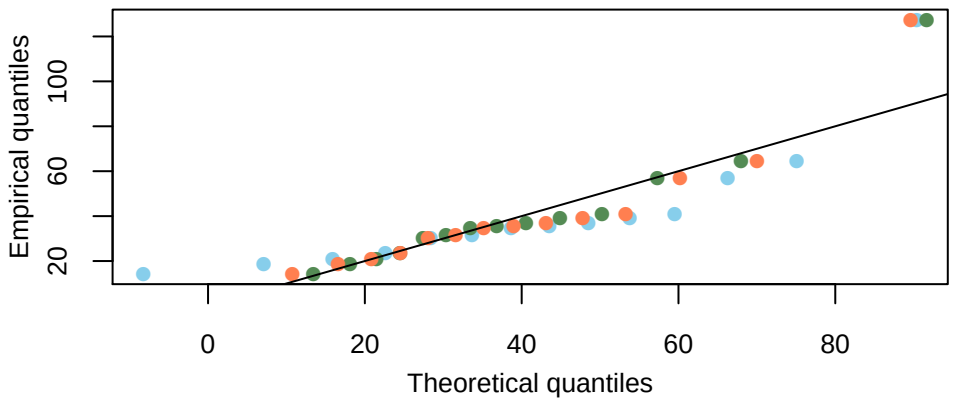
Exposure Unit:
Walden Swamp

Chemical (mg/kg):
Mercury

Legend

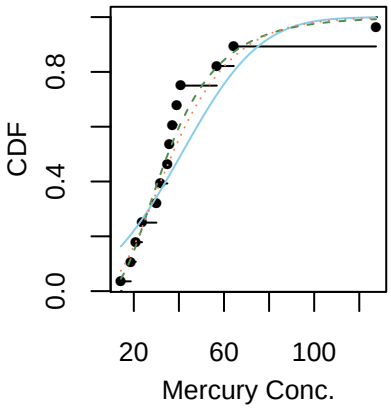
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

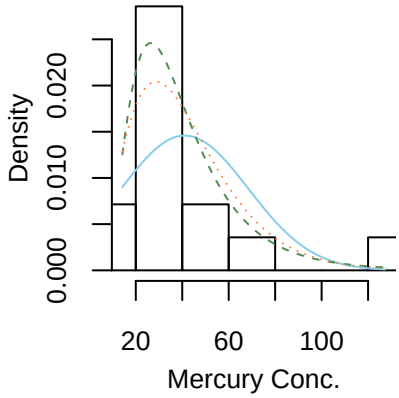


ECDF, Histogram & Q−Q (Detects Only)

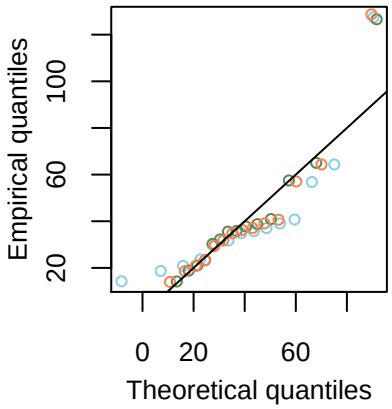
ECDF



Histogram



Q−Q



N = 14	FOD = 100%	Min (detect) = 14 J	Arithmetic Mean = 41
N (detect) = 14	SD (log detect) = 0.55	Max (detect) = 130 J	Arithmetic SD = 28

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00098	0.0022	–	–	–	–	136.381	137.659
Lognormal	0.68	0.26	–	–	–	–	125.71	126.988
Gamma	–	–	0.2187	0.27	0.5151	0.736	127.936	129.215

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Mercury

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Nickel

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 100 J	Arithmetic Mean = 180
N (detect) = 3	SD (log detect) = 0	Max (detect) = 310 J	Arithmetic SD = 110

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Nickel

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 67%	Min (detect) = 5 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 5 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Thallium

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Vanadium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 73 J	Arithmetic Mean = 93
N (detect) = 3	SD (log detect) = 0	Max (detect) = 130 J	Arithmetic SD = 28

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Vanadium

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Zinc

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 520 J	Arithmetic Mean = 1,100
N (detect) = 3	SD (log detect) = 0	Max (detect) = 2,100 J	Arithmetic SD = 840

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Zinc

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Benzo[a]pyrene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.14 J	Arithmetic Mean = 0.14
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.14 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Benzo[a]pyrene

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.031 J	Arithmetic Mean = 0.031
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.031 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Dibenz[a,h]anthra

Media:
Marsh Sediment All Depths

Exposure Unit:
Walden Swamp

Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.018 J	Arithmetic Mean = 0.018
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.018 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Aldrin

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.0058 J	Arithmetic Mean = 0.0058
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0058 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Heptachlor

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.0033 J	Arithmetic Mean = 0.0033
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0033 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Heptachlor Epoxid

Media:
Marsh Sediment All Depths

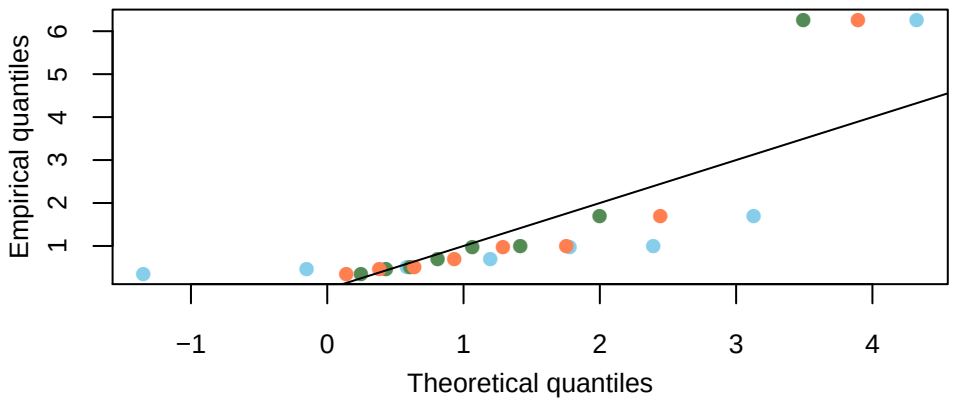
Exposure Unit:
Walden Swamp

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

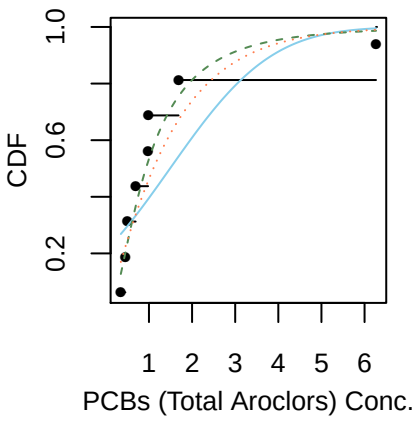
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

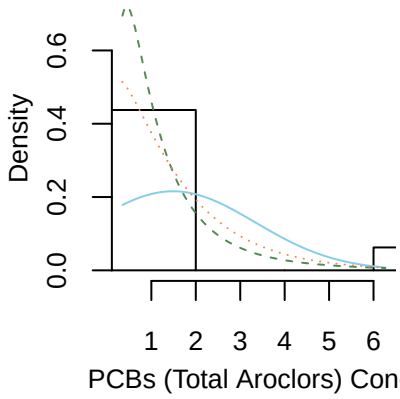


ECDF, Histogram & Q−Q (Detects Only)

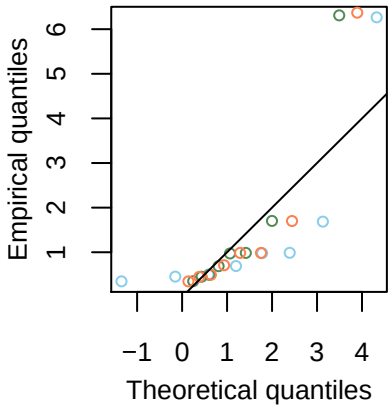
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 0.35 J	Arithmetic Mean = 1
N (detect) = 8	SD (log detect) = 0.92	Max (detect) = 6 J	Arithmetic SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00019	0.0046	–	–	–	–	36.5399	36.6988
Lognormal	0.24	0.28	–	–	–	–	23.1755	23.3344
Gamma	–	–	0.2914	0.301	0.7546	0.736	26.2114	26.3703

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−PCBs (Total Aroc

Media:
Marsh Sediment All Depths
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Walden Swamp−Trichloroethene

Media:
Marsh Sediment All Depths

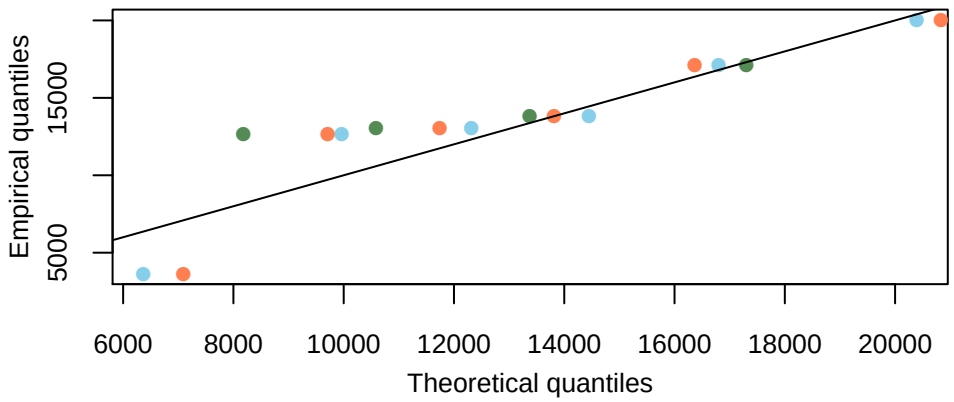
Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Aluminum

Legend

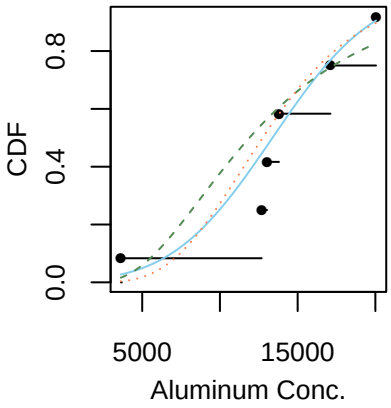
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

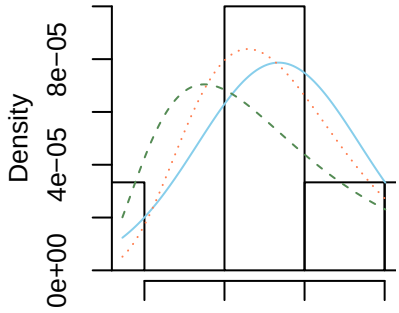


ECDF, Histogram & Q−Q (Detects Only)

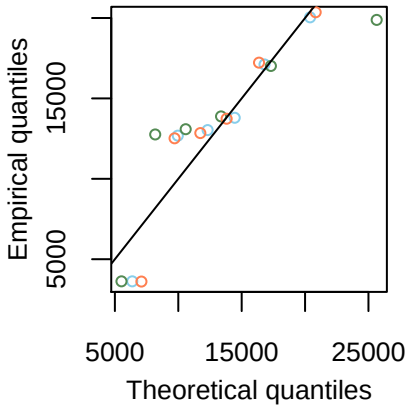
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 3,600 J	Arithmetic Mean = 13,000
N (detect) = 6	SD (log detect) = 0.61	Max (detect) = 20,000 J	Arithmetic SD = 5,600

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.46	0.14	–	–	–	–	123.402	122.985
Lognormal	0.027	0.0084	–	–	–	–	126.579	126.163
Gamma	–	–	NA	NA	NA	NA	125.966	125.55

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Aluminum

Media:
Marsh Sediment All Depths

Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 33%	Min (detect) = 2	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 4	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Antimony

Media:
Marsh Sediment All Depths

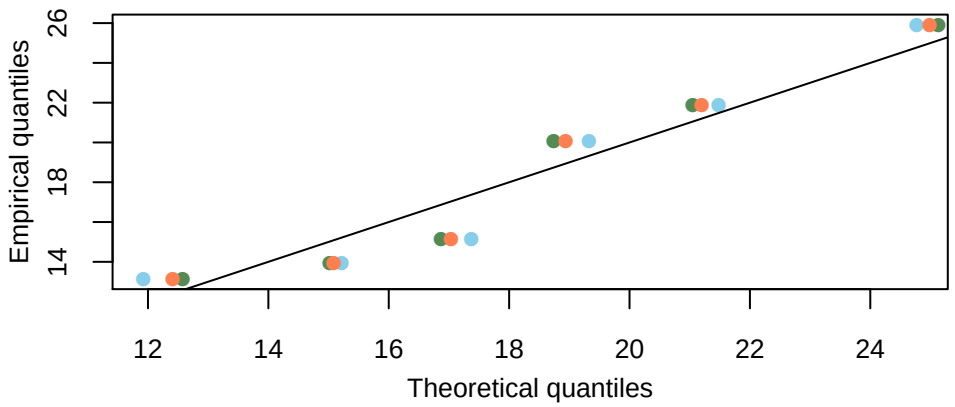
Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Arsenic

Legend

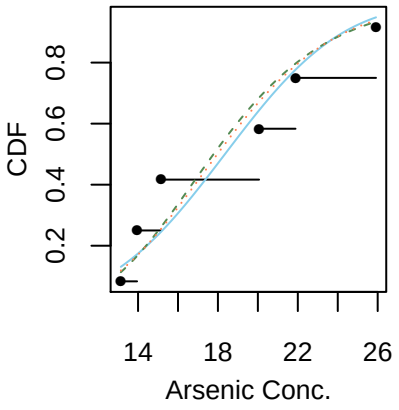
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

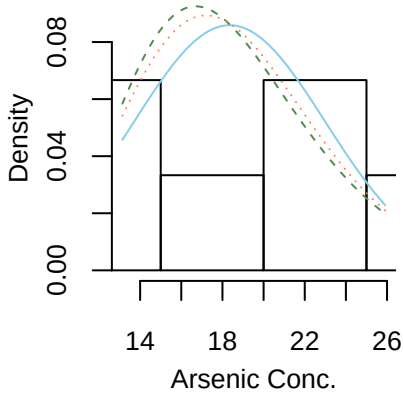


ECDF, Histogram & Q−Q (Detects Only)

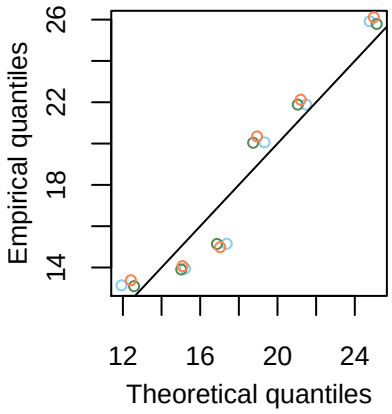
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 13	Arithmetic Mean = 18
N (detect) = 6	SD (log detect) = 0.27	Max (detect) = 26	Arithmetic SD = 5

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.46	0.37	–	–	–	–	39.4564	39.0399
Lognormal	0.51	0.48	–	–	–	–	38.9404	38.5239
Gamma	–	–	NA	NA	NA	NA	39.0508	38.6343

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Arsenic

Media:
Marsh Sediment All Depths

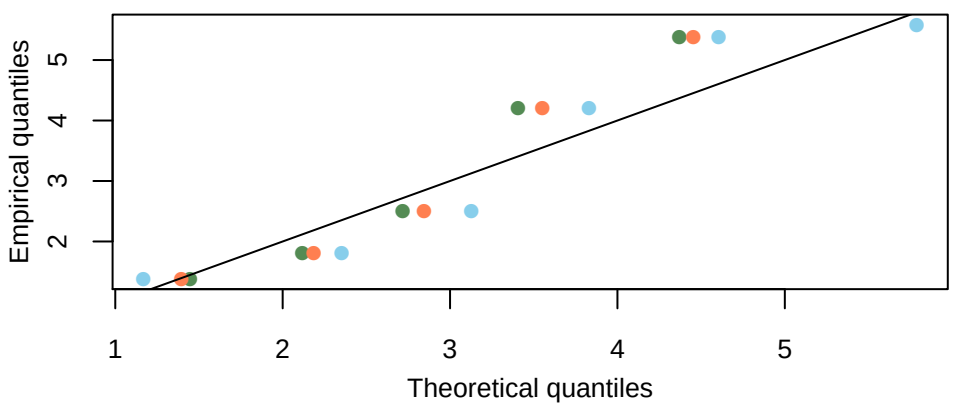
Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Cadmium

Legend

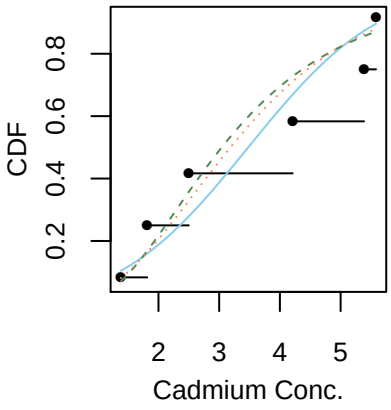
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

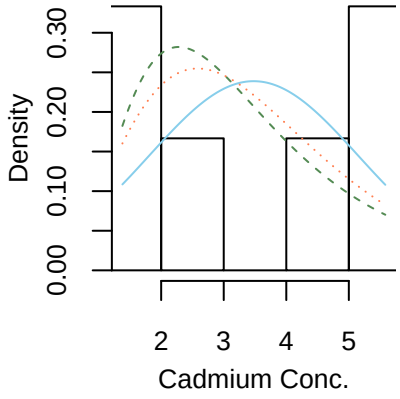


ECDF, Histogram & Q−Q (Detects Only)

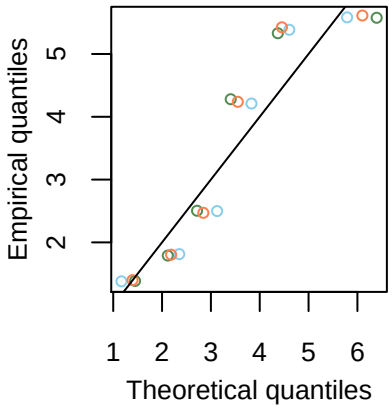
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 1	Arithmetic Mean = 3
N (detect) = 6	SD (log detect) = 0.59	Max (detect) = 5	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.31	0.61	–	–	–	–	27.1835	26.767
Lognormal	0.39	0.56	–	–	–	–	26.9208	26.5043
Gamma	–	–	NA	NA	NA	NA	26.7498	26.3333

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Cadmium

Media:
Marsh Sediment All Depths

Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Chromium (VI)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 17	Arithmetic Mean = 17
N (detect) = 1	SD (log detect) = 0	Max (detect) = 17	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Chromiun

Media:
Marsh Sediment All Depths

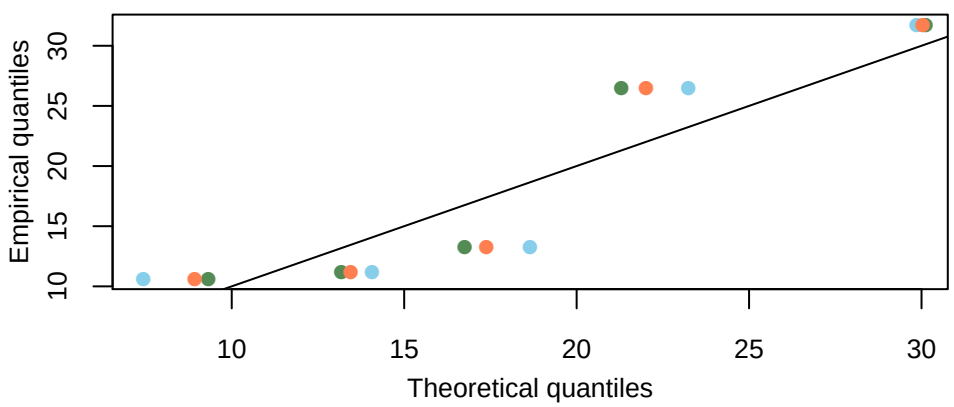
Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Cobalt

Legend

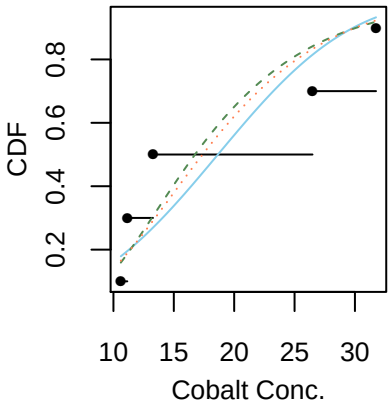
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

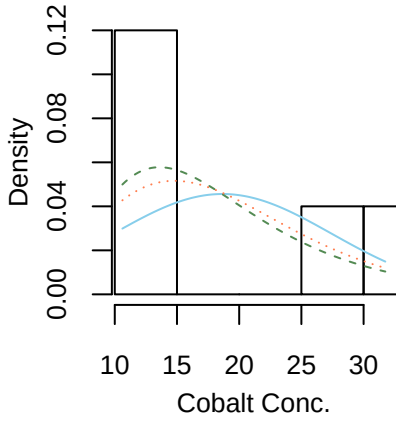


ECDF, Histogram & Q−Q (Detects Only)

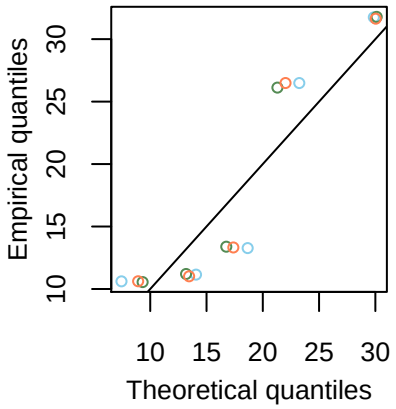
ECDF



Histogram



Q−Q



N = 6	FOD = 83%	Min (detect) = 11	Kaplan Meier Mean = 19
N (detect) = 5	SD (log detect) = 0.51	Max (detect) = 32	Kaplan Meier SD = 8

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.12	N<5	–	–	–	–	39.8777	39.0966
Lognormal	0.16	N<5	–	–	–	–	38.5578	37.7767
Gamma	–	–	NA	NA	NA	NA	38.8578	38.0767

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.12	N<5	–	–	–	–	39.8777	39.0966
Lognormal	0.16	N<5	–	–	–	–	38.5578	37.7767
Gamma	–	–	NA	NA	NA	NA	38.8578	38.0767

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Cobalt

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **274**

Media:
Marsh Sediment All Depths

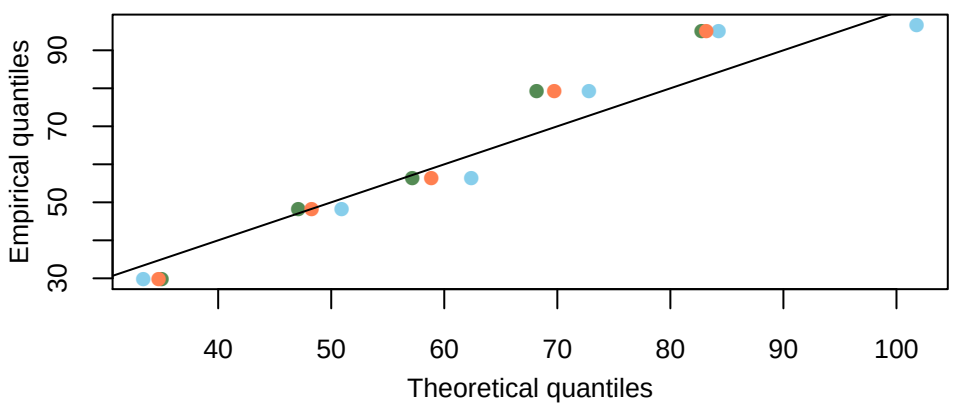
Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Copper

Legend

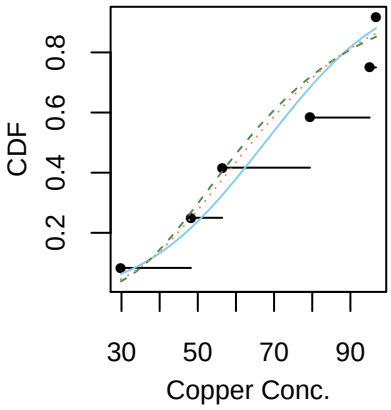
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

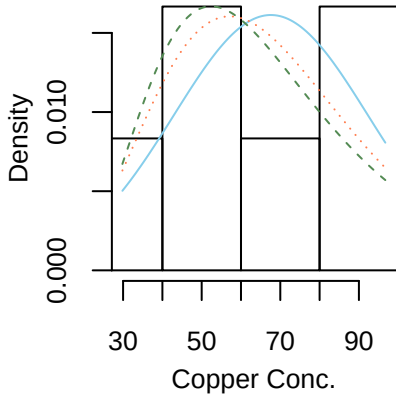


ECDF, Histogram & Q−Q (Detects Only)

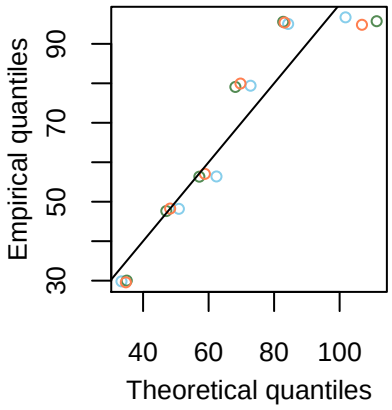
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 30	Arithmetic Mean = 68
N (detect) = 6	SD (log detect) = 0.46	Max (detect) = 97 J	Arithmetic SD = 27

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.53	0.8	–	–	–	–	59.5243	59.1078
Lognormal	0.44	0.63	–	–	–	–	60.1725	59.7561
Gamma	–	–	NA	NA	NA	NA	59.7681	59.3517

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Copper

Media:
Marsh Sediment All Depths

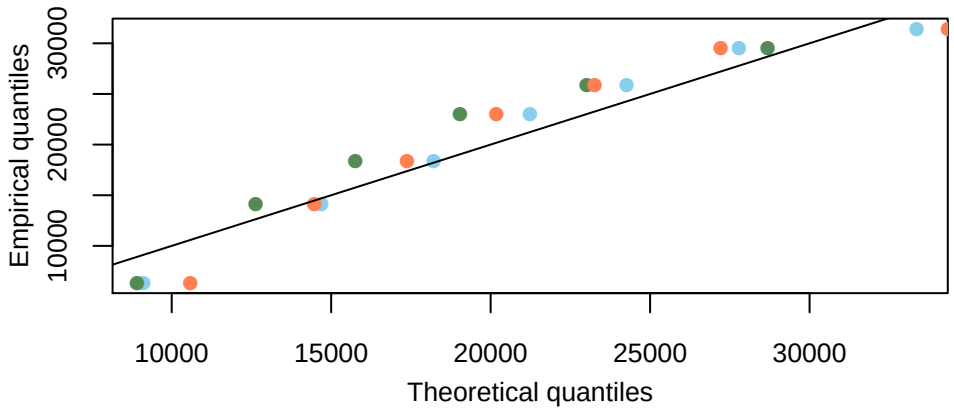
Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Iron

Legend

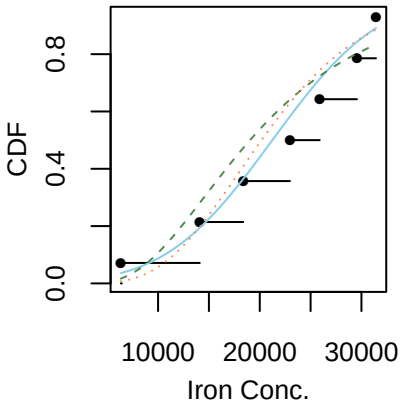
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

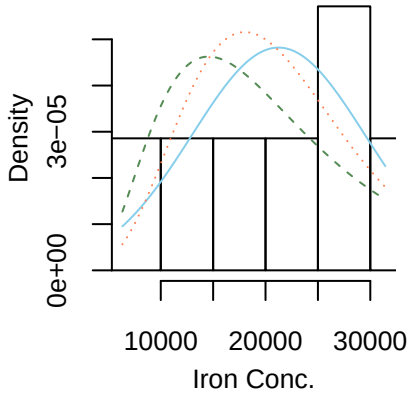


ECDF, Histogram & Q−Q (Detects Only)

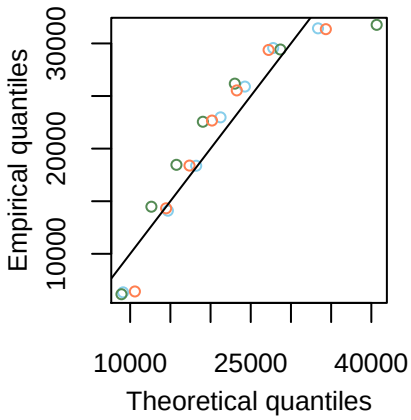
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 6,300 J	Arithmetic Mean = 21,000
N (detect) = 7	SD (log detect) = 0.56	Max (detect) = 31,000 J	Arithmetic SD = 8,900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.77	0.91	–	–	–	–	150.158	150.049
Lognormal	0.15	0.52	–	–	–	–	152.612	152.503
Gamma	–	–	NA	NA	NA	NA	151.884	151.776

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Iron

Media:
Marsh Sediment All Depths

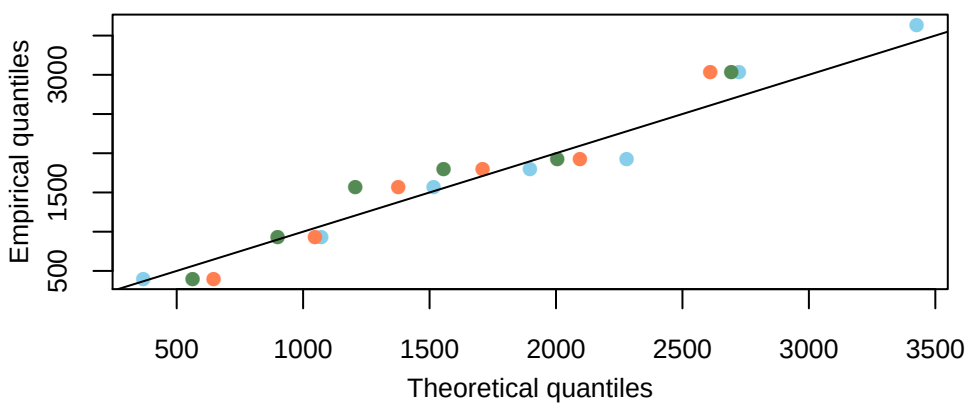
Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Manganese

Legend

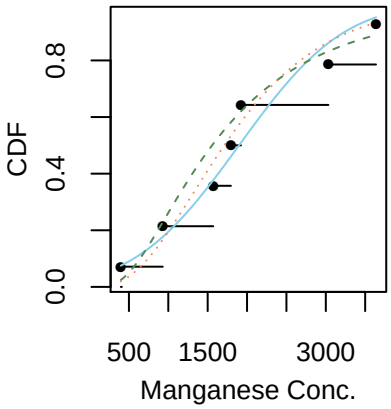
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

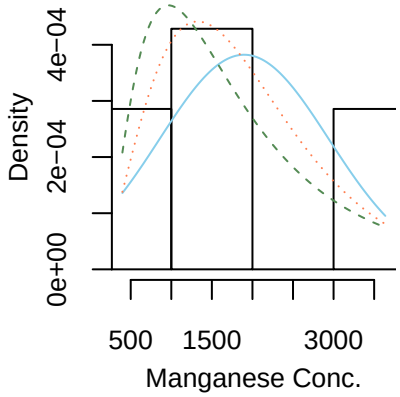


ECDF, Histogram & Q−Q (Detects Only)

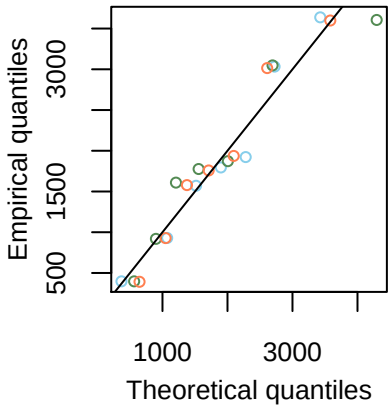
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 400	Arithmetic Mean = 1,900
N (detect) = 7	SD (log detect) = 0.75	Max (detect) = 3,600	Arithmetic SD = 1,100

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.82	0.5	–	–	–	–	121.171	121.062
Lognormal	0.54	0.39	–	–	–	–	121.628	121.52
Gamma	–	–	NA	NA	NA	NA	120.941	120.832

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Manganes

Media:
Marsh Sediment All Depths

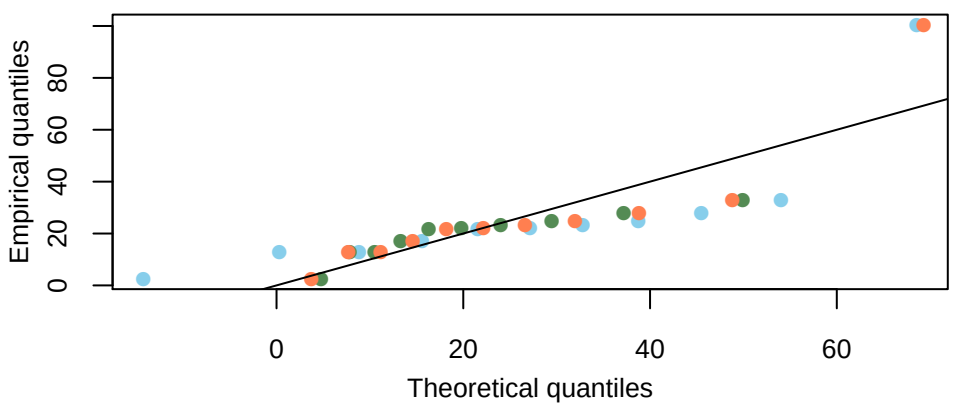
Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Mercury

Legend

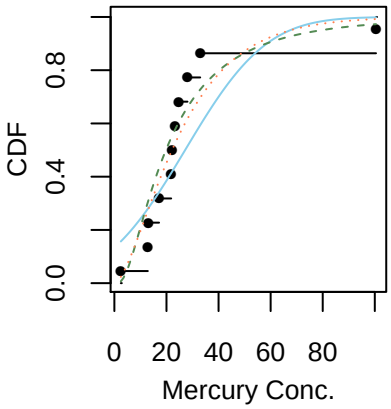
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

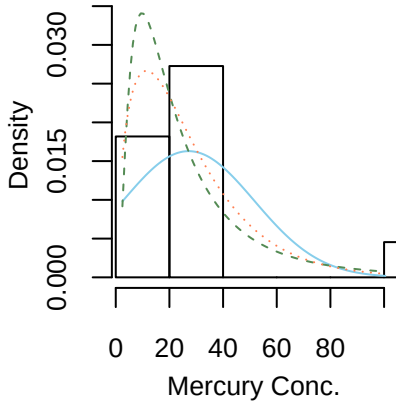


ECDF, Histogram & Q−Q (Detects Only)

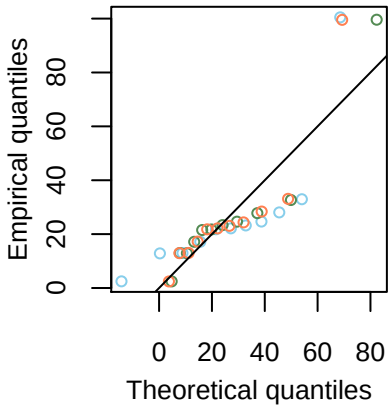
ECDF



Histogram



Q−Q



N = 11	FOD = 100%	Min (detect) = 2	Arithmetic Mean = 27
N (detect) = 11	SD (log detect) = 0.88	Max (detect) = 100 J	Arithmetic SD = 26

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00016	0.0025	–	–	–	–	105.582	106.378
Lognormal	0.091	0.14	–	–	–	–	97.1435	97.9393
Gamma	–	–	0.2125	0.274	0.6897	0.748	96.9669	97.7627

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Mercury

Media:
Marsh Sediment All Depths

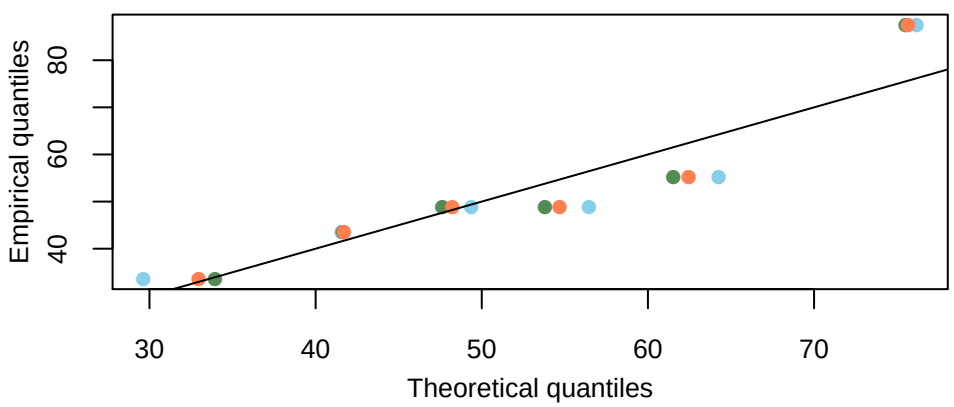
Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Nickel

Legend

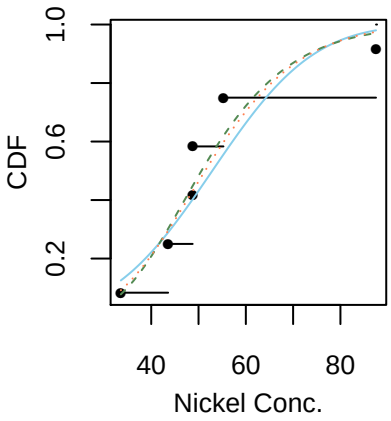
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

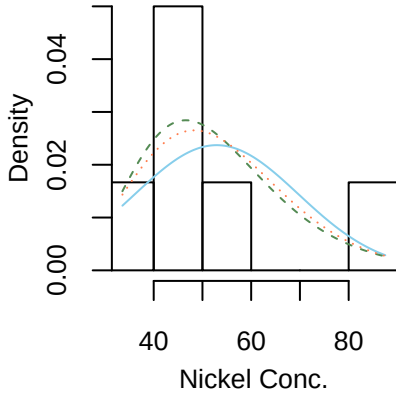


ECDF, Histogram & Q−Q (Detects Only)

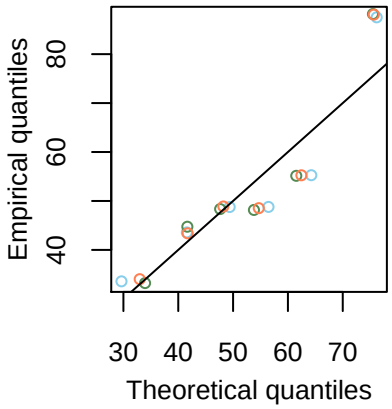
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 34	Arithmetic Mean = 53
N (detect) = 6	SD (log detect) = 0.32	Max (detect) = 88	Arithmetic SD = 18

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.15	0.14	–	–	–	–	54.9031	54.4866
Lognormal	0.58	0.45	–	–	–	–	53.2272	52.8108
Gamma	–	–	NA	NA	NA	NA	53.6568	53.2403

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Nickel

Media:
Marsh Sediment All Depths
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Thallium

Media:
Marsh Sediment All Depths

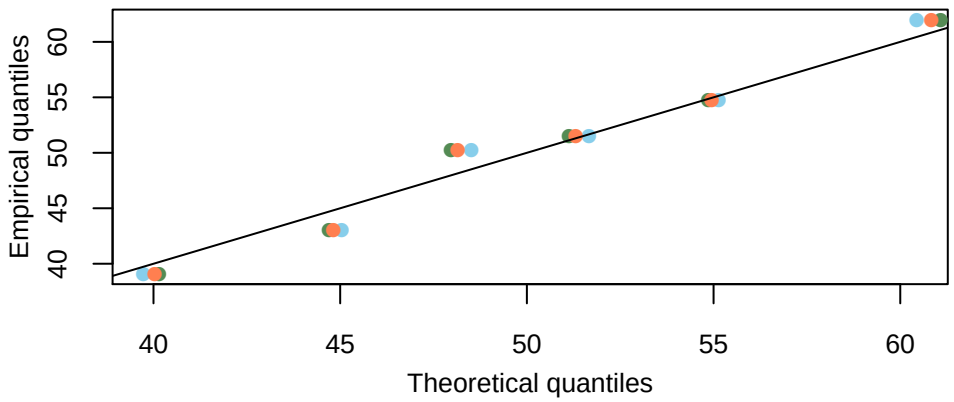
Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Vanadium

Legend

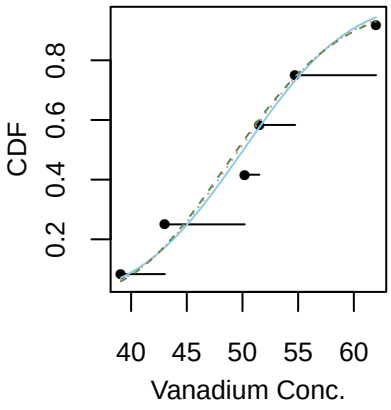
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

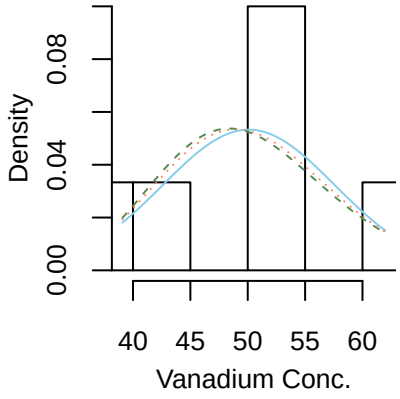


ECDF, Histogram & Q−Q (Detects Only)

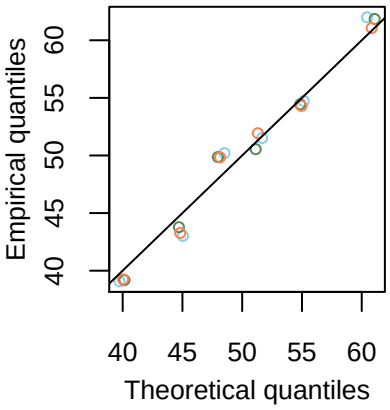
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 39	Arithmetic Mean = 50
N (detect) = 6	SD (log detect) = 0.17	Max (detect) = 62	Arithmetic SD = 8

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.94	0.84	–	–	–	–	45.187	44.7706
Lognormal	0.91	0.64	–	–	–	–	45.2262	44.8097
Gamma	–	–	NA	NA	NA	NA	45.1835	44.767

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Vanadium

Media:
Marsh Sediment All Depths

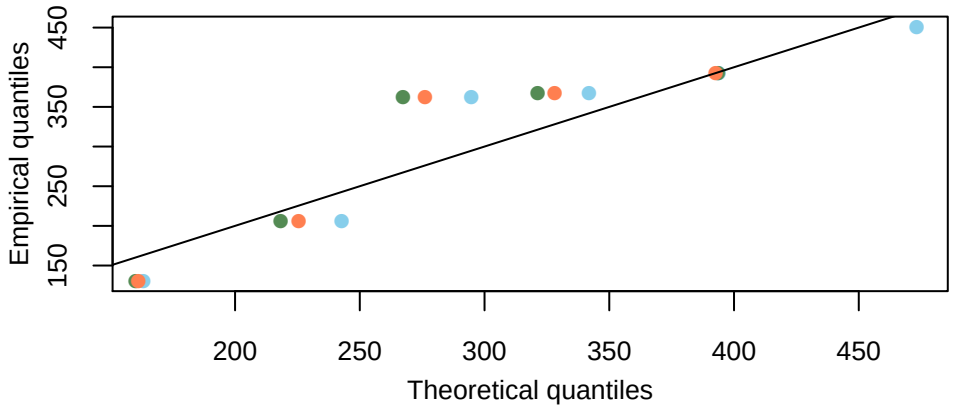
Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Zinc

Legend

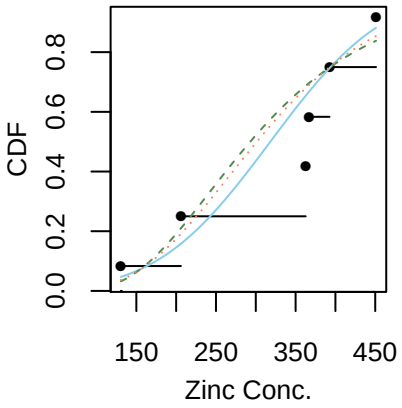
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

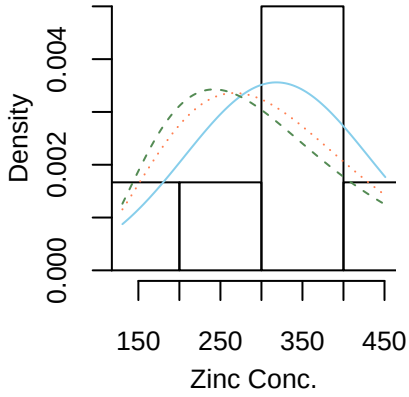


ECDF, Histogram & Q−Q (Detects Only)

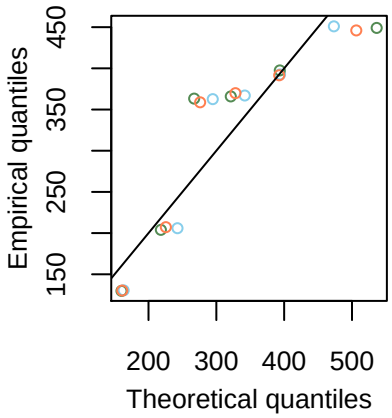
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 130	Arithmetic Mean = 320
N (detect) = 6	SD (log detect) = 0.48	Max (detect) = 450 J	Arithmetic SD = 120

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.31	0.079	–	–	–	–	77.6564	77.24
Lognormal	0.12	0.03	–	–	–	–	79.2593	78.8428
Gamma	–	–	NA	NA	NA	NA	78.55	78.1335

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Zinc

Media:
Marsh Sediment All Depths

Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Benzo[a]pyrene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 50%	Min (detect) = 0.038	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.06	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Benzo[a]p

Media:
Marsh Sediment All Depths
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 33%	Min (detect) = 0.012	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.015 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Dibenz[a,h]anthracene

Media:
Marsh Sediment All Depths

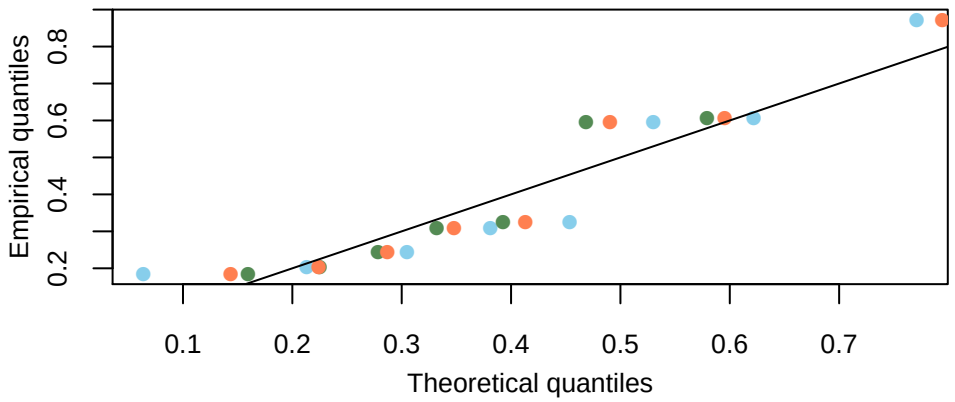
Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

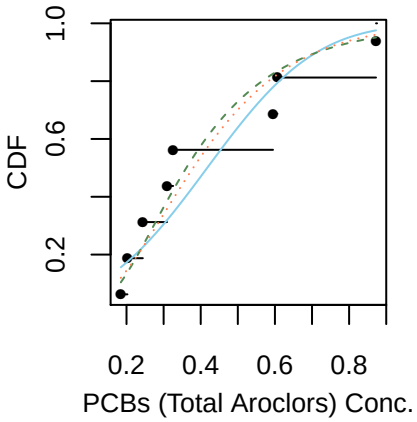
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

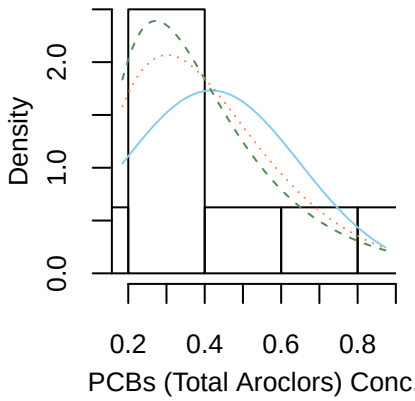


ECDF, Histogram & Q−Q (Detects Only)

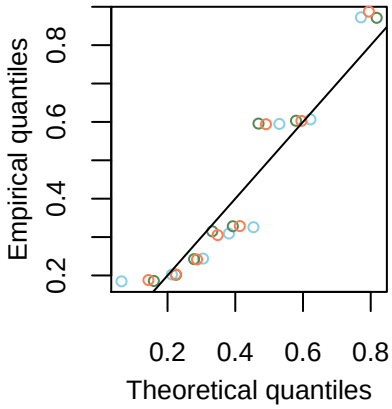
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 0.18	Arithmetic Mean = 0.42
N (detect) = 8	SD (log detect) = 0.57	Max (detect) = 0.87	Arithmetic SD = 0.25

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.14	0.088	–	–	–	–	3.22122	3.38011
Lognormal	0.44	0.48	–	–	–	–	0.326542	0.485425
Gamma	–	–	0.2325	0.297	0.4244	0.724	0.883444	1.04233

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−PCBs (Total Aroclors)

Media:
Marsh Sediment All Depths
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 17%	Min (detect) = 0.033 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.033 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Ackerman's East Marsh−Trichloroethene

Media:
Marsh Sediment All Depths
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 22,000 J	Arithmetic Mean = 22,000
N (detect) = 1	SD (log detect) = 0	Max (detect) = 22,000 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Rutherford Marsh−Iron

Media:
Marsh Sediment All Depths

Exposure Unit:
Rutherford Marsh

Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 4,600 J	Arithmetic Mean = 4,600
N (detect) = 1	SD (log detect) = 0	Max (detect) = 4,600 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Rutherford Marsh−Manganese

Media:
Marsh Sediment All Depths

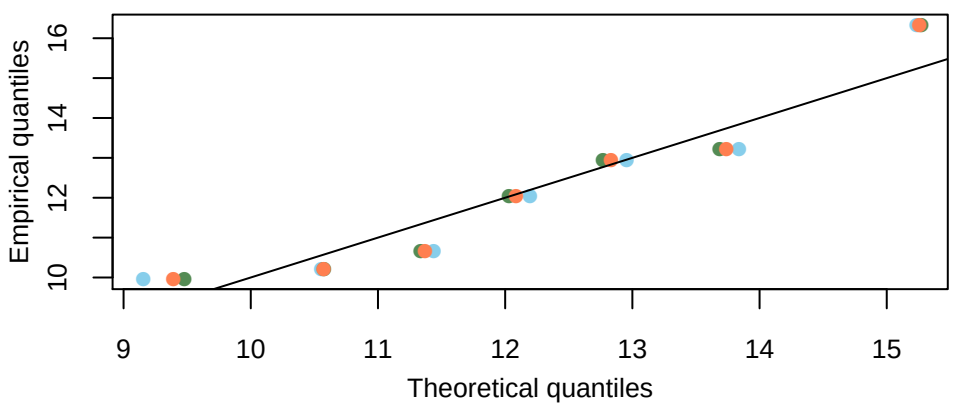
Exposure Unit:
Rutherford Marsh

Chemical (mg/kg):
Mercury

Legend

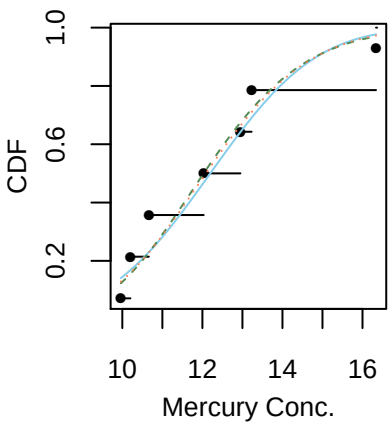
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

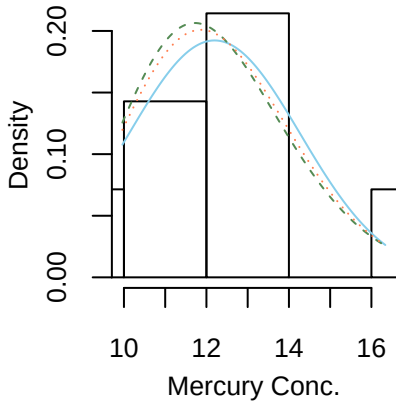


ECDF, Histogram & Q−Q (Detects Only)

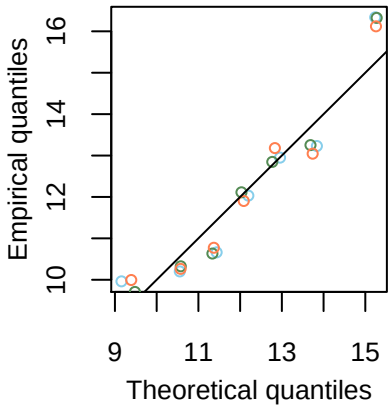
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 10 J	Arithmetic Mean = 12
N (detect) = 7	SD (log detect) = 0.18	Max (detect) = 16 J	Arithmetic SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.34	0.69	–	–	–	–	34.0826	33.9744
Lognormal	0.52	0.68	–	–	–	–	33.2734	33.1652
Gamma	–	–	NA	NA	NA	NA	33.5023	33.3941

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Rutherford Marsh−Mercury

Media:
Marsh Sediment All Depths
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.5 J	Arithmetic Mean = 0.5
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.5 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Rutherford Marsh−PCBs (Total Aroclors)

Media:
Marsh Sediment All Depths
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Aluminum

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 11,000 J	Arithmetic Mean = 11,000
N (detect) = 1	SD (log detect) = 0	Max (detect) = 11,000 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−Aluminum

Media:
Marsh Sediment All Depths

Exposure Unit:
Tollgate Marsh

Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−Antimony

Media:
Marsh Sediment All Depths
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Arsenic

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 9 J	Arithmetic Mean = 9
N (detect) = 1	SD (log detect) = 0	Max (detect) = 9 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−Arsenic

Media:
Marsh Sediment All Depths
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Cadmium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.56 J	Arithmetic Mean = 0.56
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.56 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−Cadmium

Media:
Marsh Sediment All Depths
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Cobalt

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 11 J	Arithmetic Mean = 11
N (detect) = 1	SD (log detect) = 0	Max (detect) = 11 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−Cobalt

Media:
Marsh Sediment All Depths
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 66 J	Arithmetic Mean = 66
N (detect) = 1	SD (log detect) = 0	Max (detect) = 66 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−Copper

Media:
Marsh Sediment All Depths
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 21,000 J	Arithmetic Mean = 25,000
N (detect) = 2	SD (log detect) = 0	Max (detect) = 28,000 J	Arithmetic SD = 5,500

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−Iron

Media:
Marsh Sediment All Depths
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 490 J	Arithmetic Mean = 790
N (detect) = 2	SD (log detect) = 0	Max (detect) = 1,100 J	Arithmetic SD = 420

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−Manganese

Media:
Marsh Sediment All Depths

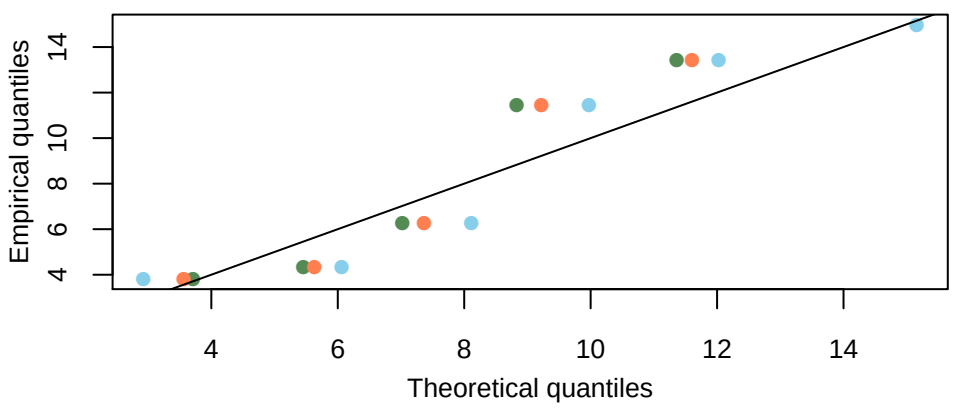
Exposure Unit:
Tollgate Marsh

Chemical (mg/kg):
Mercury

Legend

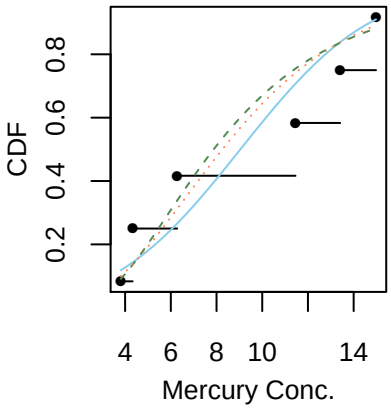
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

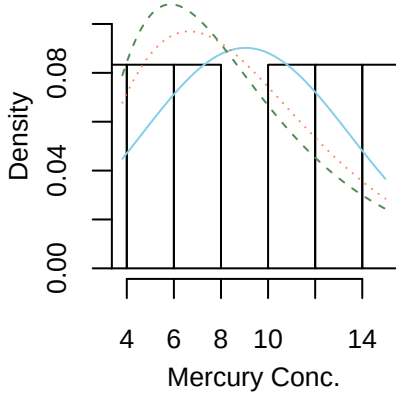


ECDF, Histogram & Q−Q (Detects Only)

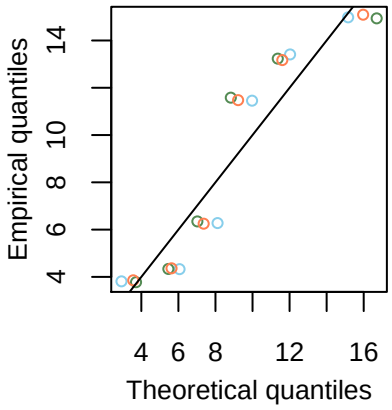
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 3 J	Arithmetic Mean = 9
N (detect) = 6	SD (log detect) = 0.6	Max (detect) = 15 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.29	0.51	–	–	–	–	38.8681	38.4517
Lognormal	0.28	0.37	–	–	–	–	38.4758	38.0593
Gamma	–	–	NA	NA	NA	NA	38.3575	37.9411

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−Mercury

Media:
Marsh Sediment All Depths

Exposure Unit:
Tollgate Marsh

Chemical (mg/kg):
Nickel

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 38 J	Arithmetic Mean = 38
N (detect) = 1	SD (log detect) = 0	Max (detect) = 38 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−Nickel

Media:
Marsh Sediment All Depths

Exposure Unit:
Tollgate Marsh

Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 2
N (detect) = 1	SD (log detect) = 0	Max (detect) = 2 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−Thallium

Media:
Marsh Sediment All Depths

Exposure Unit:
Tollgate Marsh

Chemical (mg/kg):
Vanadium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 29 J	Arithmetic Mean = 29
N (detect) = 1	SD (log detect) = 0	Max (detect) = 29 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−Vanadium

Media:
Marsh Sediment All Depths
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Zinc

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 170 J	Arithmetic Mean = 170
N (detect) = 1	SD (log detect) = 0	Max (detect) = 170 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−Zinc

Media:
Marsh Sediment All Depths

Exposure Unit:
Tollgate Marsh

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 0.27 J	Arithmetic Mean = 0.35
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.44 J	Arithmetic SD = 0.12

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Tollgate Marsh−PCBs (Total Aroclo

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Aluminum

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 8,300 J	Arithmetic Mean = 11,000
N (detect) = 2	SD (log detect) = 0	Max (detect) = 14,000 J	Arithmetic SD = 3,800

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Aluminum

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 3
N (detect) = 2	SD (log detect) = 0	Max (detect) = 3 J	Arithmetic SD = 0.26

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Antimony

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Arsenic

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 12 J	Arithmetic Mean = 17
N (detect) = 2	SD (log detect) = 0	Max (detect) = 23 J	Arithmetic SD = 8

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Arsenic

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Cadmium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 50%	Min (detect) = 0.34 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.34 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Cadmium

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Cobalt

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 4 J	Arithmetic Mean = 10
N (detect) = 2	SD (log detect) = 0	Max (detect) = 16 J	Arithmetic SD = 8

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Cobalt

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 41 J	Arithmetic Mean = 54
N (detect) = 2	SD (log detect) = 0	Max (detect) = 67 J	Arithmetic SD = 19

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Copper

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 13,000 J	Arithmetic Mean = 23,000
N (detect) = 2	SD (log detect) = 0	Max (detect) = 34,000 J	Arithmetic SD = 15,000

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Iron

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 90 J	Arithmetic Mean = 310
N (detect) = 2	SD (log detect) = 0	Max (detect) = 530 J	Arithmetic SD = 310

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Manganese

Media:
Marsh Sediment All Depths

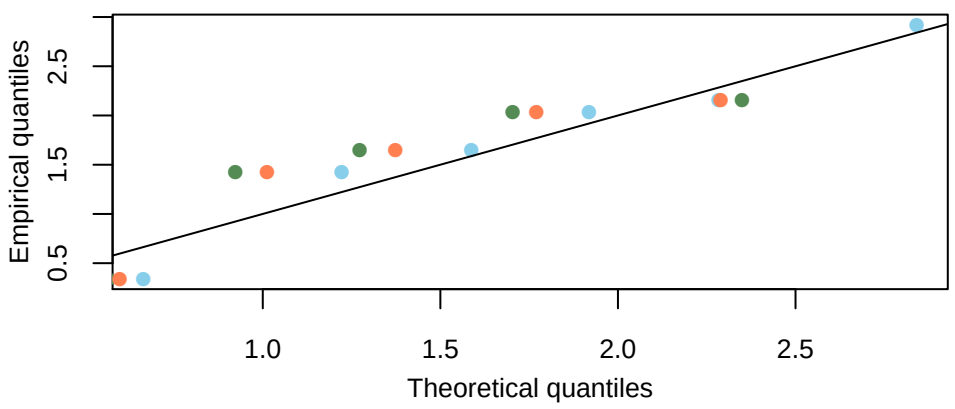
Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Mercury

Legend

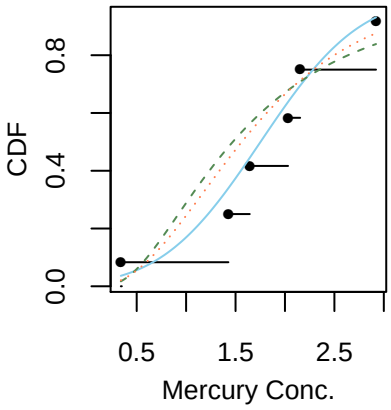
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

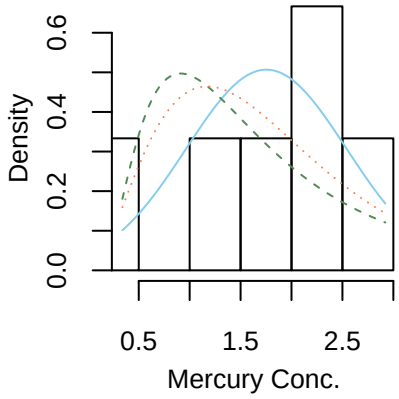


ECDF, Histogram & Q−Q (Detects Only)

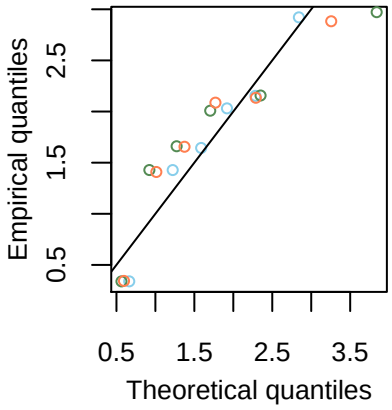
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 0.34 J	Arithmetic Mean = 1
N (detect) = 6	SD (log detect) = 0.76	Max (detect) = 2 J	Arithmetic SD = 0.86

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.88	0.74	–	–	–	–	18.1562	17.7397
Lognormal	0.058	0.059	–	–	–	–	21.2712	20.8547
Gamma	–	–	NA	NA	NA	NA	19.6898	19.2733

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Mercury

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Nickel

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 30 J	Arithmetic Mean = 35
N (detect) = 2	SD (log detect) = 0	Max (detect) = 40 J	Arithmetic SD = 7

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Nickel

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Thallium

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Vanadium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 47 J	Arithmetic Mean = 55
N (detect) = 2	SD (log detect) = 0	Max (detect) = 63 J	Arithmetic SD = 11

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Vanadium

Media:
Marsh Sediment All Depths
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Zinc

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 140 J	Arithmetic Mean = 150
N (detect) = 2	SD (log detect) = 0	Max (detect) = 160 J	Arithmetic SD = 19

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Zinc

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Benzo[a]pyrene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.2 J	Arithmetic Mean = 0.2
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.2 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Benzo[a]pyrene

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Dibenz[a,h]anthrace

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Aldrin

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.0012 J	Arithmetic Mean = 0.0012
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0012 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Heptachlor

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.0023 J	Arithmetic Mean = 0.0023
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0023 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Heptachlor Epoxide

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 50%	Min (detect) = 0.016 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.016 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−PCBs (Total Aroclor

Media:
Marsh Sediment All Depths

Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Oritani Marsh−Trichloroethene

Media:
Marsh Sediment All Depths

Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Aluminum

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 14,000 J	Arithmetic Mean = 14,000
N (detect) = 1	SD (log detect) = 0	Max (detect) = 14,000 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−Aluminum

Media:
Marsh Sediment All Depths

Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 2
N (detect) = 1	SD (log detect) = 0	Max (detect) = 2 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−Antimony

Media:
Marsh Sediment All Depths

Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Arsenic

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 27 J	Arithmetic Mean = 27
N (detect) = 1	SD (log detect) = 0	Max (detect) = 27 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−Arsenic

Media:
Marsh Sediment All Depths

Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Cadmium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 1
N (detect) = 1	SD (log detect) = 0	Max (detect) = 1 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−Cadmium

Media:
Marsh Sediment All Depths

Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Cobalt

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 18 J	Arithmetic Mean = 18
N (detect) = 1	SD (log detect) = 0	Max (detect) = 18 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−Cobalt

Media:
Marsh Sediment All Depths

Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 130 J	Arithmetic Mean = 130
N (detect) = 1	SD (log detect) = 0	Max (detect) = 130 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−Copper

Media:
Marsh Sediment All Depths

Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 21,000 J	Arithmetic Mean = 25,000
N (detect) = 2	SD (log detect) = 0	Max (detect) = 30,000 J	Arithmetic SD = 6,500

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−Iron

Media:
Marsh Sediment All Depths

Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 530 J	Arithmetic Mean = 660
N (detect) = 2	SD (log detect) = 0	Max (detect) = 800 J	Arithmetic SD = 190

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−Manganese

Media:
Marsh Sediment All Depths

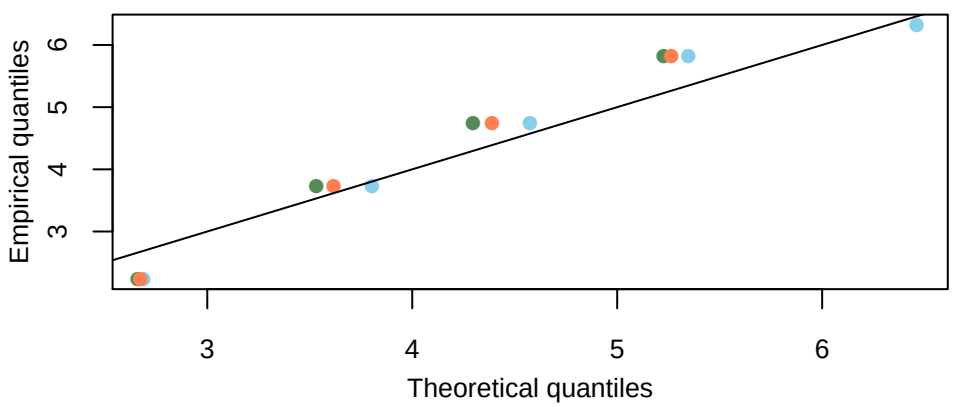
Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Mercury

Legend

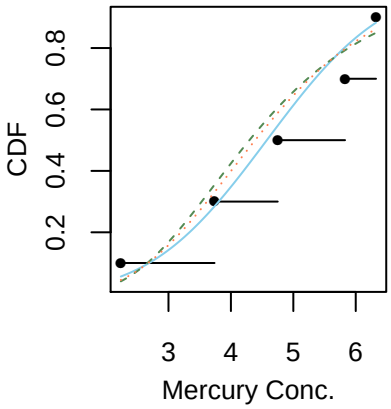
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

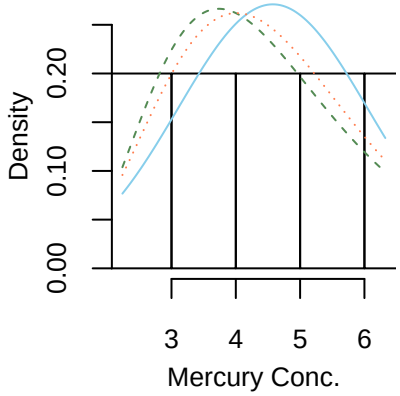


ECDF, Histogram & Q−Q (Detects Only)

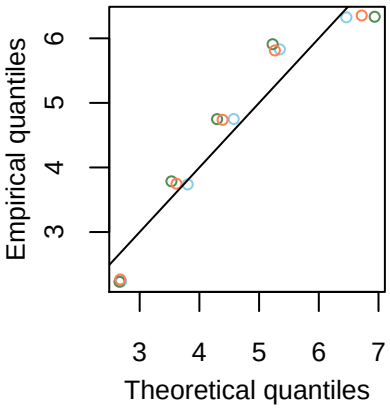
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 4
N (detect) = 5	SD (log detect) = 0.42	Max (detect) = 6 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.8	N<5	–	–	–	–	22.056	21.2749
Lognormal	0.48	N<5	–	–	–	–	22.9244	22.1433
Gamma	–	–	NA	NA	NA	NA	22.511	21.7298

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−Mercury

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Figure **333**

Media:
Marsh Sediment All Depths

Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Nickel

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 94 J	Arithmetic Mean = 94
N (detect) = 1	SD (log detect) = 0	Max (detect) = 94 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−Nickel

Media:
Marsh Sediment All Depths

Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 2
N (detect) = 1	SD (log detect) = 0	Max (detect) = 2 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−Thallium

Media:
Marsh Sediment All Depths

Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Vanadium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 66 J	Arithmetic Mean = 66
N (detect) = 1	SD (log detect) = 0	Max (detect) = 66 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−Vanadium

Media:
Marsh Sediment All Depths

Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Zinc

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 390 J	Arithmetic Mean = 390
N (detect) = 1	SD (log detect) = 0	Max (detect) = 390 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−Zinc

Media:
Marsh Sediment All Depths
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 0.06 J	Arithmetic Mean = 0.098
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.14 J	Arithmetic SD = 0.053

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Berry's Creek Marsh−PCBs (Total Aroclors)

Media:
Marsh Sediment All Depths
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Mercury

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 3 J	Arithmetic Mean = 3
N (detect) = 1	SD (log detect) = 0	Max (detect) = 3 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment All Depths in Former ENCAP Restoration Area−Mercury

Media:
Waterway Sediment All Depths

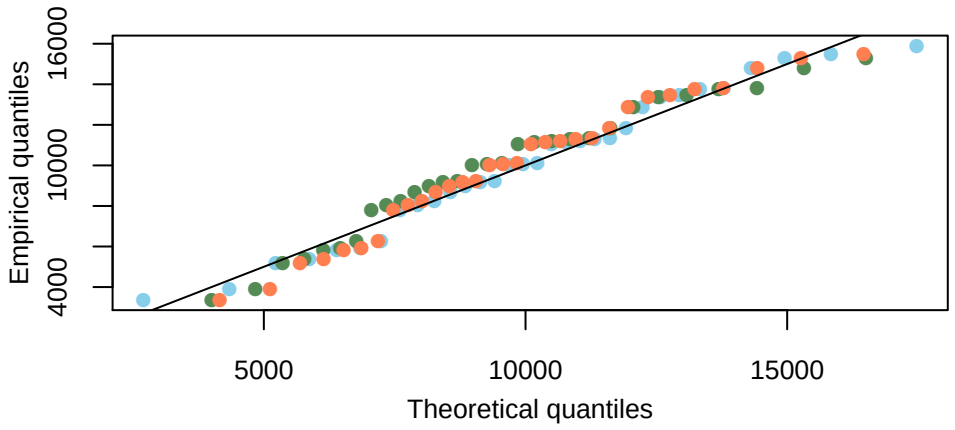
Exposure Unit:
UBC

Chemical (mg/kg):
Aluminum

Legend

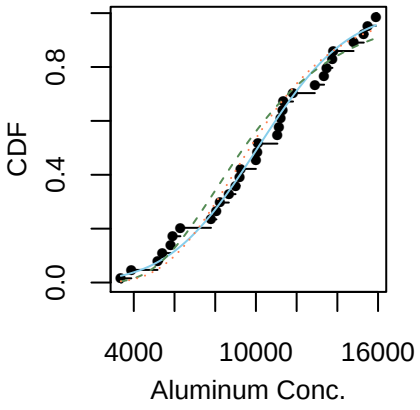
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

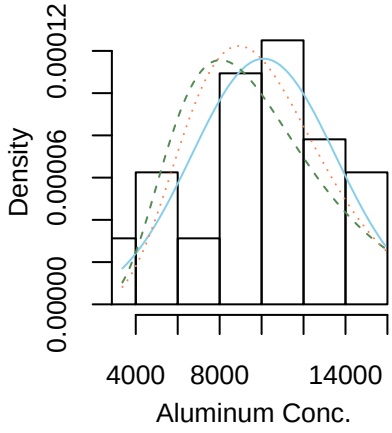


ECDF, Histogram & Q−Q (Detects Only)

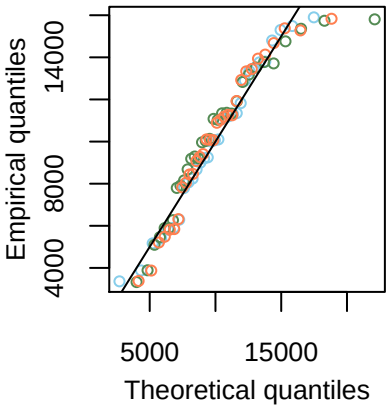
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 3,400 J	Arithmetic Mean = 10,000
N (detect) = 32	SD (log detect) = 0.4	Max (detect) = 16,000 J	Arithmetic SD = 3,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.5	0.86	–	–	–	–	615.8	618.732
Lognormal	0.028	0.23	–	–	–	–	621.182	624.113
Gamma	–	–	0.1191	0.16	0.6462	0.746	618.694	621.625

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Aluminum

Media:
Waterway Sediment All Depths

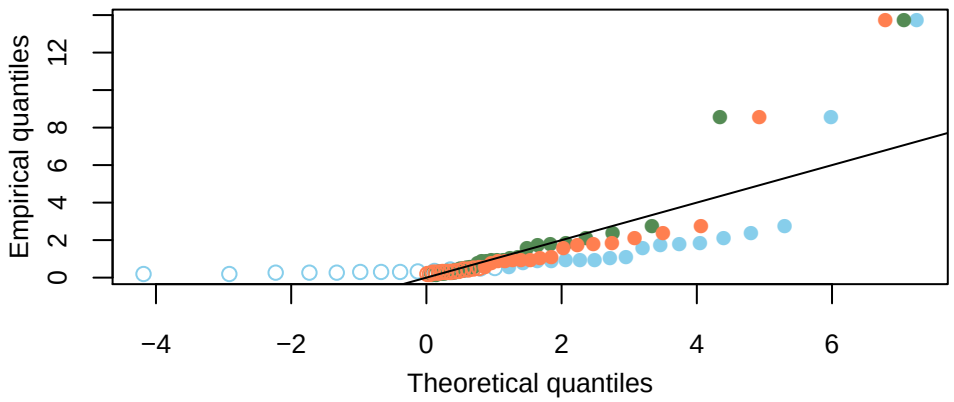
Exposure Unit:
UBC

Chemical (mg/kg):
Antimony

Legend

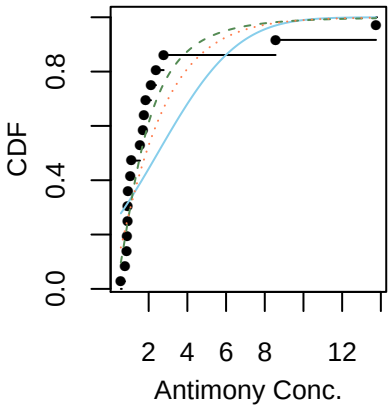
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

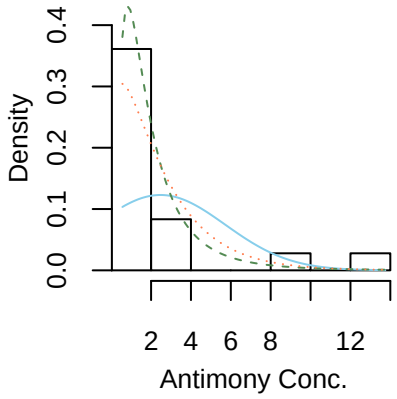


ECDF, Histogram & Q−Q (Detects Only)

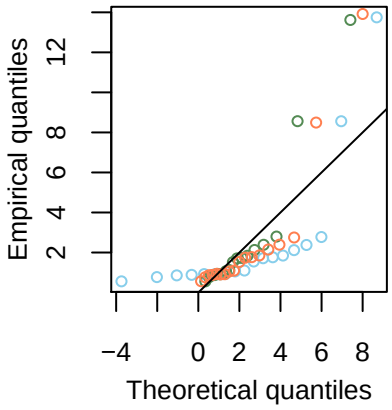
ECDF



Histogram



Q−Q



N = 32	FOD = 56%	Min (detect) = 0.56 J	Kaplan Meier Mean = 1
N (detect) = 18	SD (log detect) = 0.83	Max (detect) = 14 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.9e−08	–	–	–	–	157.315	160.247
Lognormal	0.034	0.6	–	–	–	–	80.7178	83.6493
Gamma	–	–	0.19	0.169	1.906	0.809	95.0757	98.0071

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2e−06	–	–	–	–	97.4555	99.2362
Lognormal	0.0093	0.17	–	–	–	–	63.9149	65.6956
Gamma	–	–	0.2324	0.209	1.798	0.767	71.9316	73.7123

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Antimony

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Berry's Creek Study Area Remedial Investigation

Figure **341**

Media:
Waterway Sediment All Depths

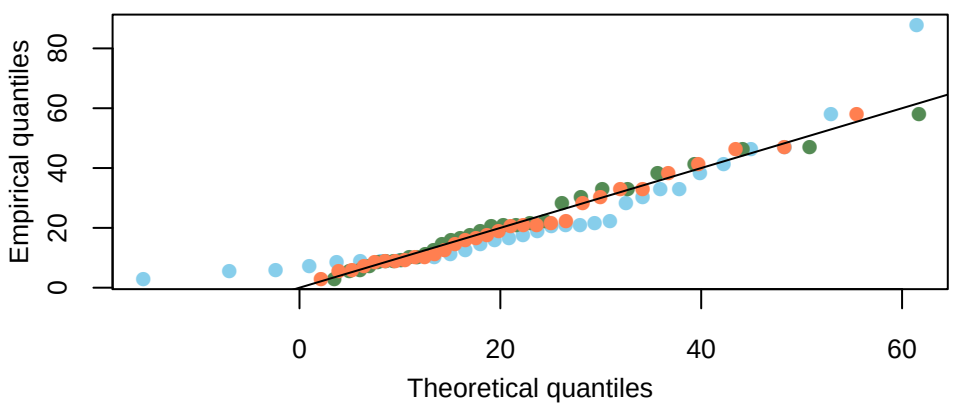
Exposure Unit:
UBC

Chemical (mg/kg):
Arsenic

Legend

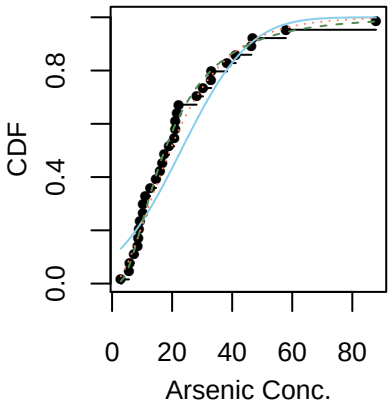
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

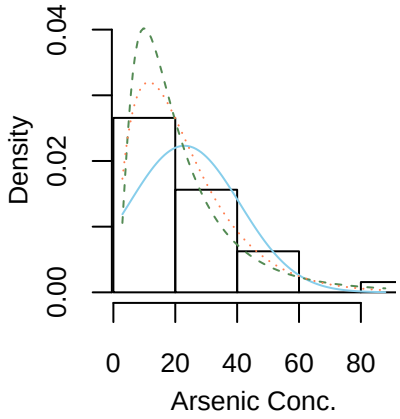


ECDF, Histogram & Q−Q (Detects Only)

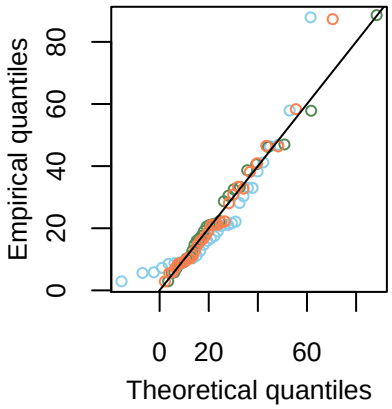
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 2	Arithmetic Mean = 23
N (detect) = 32	SD (log detect) = 0.76	Max (detect) = 88 J	Arithmetic SD = 18

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−04	0.0014	–	–	–	–	279.352	282.283
Lognormal	0.99	0.97	–	–	–	–	259.74	262.672
Gamma	–	–	0.113	0.165	0.292	0.775	261.269	264.2

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Arsenic

Media:
Waterway Sediment All Depths

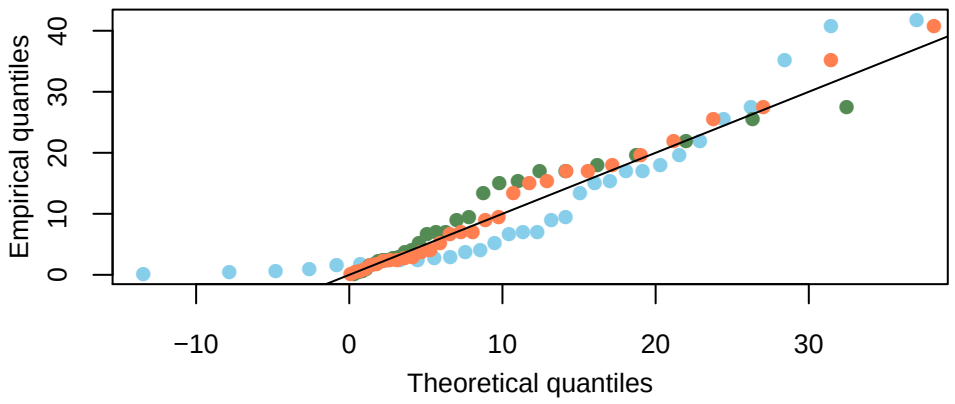
Exposure Unit:
UBC

Chemical (mg/kg):
Cadmium

Legend

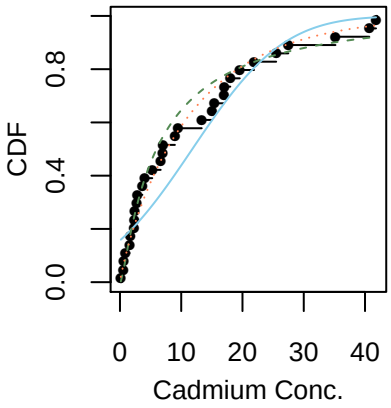
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

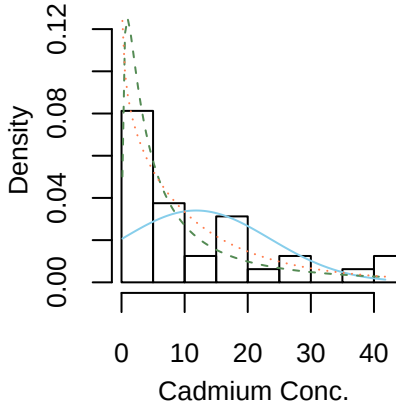


ECDF, Histogram & Q−Q (Detects Only)

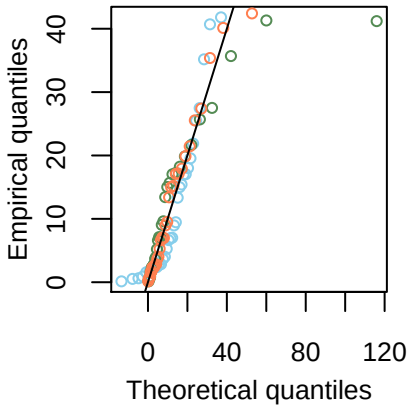
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 0.14 J	Arithmetic Mean = 12
N (detect) = 32	SD (log detect) = 1.4	Max (detect) = 42 J	Arithmetic SD = 12

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00035	0.0057	–	–	–	–	252.337	255.269
Lognormal	0.13	0.25	–	–	–	–	229.637	232.568
Gamma	–	–	0.09684	0.169	0.2802	0.809	225.524	228.456

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Cadmium

Media:
Waterway Sediment All Depths

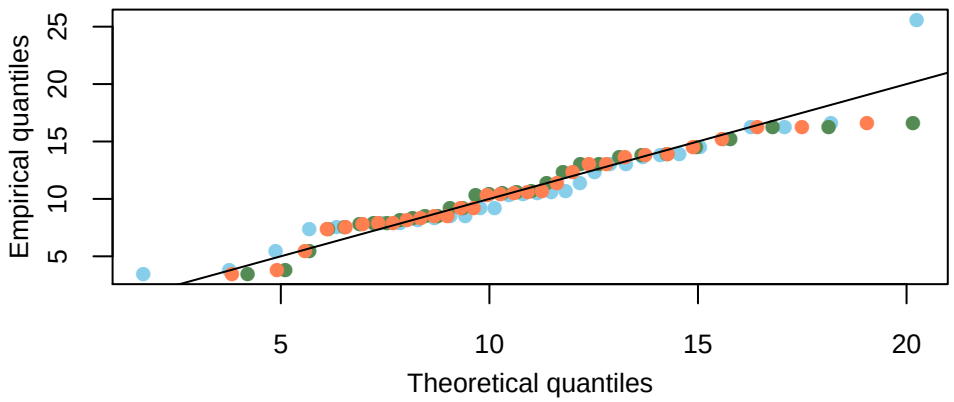
Exposure Unit:
UBC

Chemical (mg/kg):
Cobalt

Legend

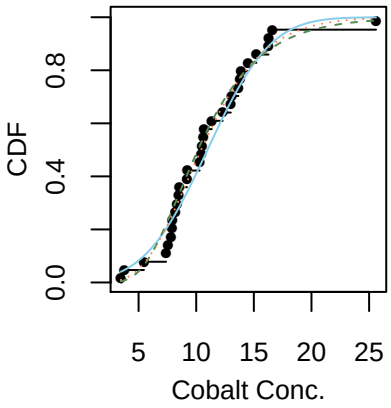
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

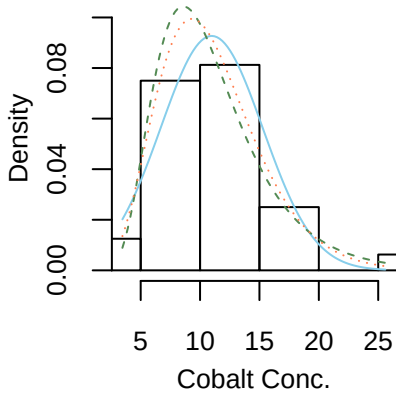


ECDF, Histogram & Q−Q (Detects Only)

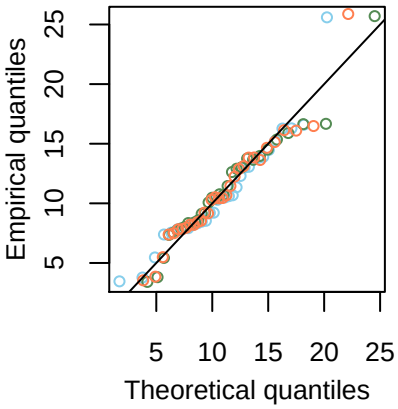
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 3 J	Arithmetic Mean = 11
N (detect) = 32	SD (log detect) = 0.42	Max (detect) = 26 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.035	0.27	–	–	–	–	188.216	191.148
Lognormal	0.16	0.19	–	–	–	–	185.971	188.902
Gamma	–	–	0.1137	0.16	0.3807	0.746	184.677	187.609

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Cobalt

Media:
Waterway Sediment All Depths

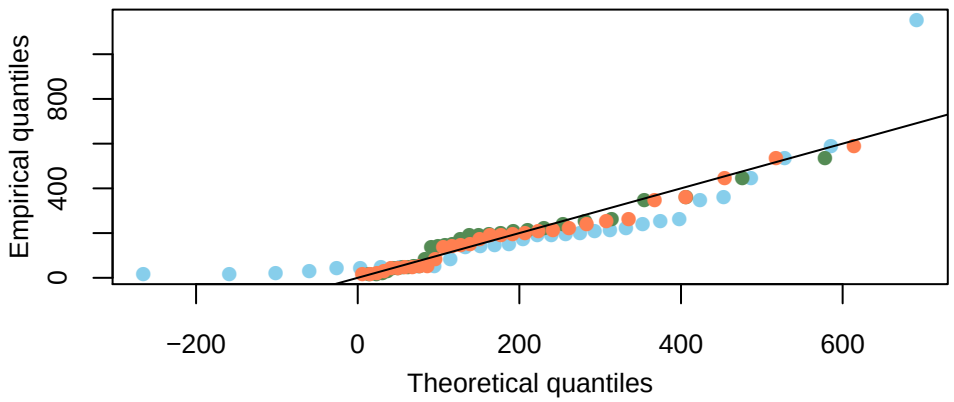
Exposure Unit:
UBC

Chemical (mg/kg):
Copper

Legend

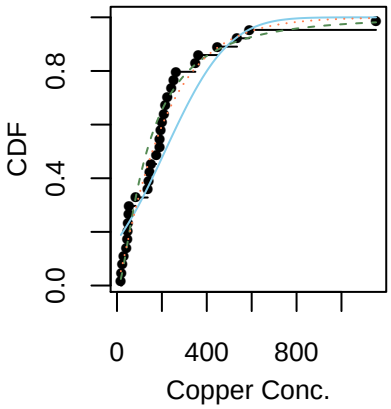
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

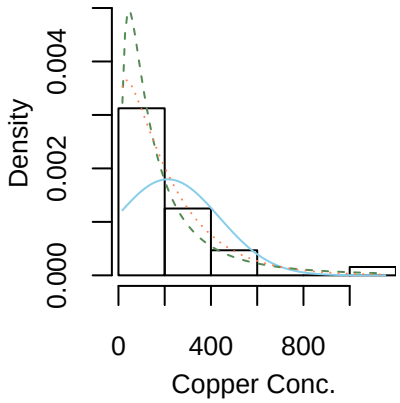


ECDF, Histogram & Q−Q (Detects Only)

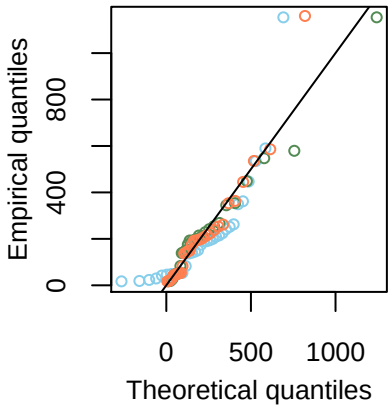
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 17 J	Arithmetic Mean = 210
N (detect) = 32	SD (log detect) = 1.1	Max (detect) = 1,200 J	Arithmetic SD = 230

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00023	–	–	–	–	440.619	443.551
Lognormal	0.22	0.021	–	–	–	–	410.029	412.96
Gamma	–	–	0.1282	0.165	0.4938	0.775	410.674	413.606

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Copper

Media:
Waterway Sediment All Depths

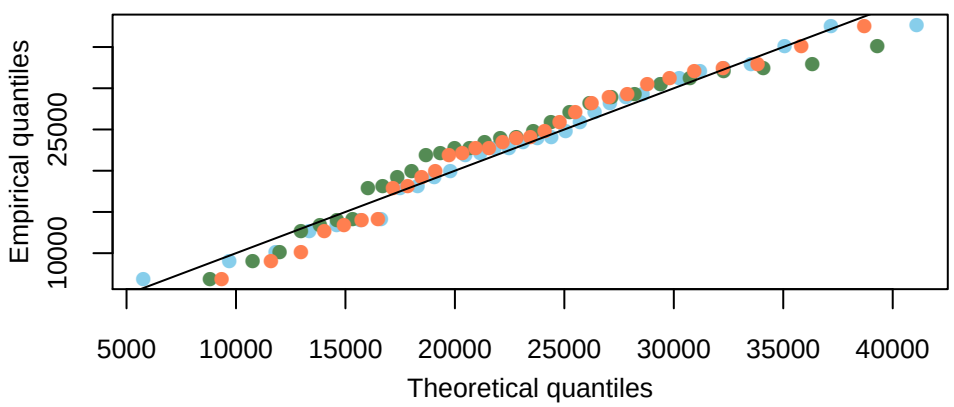
Exposure Unit:
UBC

Chemical (mg/kg):
Iron

Legend

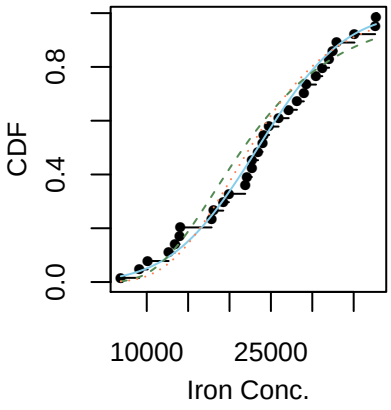
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

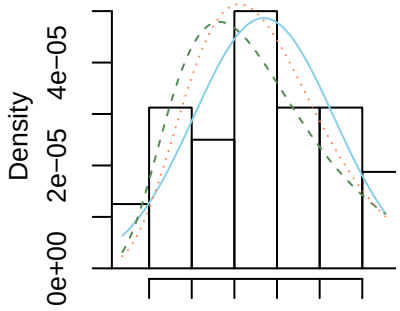


ECDF, Histogram & Q−Q (Detects Only)

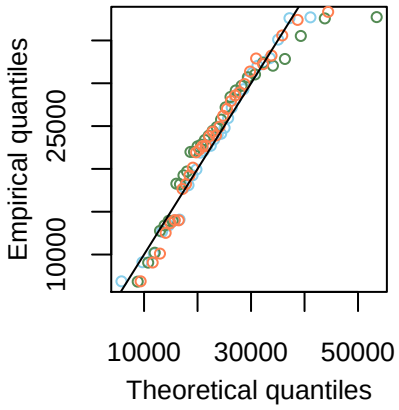
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 6,900 J	Arithmetic Mean = 23,000
N (detect) = 32	SD (log detect) = 0.43	Max (detect) = 38,000 J	Arithmetic SD = 8,300

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.65	0.76	–	–	–	–	671.579	674.511
Lognormal	0.018	0.028	–	–	–	–	678.154	681.086
Gamma	–	–	0.1266	0.16	0.7076	0.746	675.304	678.235

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Iron

Media:
Waterway Sediment All Depths

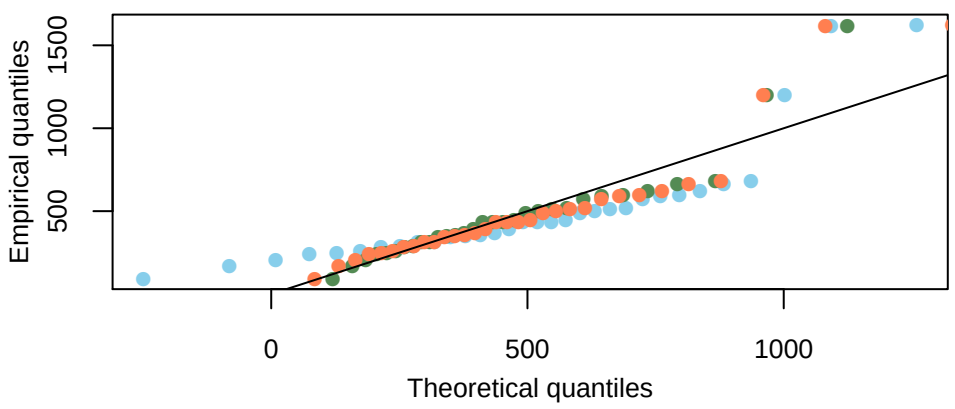
Exposure Unit:
UBC

Chemical (mg/kg):
Manganese

Legend

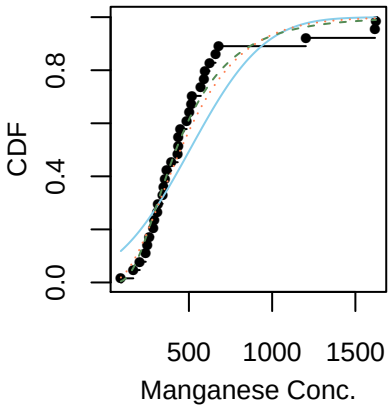
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

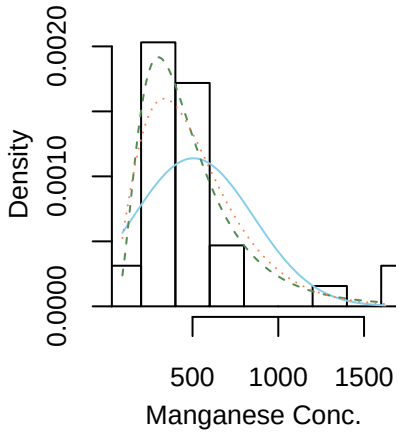


ECDF, Histogram & Q−Q (Detects Only)

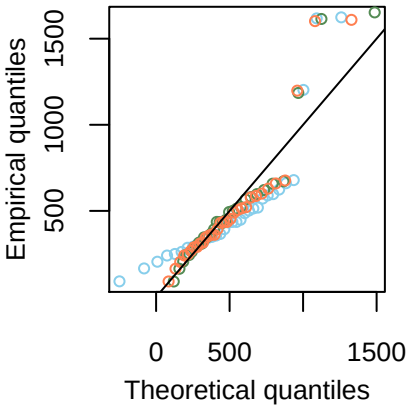
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 91	Arithmetic Mean = 510
N (detect) = 32	SD (log detect) = 0.59	Max (detect) = 1,600 J	Arithmetic SD = 360

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00043	–	–	–	–	469.772	472.704
Lognormal	0.25	0.3	–	–	–	–	447.359	450.29
Gamma	–	–	0.1409	0.162	0.9262	0.758	450.774	453.706

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Manganese

Media:
Waterway Sediment All Depths

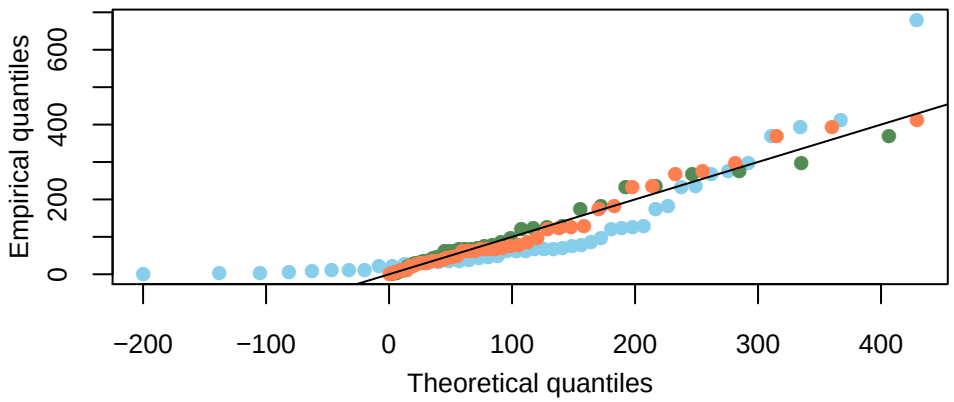
Exposure Unit:
UBC

Chemical (mg/kg):
Mercury

Legend

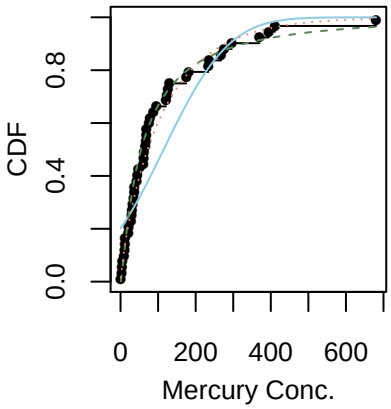
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

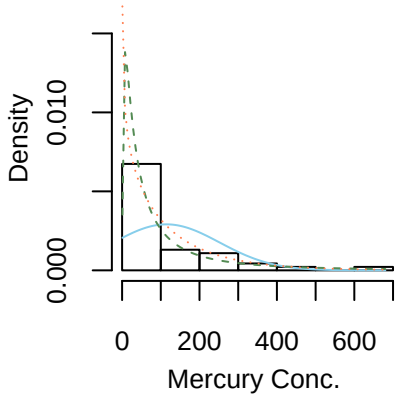


ECDF, Histogram & Q−Q (Detects Only)

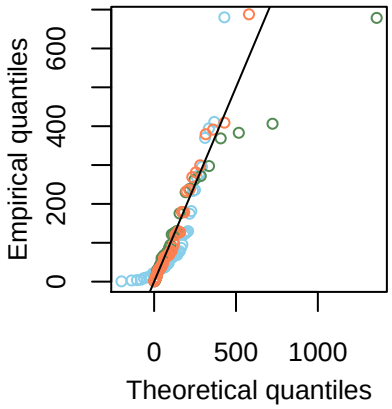
ECDF



Histogram



Q−Q



N = 46	FOD = 100%	Min (detect) = 0.77	Arithmetic Mean = 110
N (detect) = 46	SD (log detect) = 1.4	Max (detect) = 680 J	Arithmetic SD = 140

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	9.4e−07	–	–	–	–	587.176	590.833
Lognormal	0.15	0.3	–	–	–	–	533.877	537.534
Gamma	–	–	0.1061	0.139	0.3629	0.813	530.768	534.426

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Mercury

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **348**

Media:
Waterway Sediment All Depths

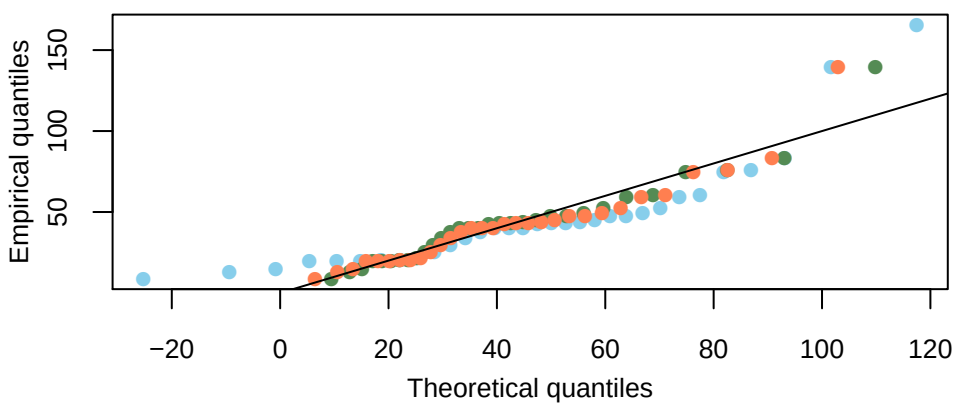
Exposure Unit:
UBC

Chemical (mg/kg):
Nickel

Legend

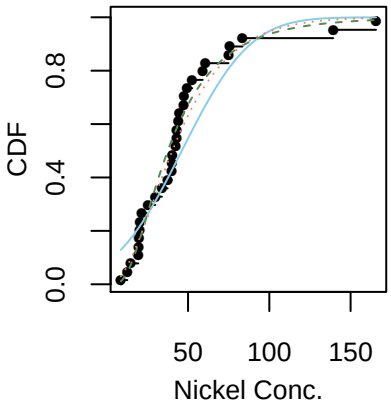
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

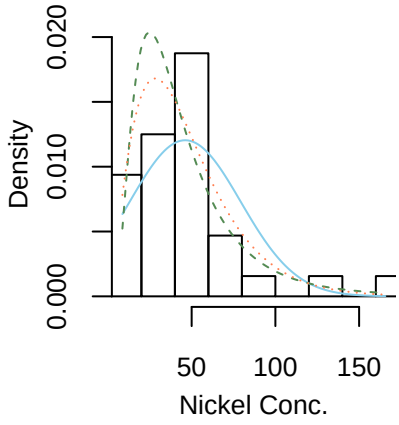


ECDF, Histogram & Q−Q (Detects Only)

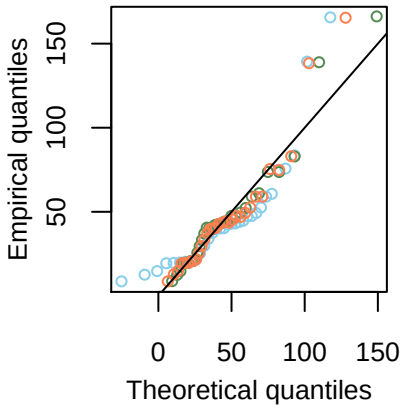
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 8	Arithmetic Mean = 46
N (detect) = 32	SD (log detect) = 0.65	Max (detect) = 170 J	Arithmetic SD = 34

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−05	0.00076	–	–	–	–	318.84	321.772
Lognormal	0.61	0.16	–	–	–	–	298.323	301.255
Gamma	–	–	0.1266	0.162	0.6018	0.758	300.719	303.65

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Nickel

Media:
Waterway Sediment All Depths

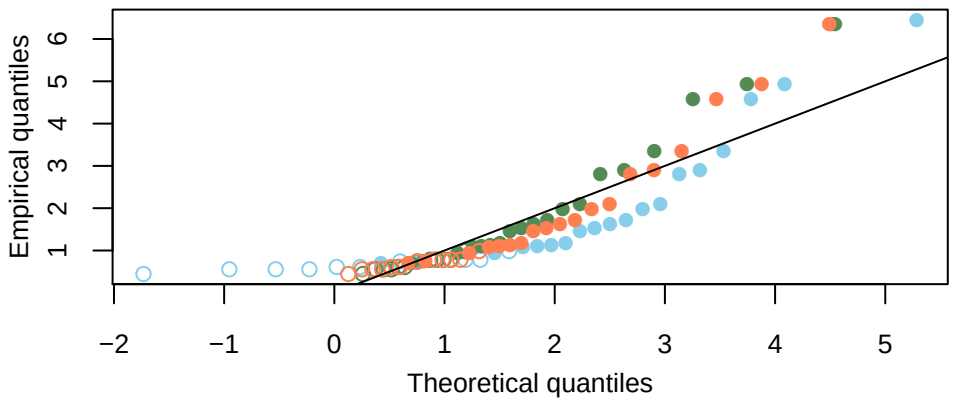
Exposure Unit:
UBC

Chemical (mg/kg):
Thallium

Legend

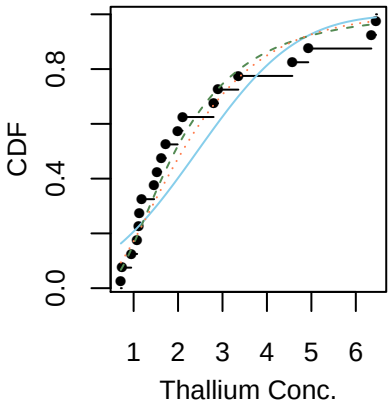
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

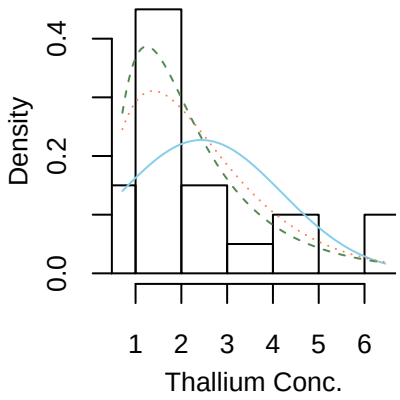


ECDF, Histogram & Q−Q (Detects Only)

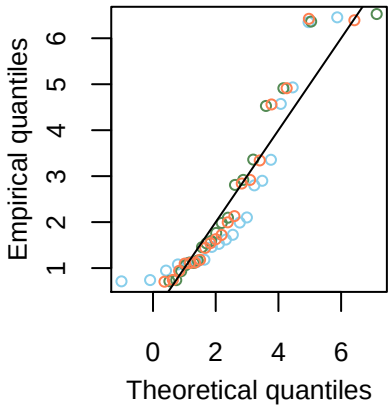
ECDF



Histogram



Q−Q



N = 32	FOD = 62%	Min (detect) = 0.71 J	Kaplan Meier Mean = 1
N (detect) = 20	SD (log detect) = 0.68	Max (detect) = 6 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00011	–	–	–	–	126.052	128.983
Lognormal	0.018	0.052	–	–	–	–	92.8718	95.8033
Gamma	–	–	0.1882	0.165	1.556	0.775	99.8748	102.806

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0018	0.01	–	–	–	–	83.2718	85.2632
Lognormal	0.28	0.69	–	–	–	–	70.873	72.8644
Gamma	–	–	0.1563	0.196	0.6446	0.752	73.1544	75.1459

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Thallium

Media:
Waterway Sediment All Depths

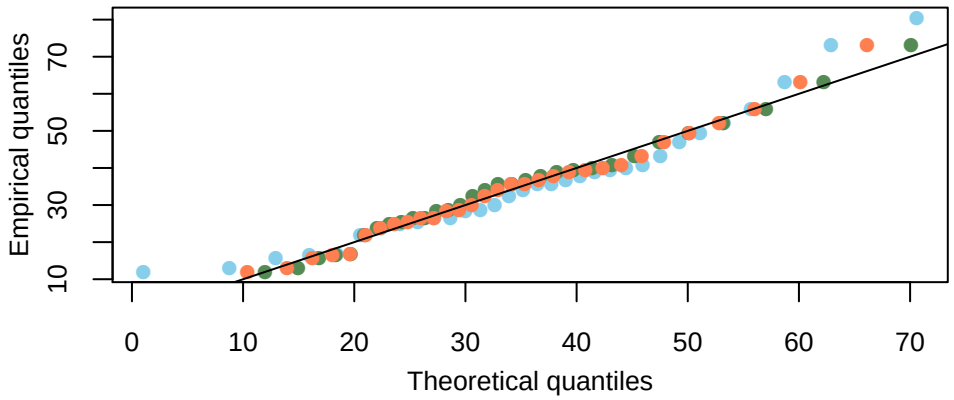
Exposure Unit:
UBC

Chemical (mg/kg):
Vanadium

Legend

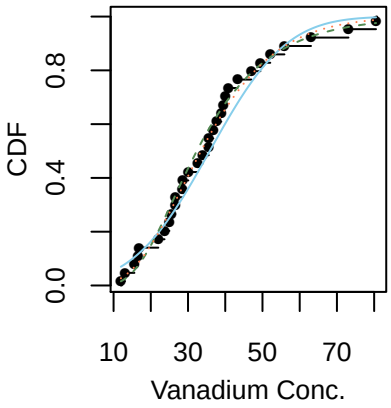
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

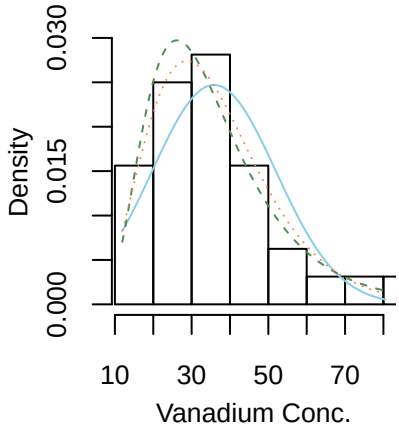


ECDF, Histogram & Q−Q (Detects Only)

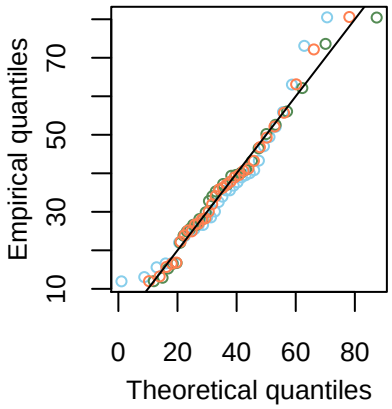
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 12	Arithmetic Mean = 36
N (detect) = 32	SD (log detect) = 0.47	Max (detect) = 80 J	Arithmetic SD = 16

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.067	0.18	–	–	–	–	272.851	275.783
Lognormal	0.8	0.86	–	–	–	–	267.801	270.733
Gamma	–	–	0.07724	0.16	0.1772	0.746	267.511	270.443

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Vanadium

Media:
Waterway Sediment All Depths

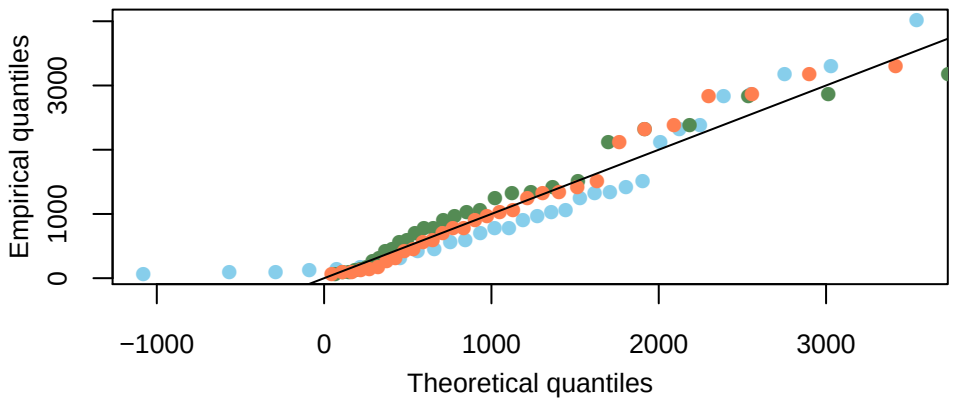
Exposure Unit:
UBC

Chemical (mg/kg):
Zinc

Legend

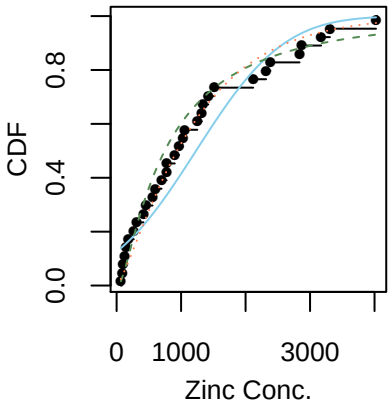
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

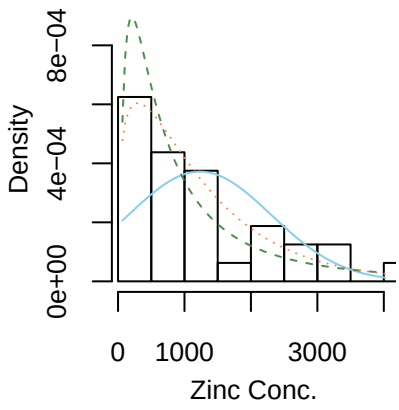


ECDF, Histogram & Q−Q (Detects Only)

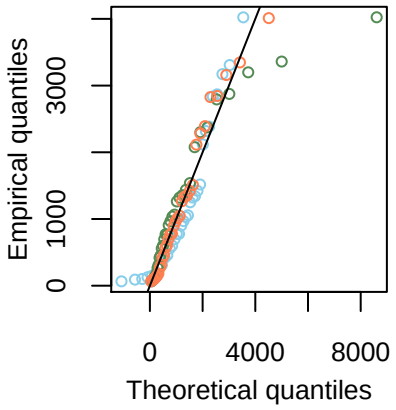
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 66 J	Arithmetic Mean = 1,200
N (detect) = 32	SD (log detect) = 1.2	Max (detect) = 4,000 J	Arithmetic SD = 1,100

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0021	0.041	–	–	–	–	541.414	544.346
Lognormal	0.097	0.46	–	–	–	–	526.277	529.208
Gamma	–	–	0.1002	0.165	0.4737	0.775	523.595	526.526

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Zinc

Exhibit 2: EPC Program and Results
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Berry's Creek Study Area Remedial Investigation

Figure **352**

Media:
Waterway Sediment All Depths

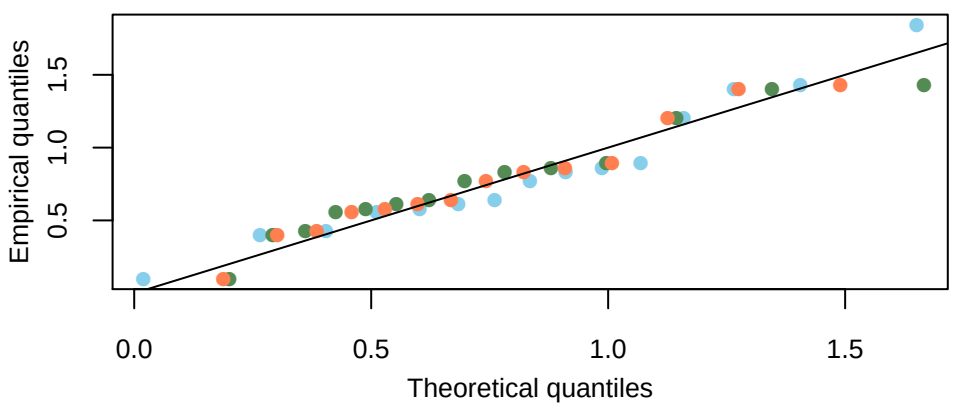
Exposure Unit:
UBC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

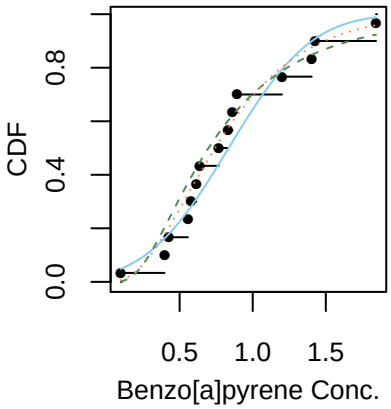
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

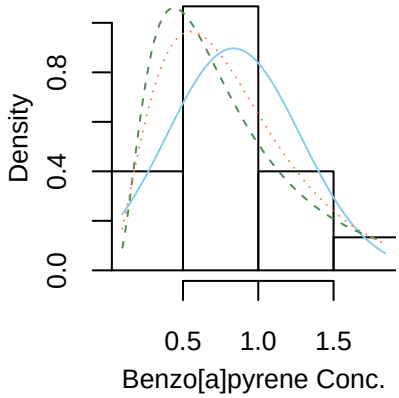


ECDF, Histogram & Q−Q (Detects Only)

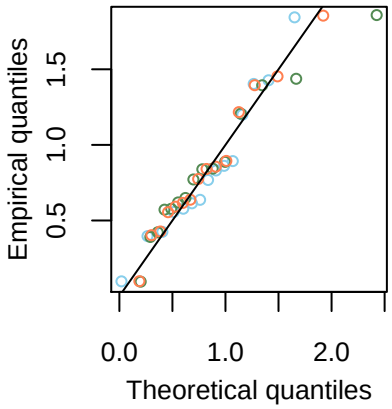
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 0.098 J	Arithmetic Mean = 0.84
N (detect) = 15	SD (log detect) = 0.7	Max (detect) = 1 J	Arithmetic SD = 0.46

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.49	0.19	–	–	–	–	22.2687	23.6848
Lognormal	0.061	0.26	–	–	–	–	24.1694	25.5855
Gamma	–	–	0.1266	0.224	0.288	0.747	21.3472	22.7633

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Benzo[a]pyrene

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **353**

Media:
Waterway Sediment All Depths

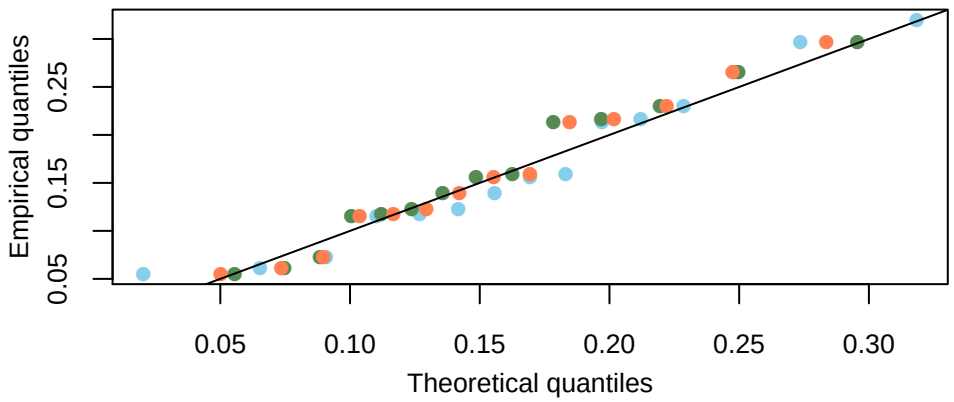
Exposure Unit:
UBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

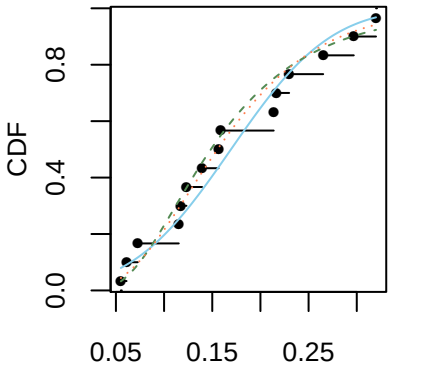
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

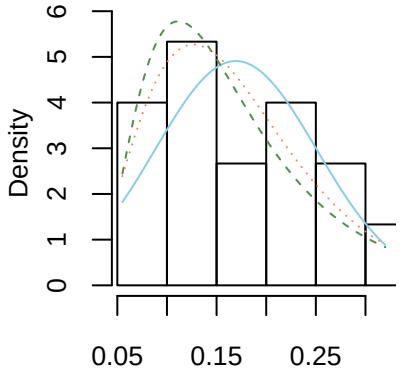


ECDF, Histogram & Q−Q (Detects Only)

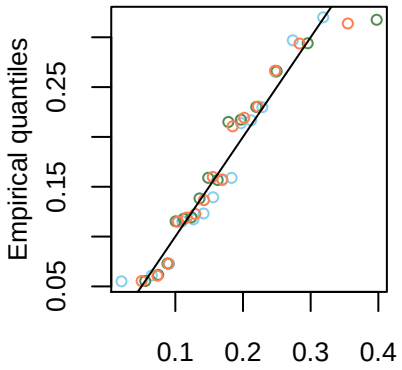
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 0.055 J	Arithmetic Mean = 0.17
N (detect) = 15	SD (log detect) = 0.56	Max (detect) = 0.32 J	Arithmetic SD = 0.084

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.47	0.48	–	–	–	–	−28.7311	−27.315
Lognormal	0.42	0.55	–	–	–	–	−29.3031	−27.887
Gamma	–	–	0.1409	0.224	0.2619	0.747	−30.0145	−28.5984

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Dibenz[a,h]anthracene

Media:
Waterway Sediment All Depths

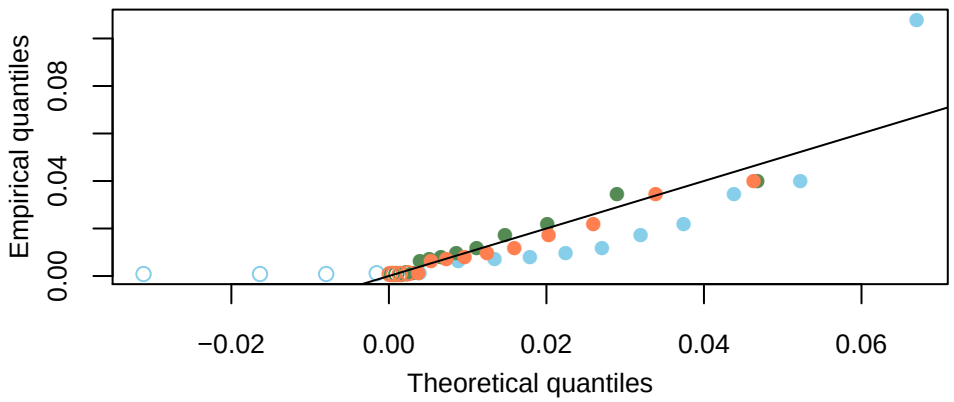
Exposure Unit:
UBC

Chemical (mg/kg):
Aldrin

Legend

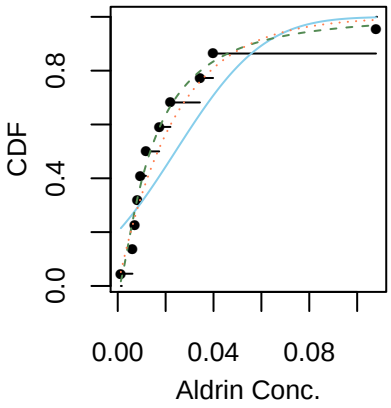
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

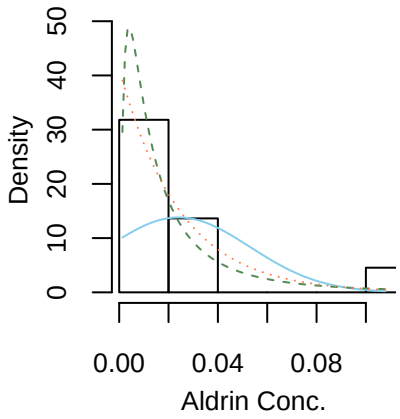


ECDF, Histogram & Q−Q (Detects Only)

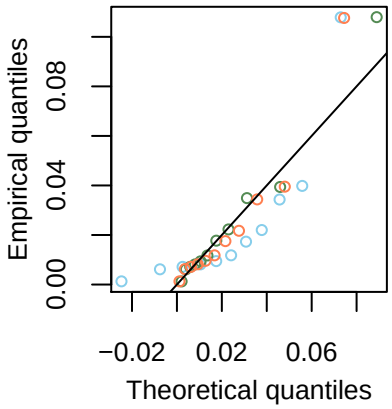
ECDF



Histogram



Q−Q



N = 15	FOD = 73%	Min (detect) = 0.0013 J	Kaplan Meier Mean = 0.018
N (detect) = 11	SD (log detect) = 1.2	Max (detect) = 0.11 J	Kaplan Meier SD = 0.027

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	6e−05	0.0047	–	–	–	–	−62.0473	−60.6312
Lognormal	0.18	0.19	–	–	–	–	−91.2521	−89.836
Gamma	–	–	0.1732	0.234	0.4707	0.793	−89.4236	−88.0075

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00035	0.044	–	–	–	–	−42.7686	−41.9728
Lognormal	0.92	0.62	–	–	–	–	−57.0344	−56.2386
Gamma	–	–	0.1594	0.274	0.3534	0.748	−55.9409	−55.1451

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment All Depths in UBC−Aldrin

Exhibit 2: EPC Program and Results
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Figure **355**

Media:
Waterway Sediment All Depths

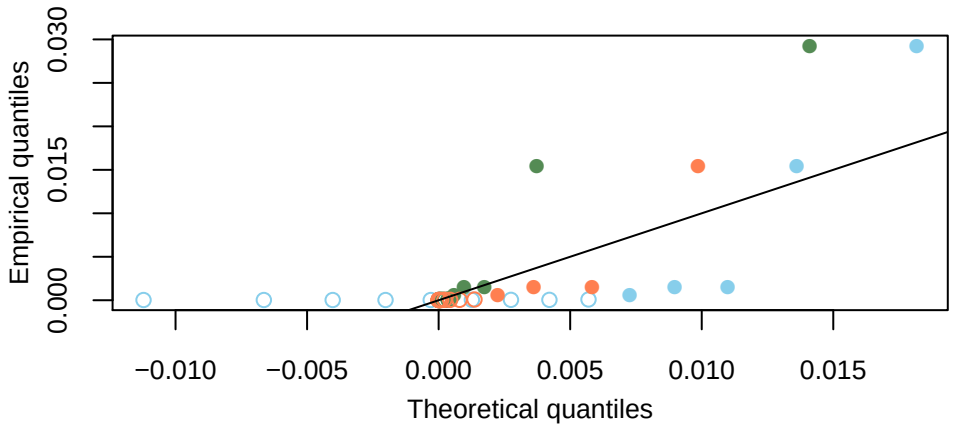
Exposure Unit:
UBC

Chemical (mg/kg):
Heptachlor

Legend

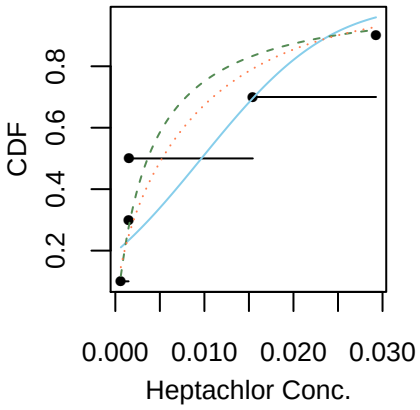
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

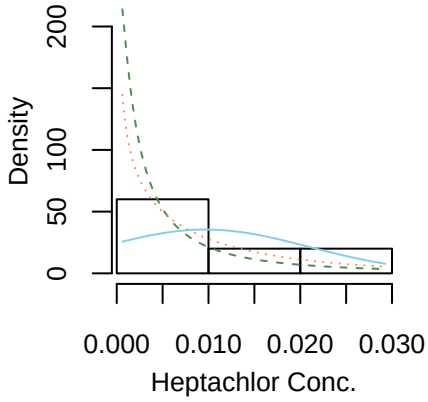


ECDF, Histogram & Q−Q (Detects Only)

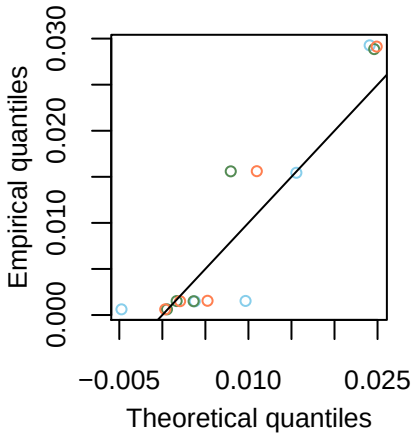
ECDF



Histogram



Q−Q



N = 14	FOD = 36%	Min (detect) = 0.00062 J	Kaplan Meier Mean = 0.0035
N (detect) = 5	SD (log detect) = 1.7	Max (detect) = 0.029 J	Kaplan Meier SD = 0.0081

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.7e−08	–	–	–	–	−90.9341	−89.6559
Lognormal	0.003	0.0026	–	–	–	–	−171.101	−169.823
Gamma	–	–	0.3258	0.2944	1.899	0.8551	−162.114	−160.836

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.072	N<5	–	–	–	–	−26.6859	−27.467
Lognormal	0.31	N<5	–	–	–	–	−33.9809	−34.762
Gamma	–	–	NA	NA	NA	NA	−33.2631	−34.0442

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Heptachlor

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **356**

Media:
Waterway Sediment All Depths

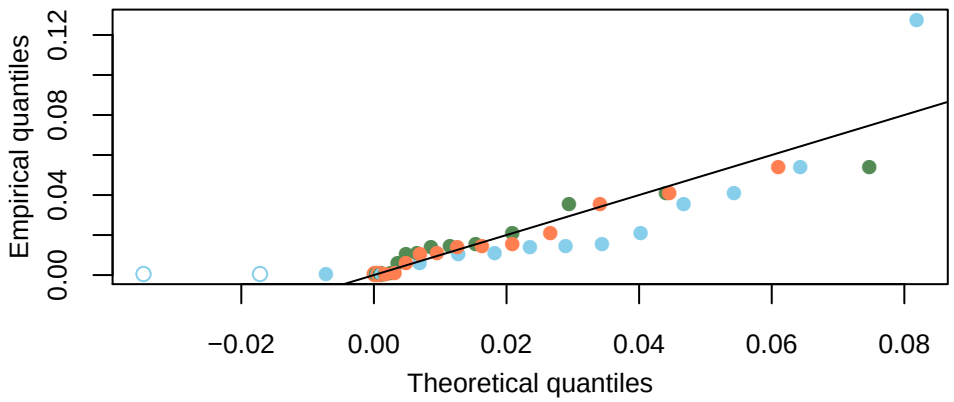
Exposure Unit:
UBC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

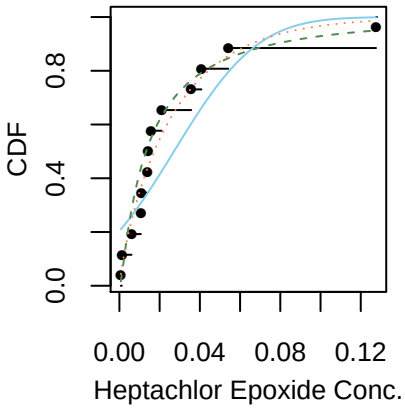
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

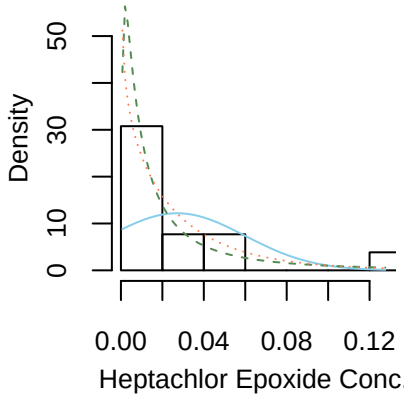


ECDF, Histogram & Q−Q (Detects Only)

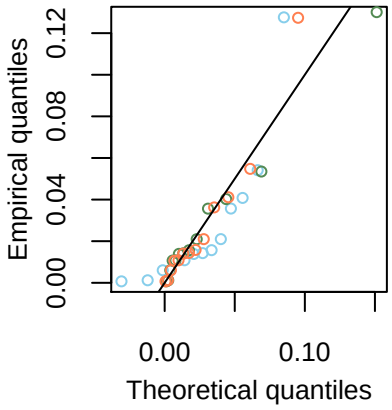
ECDF



Histogram



Q−Q



N = 15	FOD = 87%	Min (detect) = 7e−04 J	Kaplan Meier Mean = 0.024
N (detect) = 13	SD (log detect) = 1.4	Max (detect) = 0.13 J	Kaplan Meier SD = 0.032

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00019	0.0059	–	–	–	–	−56.8803	−55.4642
Lognormal	0.12	0.061	–	–	–	–	−80.3463	−78.9302
Gamma	–	–	0.1337	0.234	0.3458	0.793	−81.3404	−79.9243

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00069	0.014	–	–	–	–	−47.997	−46.8671
Lognormal	0.38	0.13	–	–	–	–	−63.2037	−62.0738
Gamma	–	–	0.1442	0.281	0.2867	0.777	−64.1331	−63.0032

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Heptachlor Epoxide

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **357**

Media:
Waterway Sediment All Depths

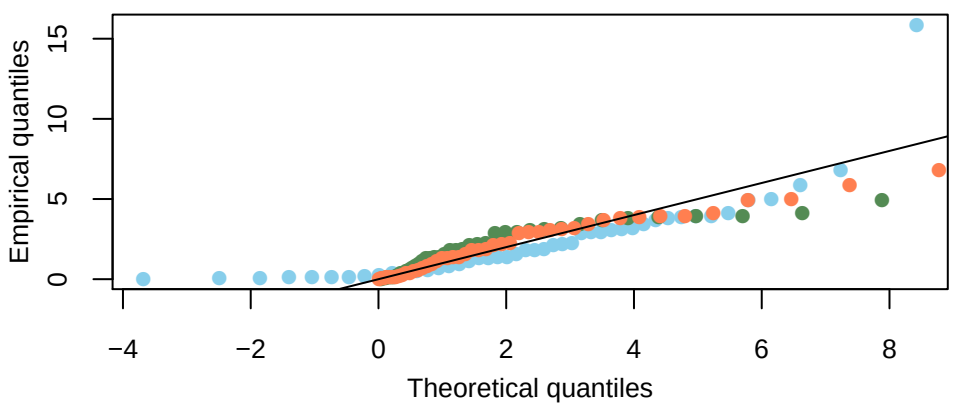
Exposure Unit:
UBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

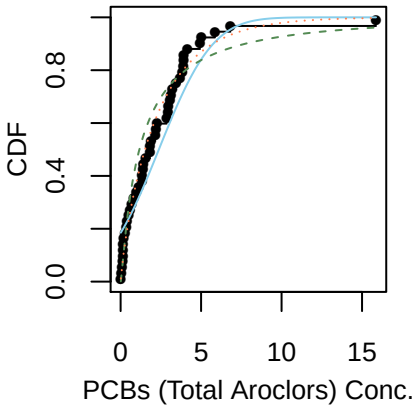
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

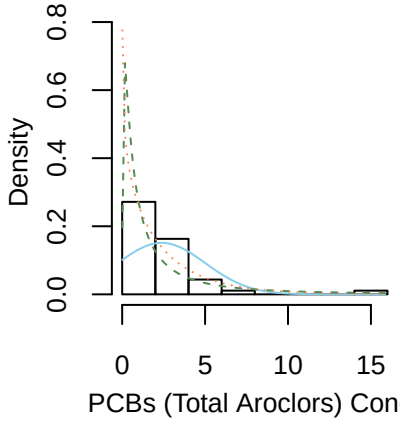


ECDF, Histogram & Q−Q (Detects Only)

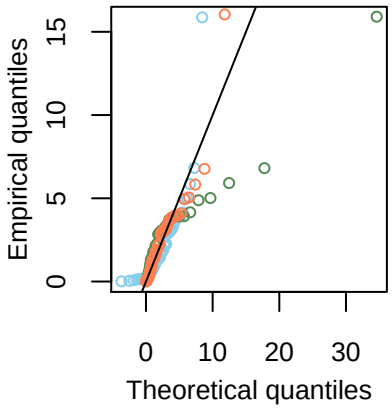
ECDF



Histogram



Q−Q



N = 46	FOD = 100%	Min (detect) = 0.013 J	Arithmetic Mean = 2
N (detect) = 46	SD (log detect) = 1.5	Max (detect) = 16 J	Arithmetic SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00031	–	–	–	–	223.774	227.431
Lognormal	0.0026	0.0034	–	–	–	–	184.516	188.174
Gamma	–	–	0.09661	0.139	0.5052	0.813	174.458	178.115

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−PCBs (Total Aroclors)

Media:
Waterway Sediment All Depths

Exposure Unit:
UBC

Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 15	FOD = 7%	Min (detect) = 0.0015 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0015 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in UBC−Trichloroethene

Media:
Waterway Sediment All Depths

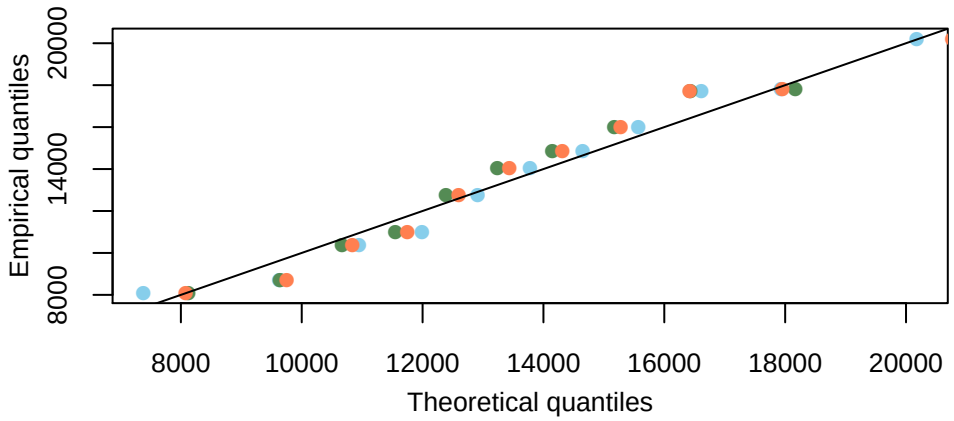
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Aluminum

Legend

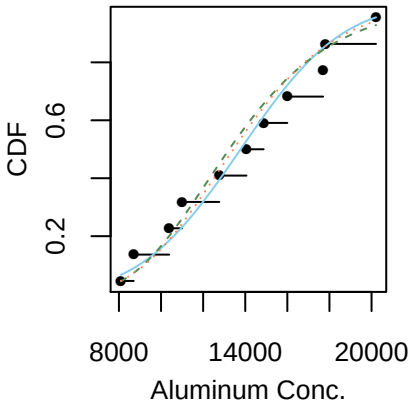
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

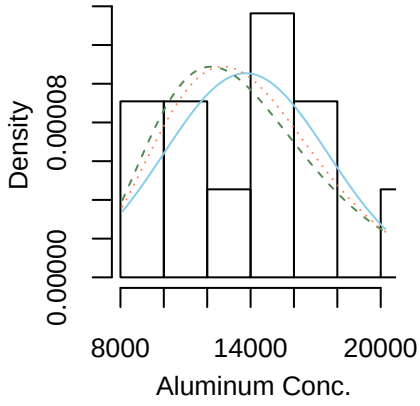


ECDF, Histogram & Q−Q (Detects Only)

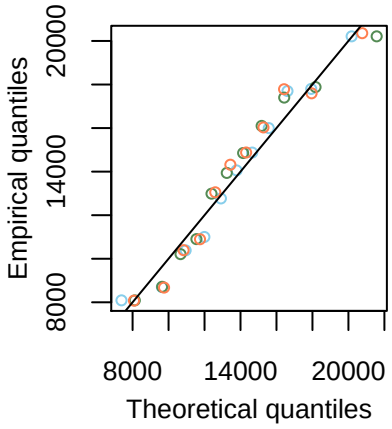
ECDF



Histogram



Q−Q



N = 11	FOD = 100%	Min (detect) = 8,100	Arithmetic Mean = 14,000
N (detect) = 11	SD (log detect) = 0.3	Max (detect) = 20,000 J	Arithmetic SD = 4,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.82	0.92	–	–	–	–	216.469	217.265
Lognormal	0.68	0.91	–	–	–	–	216.691	217.487
Gamma	–	–	0.1237	0.267	0.2555	0.725	216.452	217.247

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Alu

Media:
Waterway Sediment All Depths

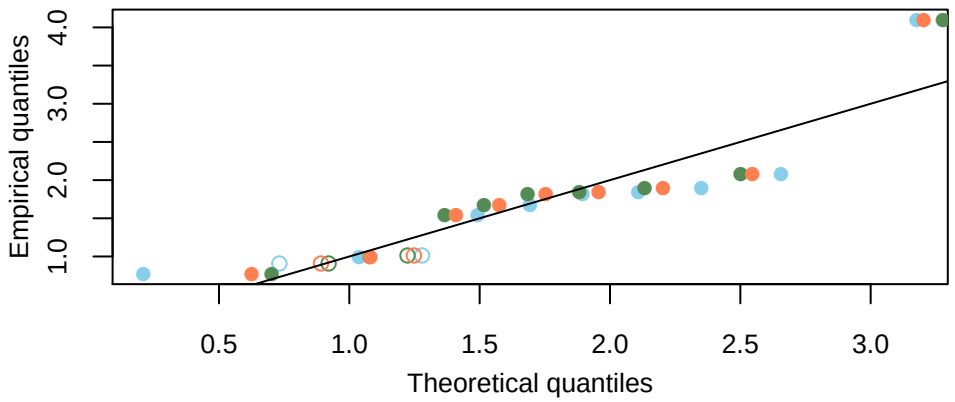
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Antimony

Legend

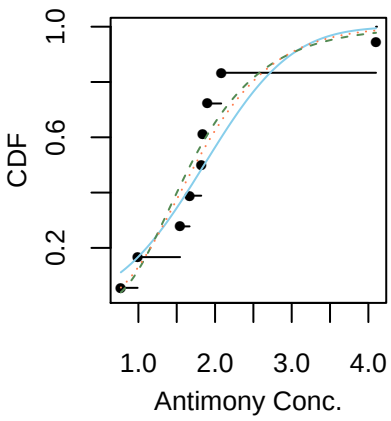
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

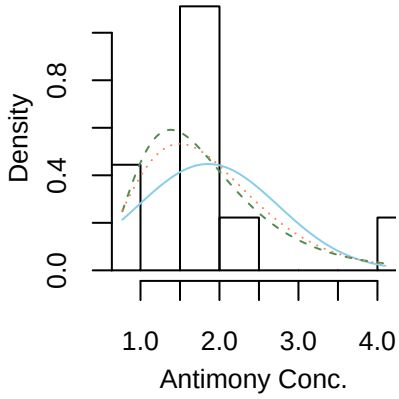


ECDF, Histogram & Q−Q (Detects Only)

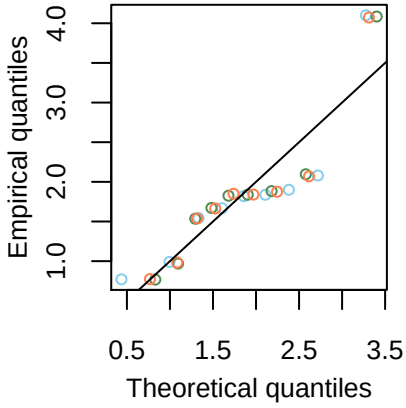
ECDF



Histogram



Q−Q



N = 11	FOD = 82%	Min (detect) = 0.77 J	Kaplan Meier Mean = 1
N (detect) = 9	SD (log detect) = 0.47	Max (detect) = 4 J	Kaplan Meier SD = 0.88

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0083	0.061	–	–	–	–	32.3386	33.1344
Lognormal	0.38	0.56	–	–	–	–	27.0964	27.8922
Gamma	–	–	0.1791	0.27	0.4945	0.736	28.1417	28.9375

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.024	0.023	–	–	–	–	27.4696	27.8641
Lognormal	0.4	0.28	–	–	–	–	24.2165	24.6109
Gamma	–	–	0.2302	0.28	0.5201	0.723	24.6991	25.0936

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Ant

Media:
Waterway Sediment All Depths

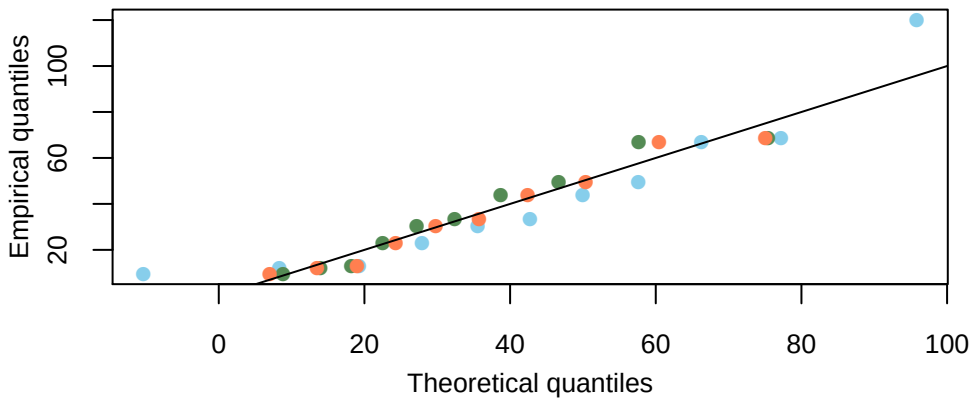
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Arsenic

Legend

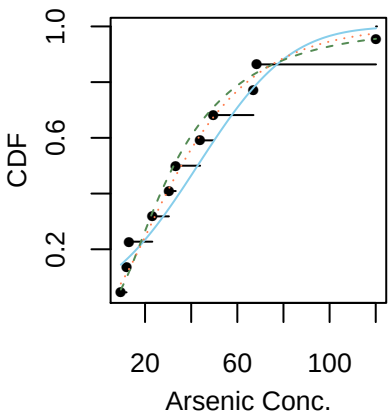
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

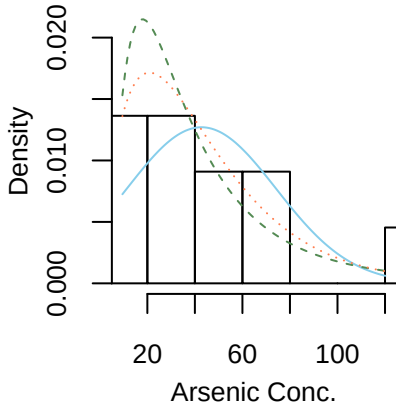


ECDF, Histogram & Q−Q (Detects Only)

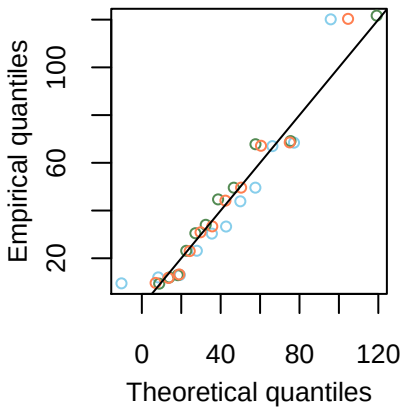
ECDF



Histogram



Q−Q



N = 11	FOD = 100%	Min (detect) = 9	Arithmetic Mean = 43
N (detect) = 11	SD (log detect) = 0.81	Max (detect) = 120 J	Arithmetic SD = 33

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.099	0.62	–	–	–	–	111.048	111.844
Lognormal	0.79	0.76	–	–	–	–	105.998	106.794
Gamma	–	–	0.1443	0.274	0.2118	0.748	106.212	107.007

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Ars

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **362**

Media:
Waterway Sediment All Depths

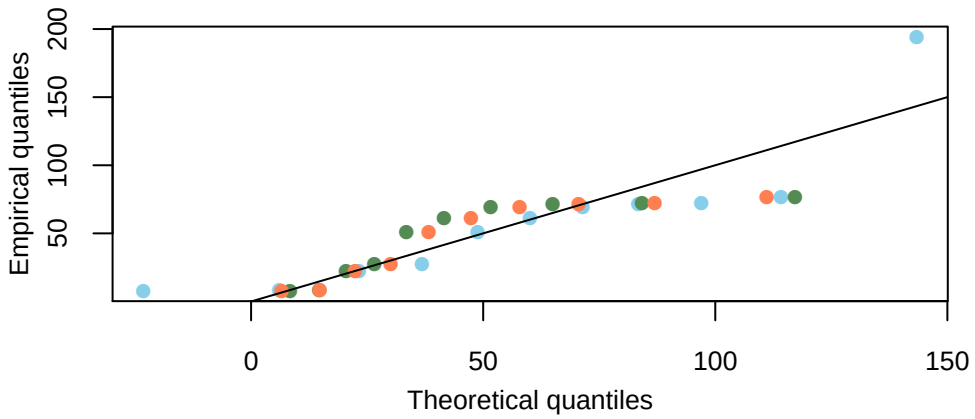
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Cadmium

Legend

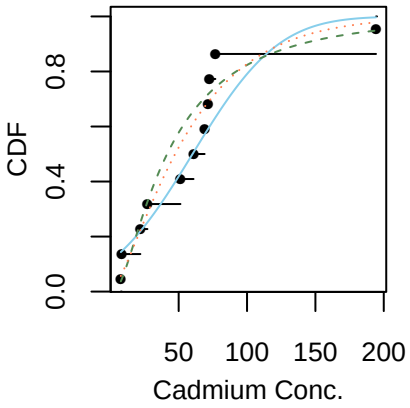
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

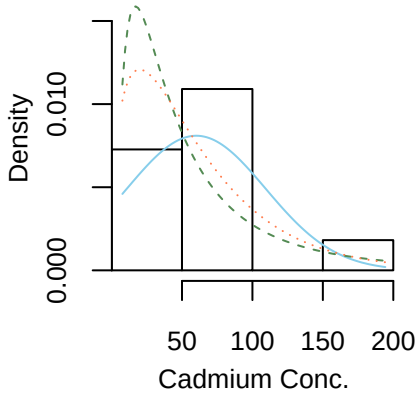


ECDF, Histogram & Q−Q (Detects Only)

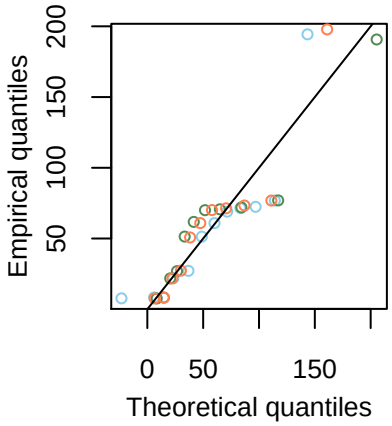
ECDF



Histogram



Q−Q



N = 11	FOD = 100%	Min (detect) = 7 J	Arithmetic Mean = 60
N (detect) = 11	SD (log detect) = 0.99	Max (detect) = 190 J	Arithmetic SD = 52

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0096	0.014	–	–	–	–	120.958	121.754
Lognormal	0.18	0.14	–	–	–	–	115.967	116.763
Gamma	–	–	0.1892	0.274	0.4659	0.748	115.152	115.948

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Cad

Media:
Waterway Sediment All Depths

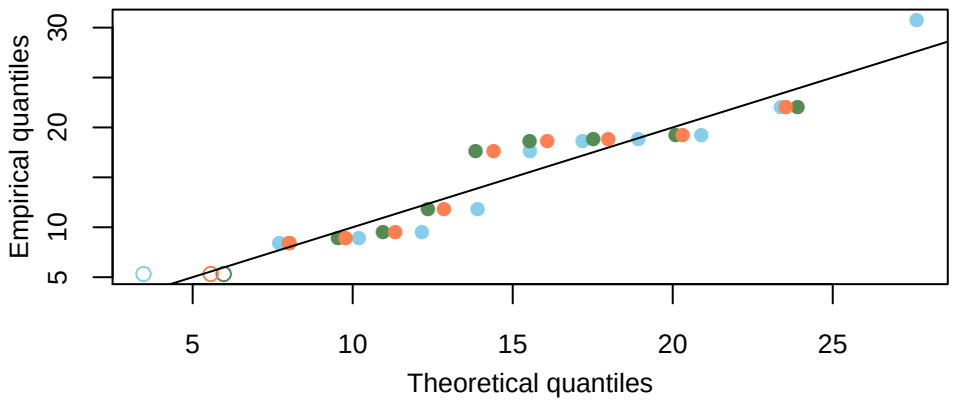
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Cobalt

Legend

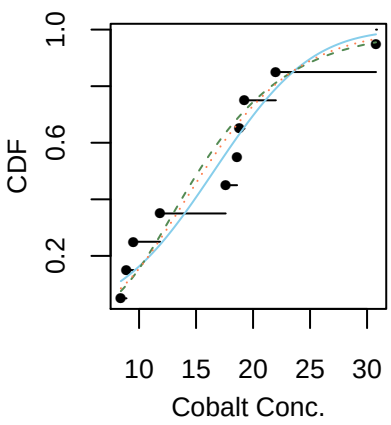
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

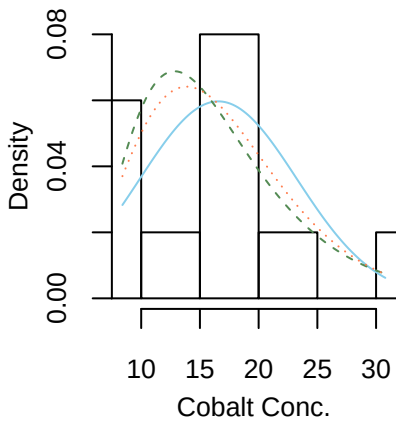


ECDF, Histogram & Q−Q (Detects Only)

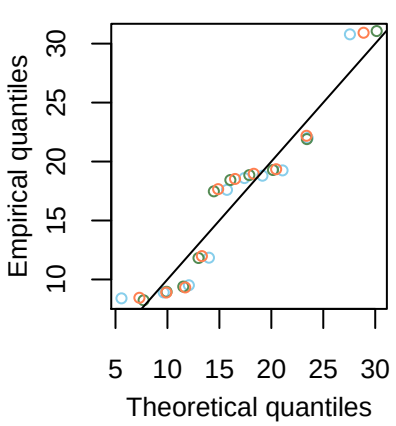
ECDF



Histogram



Q−Q



N = 11	FOD = 91%	Min (detect) = 8 J	Kaplan Meier Mean = 15
N (detect) = 10	SD (log detect) = 0.44	Max (detect) = 31 J	Kaplan Meier SD = 7

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.46	0.67	–	–	–	–	78.4814	79.2772
Lognormal	0.6	0.13	–	–	–	–	77.689	78.4848
Gamma	–	–	0.21	0.27	0.3687	0.736	77.3445	78.1403

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.26	0.68	–	–	–	–	70.3722	70.9774
Lognormal	0.31	0.14	–	–	–	–	69.2455	69.8507
Gamma	–	–	0.2123	0.267	0.458	0.729	69.2511	69.8563

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Cob

Media:
Waterway Sediment All Depths

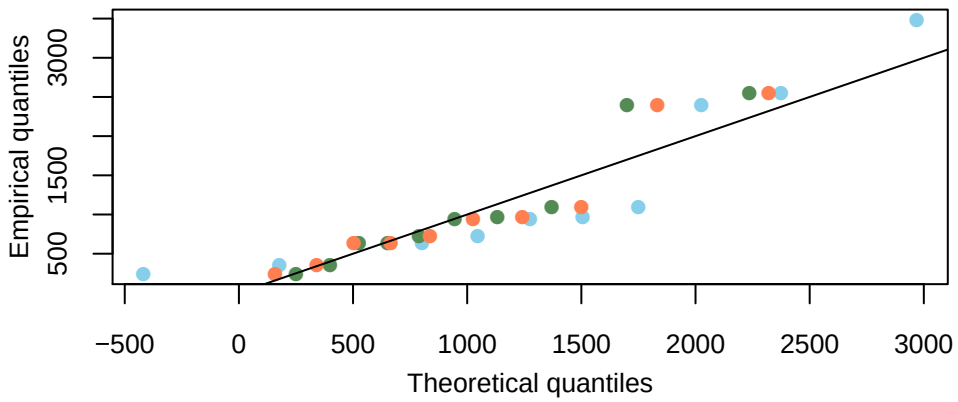
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Copper

Legend

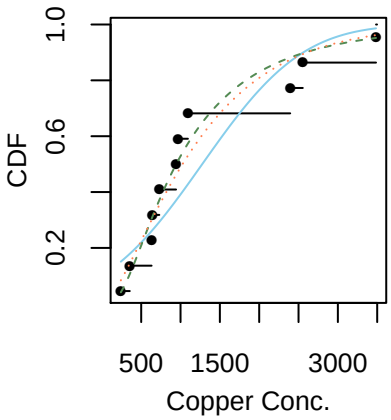
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

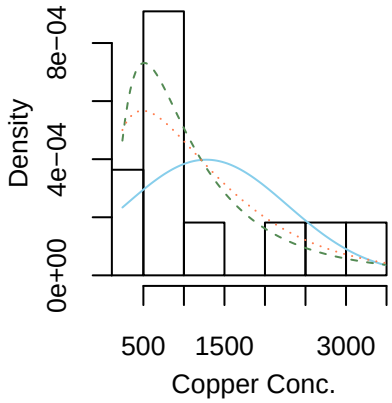


ECDF, Histogram & Q−Q (Detects Only)

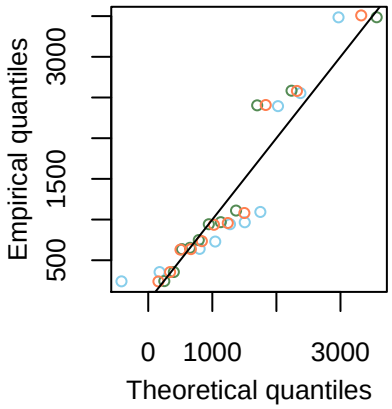
ECDF



Histogram



Q−Q



N = 11	FOD = 100%	Min (detect) = 240 J	Arithmetic Mean = 1,300
N (detect) = 11	SD (log detect) = 0.82	Max (detect) = 3,500 J	Arithmetic SD = 1,100

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.023	0.0078	–	–	–	–	187.226	188.022
Lognormal	0.73	0.63	–	–	–	–	180.626	181.422
Gamma	–	–	0.1969	0.274	0.3798	0.748	181.452	182.248

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Cop

Media:
Waterway Sediment All Depths

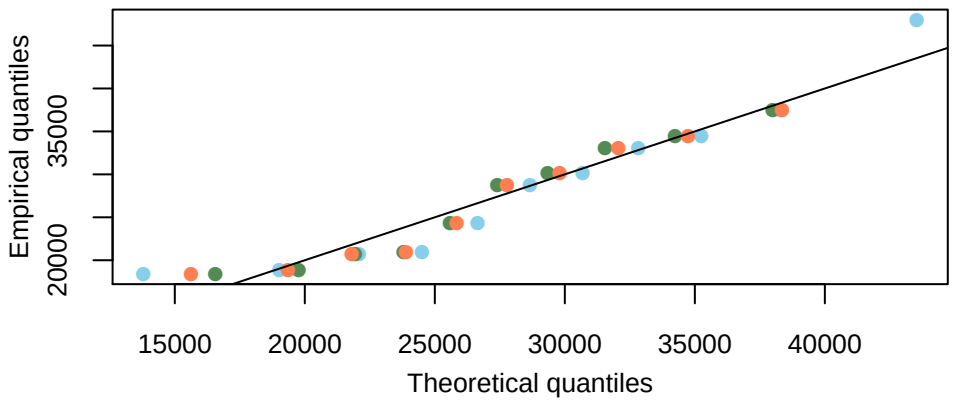
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Iron

Legend

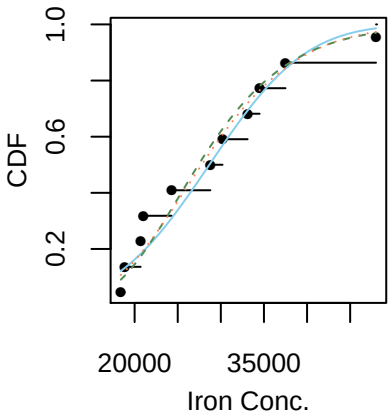
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

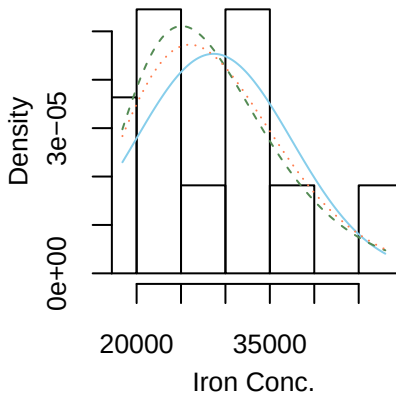


ECDF, Histogram & Q−Q (Detects Only)

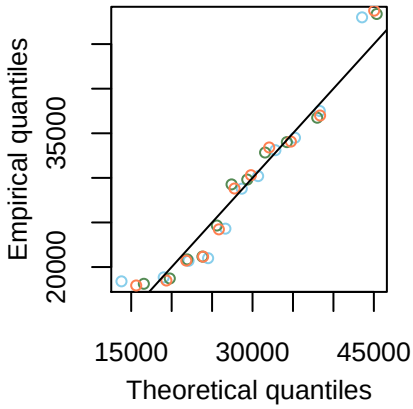
ECDF



Histogram



Q−Q



N = 11	FOD = 100%	Min (detect) = 18,000 J	Arithmetic Mean = 29,000
N (detect) = 11	SD (log detect) = 0.31	Max (detect) = 48,000 J	Arithmetic SD = 9,200

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.34	0.59	–	–	–	–	235.021	235.817
Lognormal	0.59	0.53	–	–	–	–	233.379	234.175
Gamma	–	–	0.1686	0.267	0.2739	0.725	233.729	234.525

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Iron

Media:
Waterway Sediment All Depths

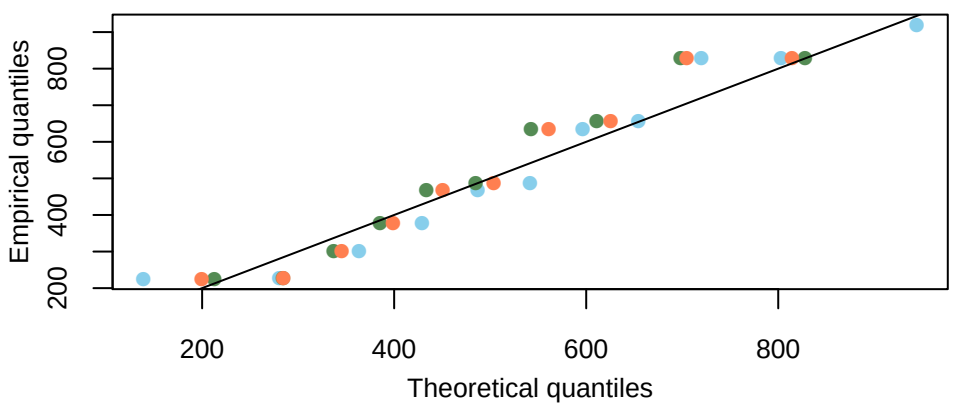
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Manganese

Legend

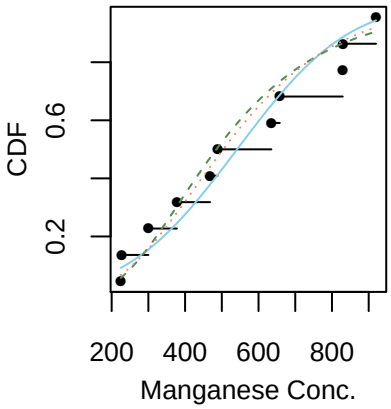
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

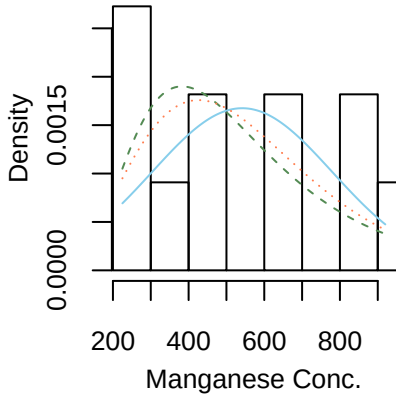


ECDF, Histogram & Q−Q (Detects Only)

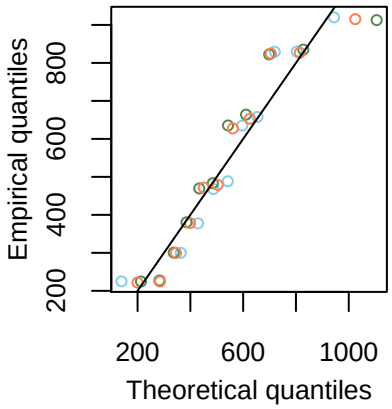
ECDF



Histogram



Q−Q



N = 11	FOD = 100%	Min (detect) = 220 J	Arithmetic Mean = 540
N (detect) = 11	SD (log detect) = 0.51	Max (detect) = 920 J	Arithmetic SD = 250

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.38	0.72	–	–	–	–	155.624	156.42
Lognormal	0.31	0.65	–	–	–	–	155.46	156.256
Gamma	–	–	0.1483	0.27	0.3323	0.736	155.046	155.841

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Manganese

Media:
Waterway Sediment All Depths

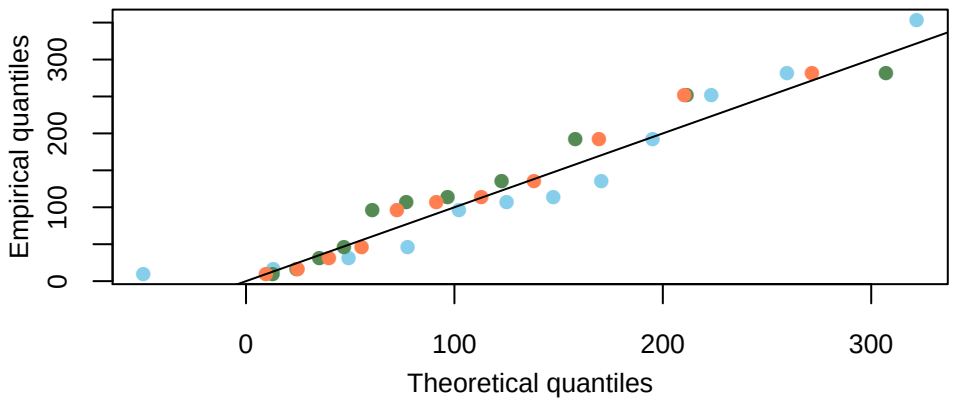
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Mercury

Legend

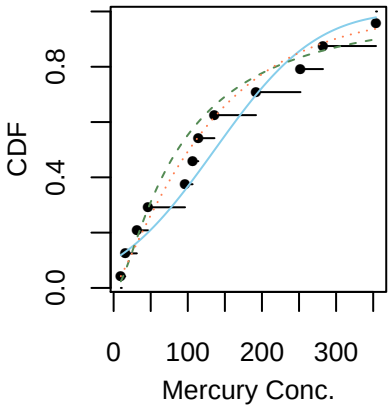
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

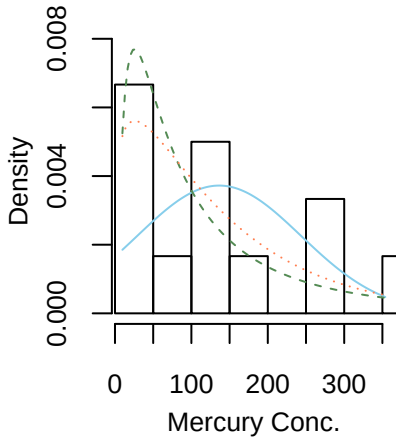


ECDF, Histogram & Q−Q (Detects Only)

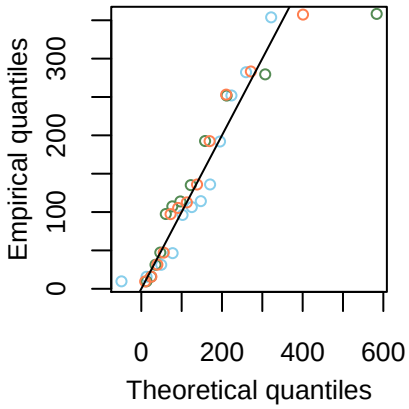
ECDF



Histogram



Q−Q



N = 12	FOD = 100%	Min (detect) = 9 J	Arithmetic Mean = 140
N (detect) = 12	SD (log detect) = 1.2	Max (detect) = 350 J	Arithmetic SD = 110

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.28	0.46	–	–	–	–	150.235	151.205
Lognormal	0.34	0.18	–	–	–	–	147.409	148.379
Gamma	–	–	0.145	0.274	0.2316	0.748	145.658	146.628

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Mer

Media:
Waterway Sediment All Depths

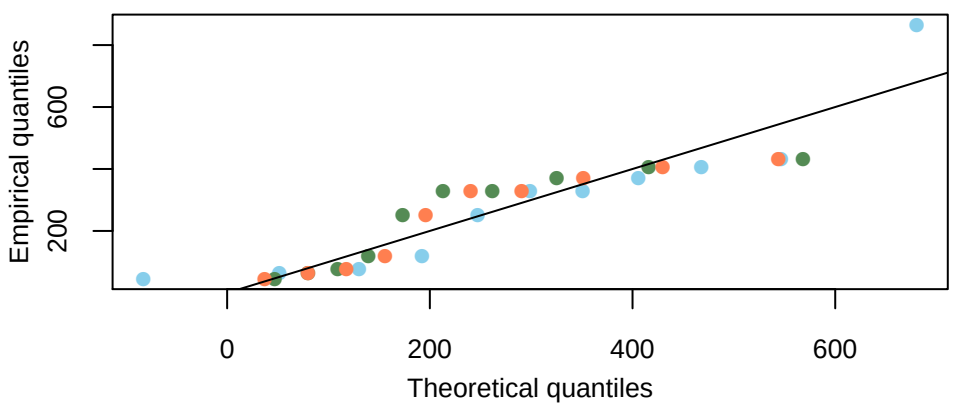
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Nickel

Legend

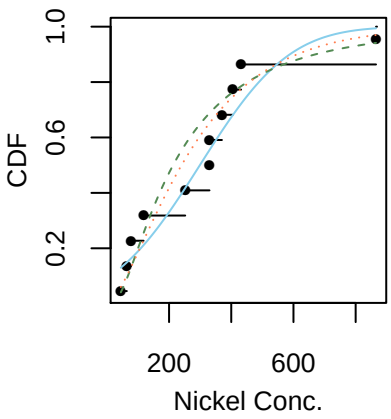
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

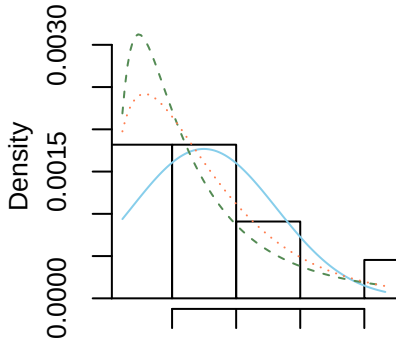


ECDF, Histogram & Q−Q (Detects Only)

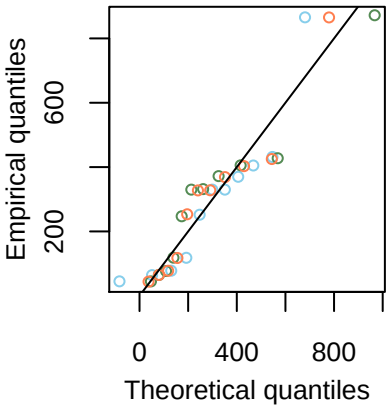
ECDF



Histogram



Q−Q



N = 11	FOD = 100%	Min (detect) = 45 J	Arithmetic Mean = 300
N (detect) = 11	SD (log detect) = 0.94	Max (detect) = 870 J	Arithmetic SD = 240

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.07	0.27	–	–	–	–	154.436	155.232
Lognormal	0.3	0.12	–	–	–	–	150.719	151.515
Gamma	–	–	0.1973	0.274	0.4255	0.748	150.072	150.868

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Nicl

Media:
Waterway Sediment All Depths

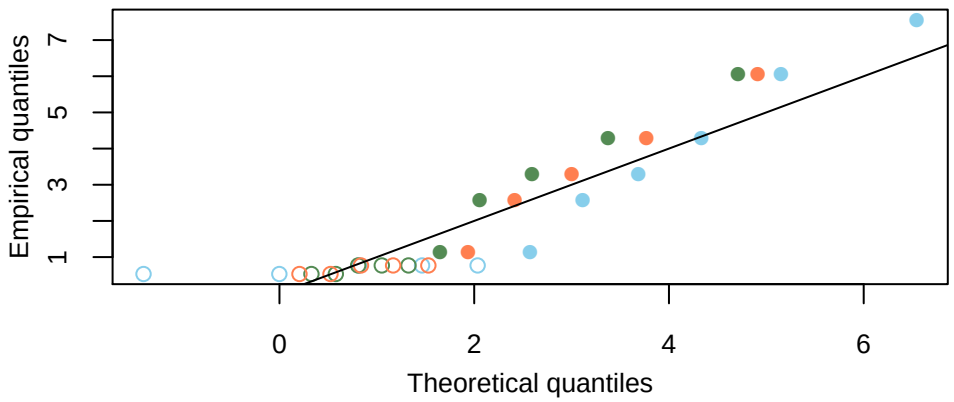
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Thallium

Legend

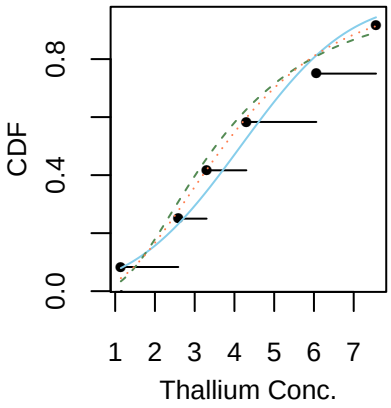
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

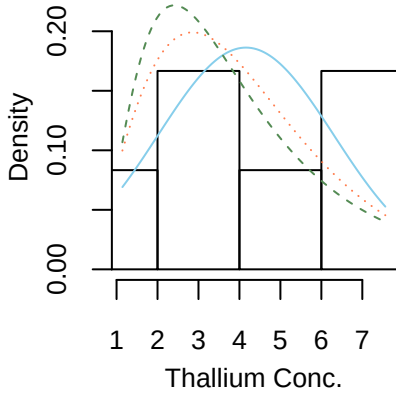


ECDF, Histogram & Q−Q (Detects Only)

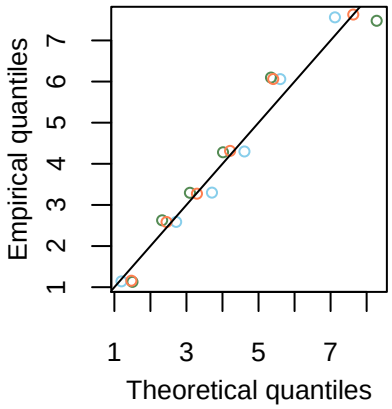
ECDF



Histogram



Q−Q



N = 11	FOD = 55%	Min (detect) = 1 J	Kaplan Meier Mean = 2
N (detect) = 6	SD (log detect) = 0.68	Max (detect) = 7 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.017	0.03	–	–	–	–	54.0023	54.7981
Lognormal	0.1	0.1	–	–	–	–	45.2506	46.0464
Gamma	–	–	0.2466	0.274	0.6566	0.748	46.4537	47.2495

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.95	0.96	–	–	–	–	30.1658	29.7493
Lognormal	0.78	0.91	–	–	–	–	30.3574	29.941
Gamma	–	–	NA	NA	NA	NA	29.8174	29.4009

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Tha

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **370**

Media:
Waterway Sediment All Depths

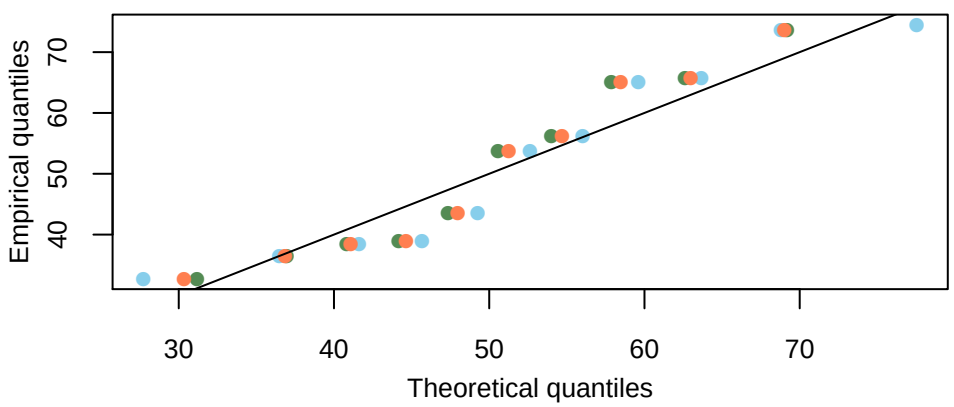
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Vanadium

Legend

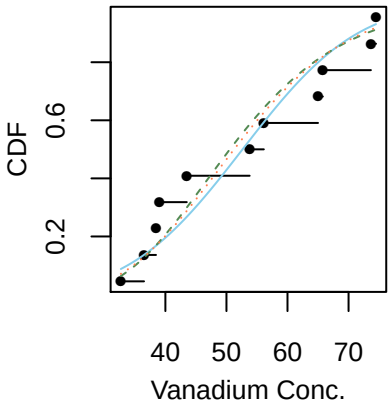
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

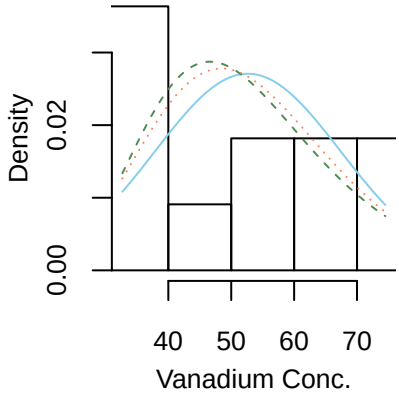


ECDF, Histogram & Q−Q (Detects Only)

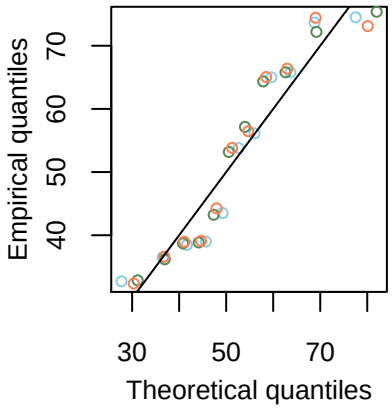
ECDF



Histogram



Q−Q



N = 11	FOD = 100%	Min (detect) = 33 J	Arithmetic Mean = 53
N (detect) = 11	SD (log detect) = 0.3	Max (detect) = 74 J	Arithmetic SD = 15

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.22	0.43	–	–	–	–	94.3979	95.1937
Lognormal	0.26	0.5	–	–	–	–	93.9894	94.7852
Gamma	–	–	0.1839	0.267	0.4559	0.725	93.9774	94.7732

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Van

Media:
Waterway Sediment All Depths

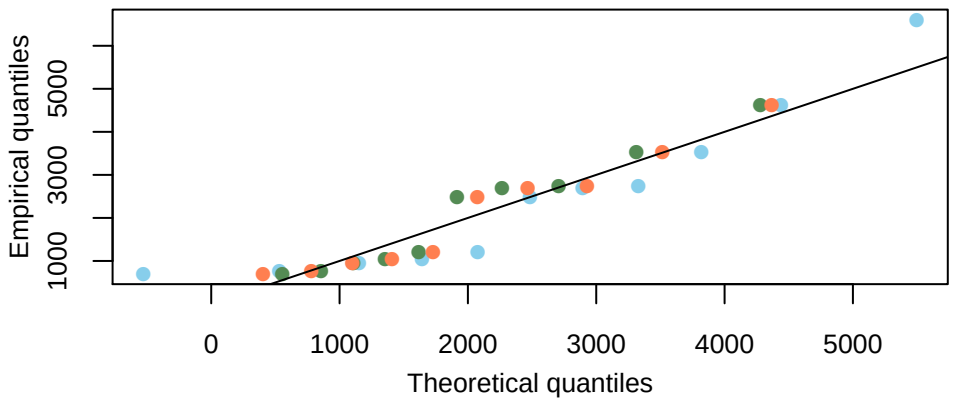
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Zinc

Legend

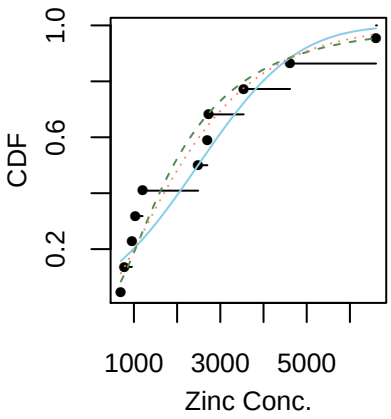
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

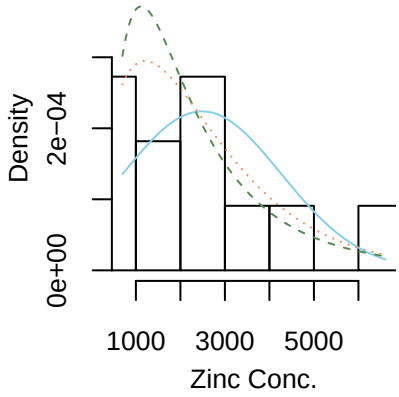


ECDF, Histogram & Q−Q (Detects Only)

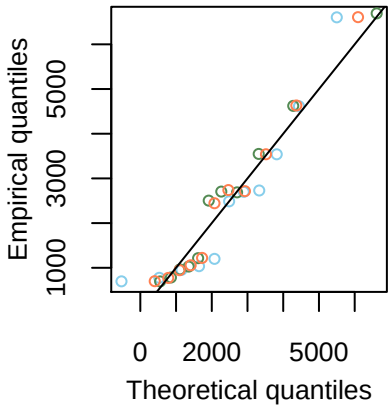
ECDF



Histogram



Q−Q



N = 11	FOD = 100%	Min (detect) = 700 J	Arithmetic Mean = 2,500
N (detect) = 11	SD (log detect) = 0.77	Max (detect) = 6,600 J	Arithmetic SD = 1,900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.077	0.2	–	–	–	–	199.899	200.695
Lognormal	0.39	0.38	–	–	–	–	194.655	195.45
Gamma	–	–	0.1977	0.274	0.3777	0.748	195.256	196.052

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Zinc

Media:
Waterway Sediment All Depths

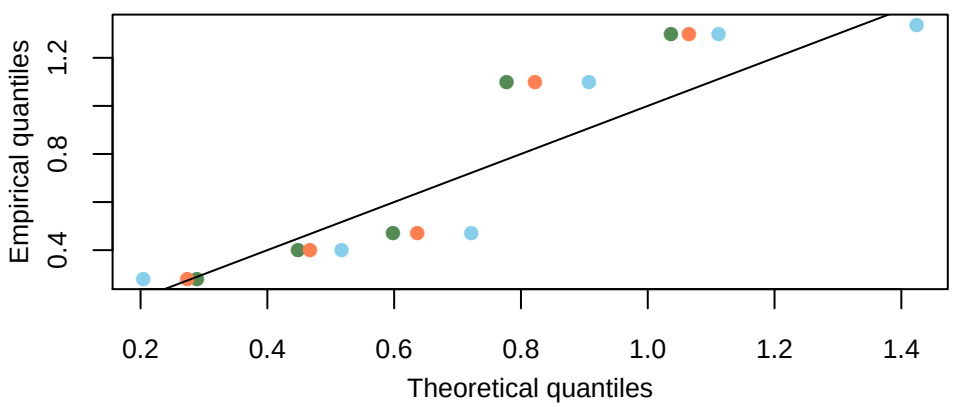
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Benzo[a]pyrene

Legend

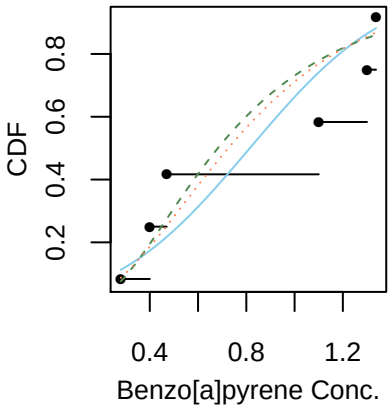
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

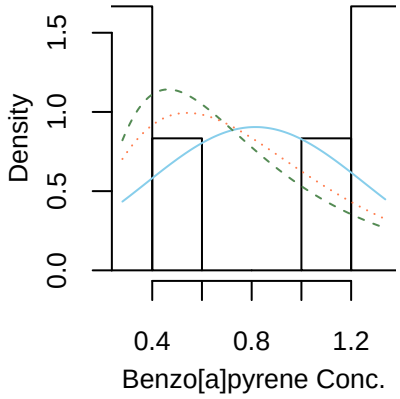


ECDF, Histogram & Q−Q (Detects Only)

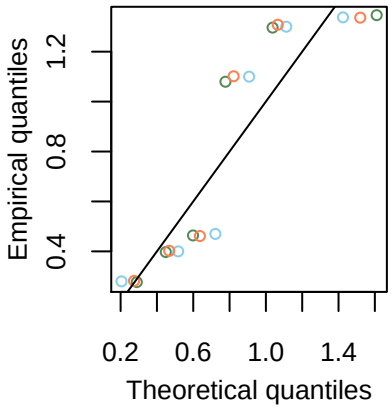
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 0.28 J	Arithmetic Mean = 0.81
N (detect) = 6	SD (log detect) = 0.68	Max (detect) = 1 J	Arithmetic SD = 0.48

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.12	0.22	–	–	–	–	11.203	10.7865
Lognormal	0.19	0.24	–	–	–	–	10.7193	10.3028
Gamma	–	–	NA	NA	NA	NA	10.5678	10.1513

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Benzo[a]pyrene

Exhibit 2: EPC Program and Results
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Berry's Creek Study Area Remedial Investigation

Figure **373**

Media:
Waterway Sediment All Depths

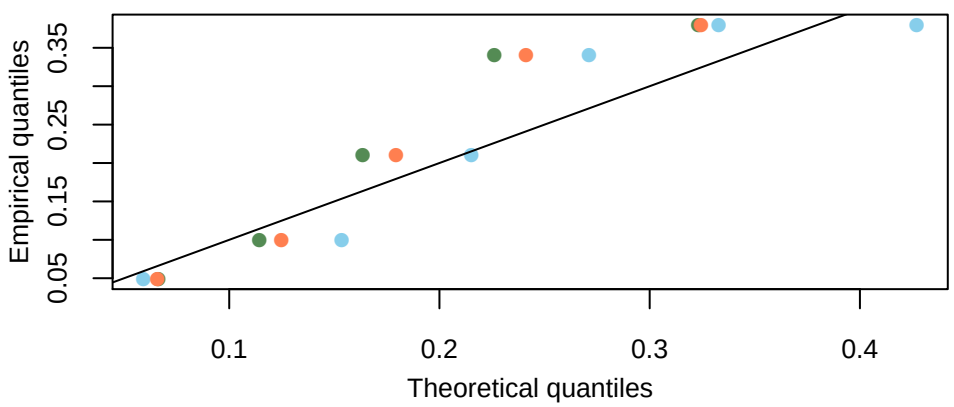
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

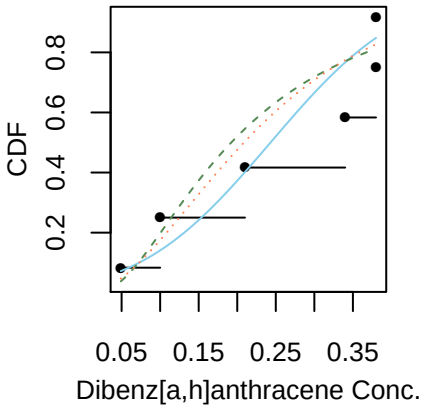
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

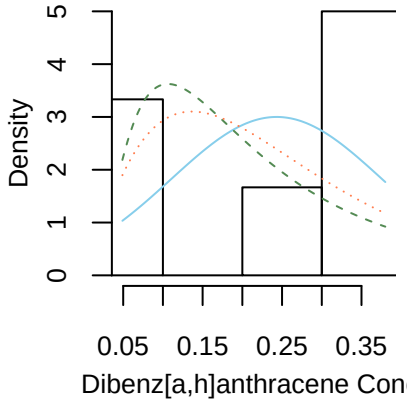


ECDF, Histogram & Q−Q (Detects Only)

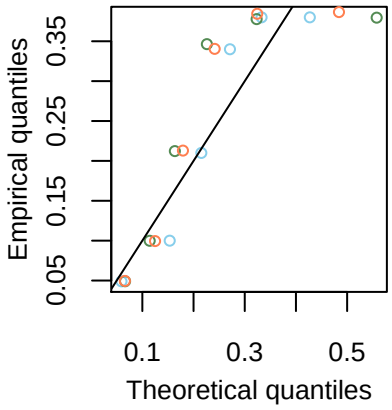
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 0.049 J	Arithmetic Mean = 0.24
N (detect) = 6	SD (log detect) = 0.84	Max (detect) = 0.38 J	Arithmetic SD = 0.15

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.21	0.3	–	–	–	–	−3.18236	−3.59884
Lognormal	0.14	0.28	–	–	–	–	−1.89564	−2.31212
Gamma	–	–	NA	NA	NA	NA	−2.84268	−3.25916

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Dibenz[a,h]anthracene

Media:
Waterway Sediment All Depths

Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 33%	Min (detect) = 0.021 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.05 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Aldr

Media:
Waterway Sediment All Depths

Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 4	FOD = 25%	Min (detect) = 0.029 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.029 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Heptachlor

Media:
Waterway Sediment All Depths

Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 50%	Min (detect) = 0.0054 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.11	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Heptachlor Epoxide

Media:
Waterway Sediment All Depths

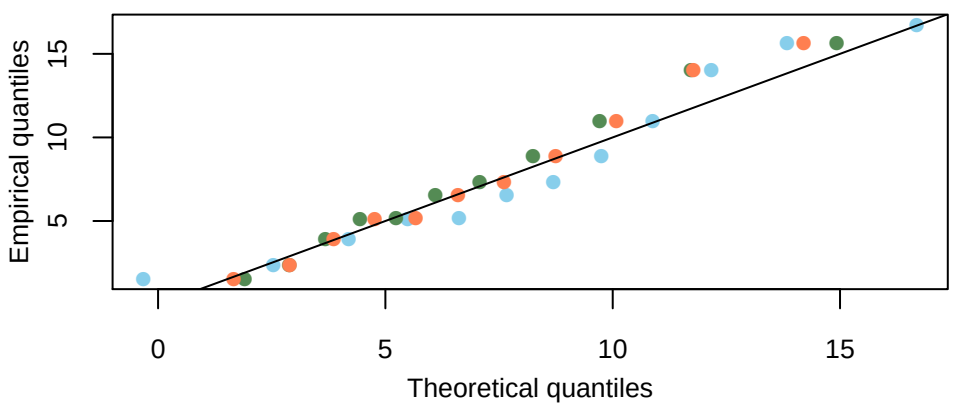
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

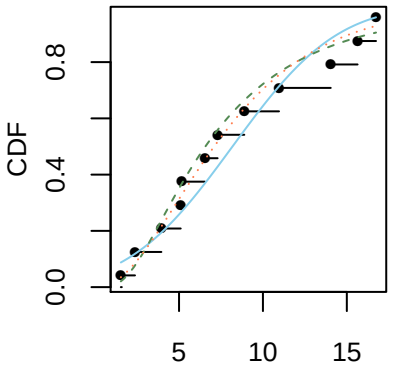
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

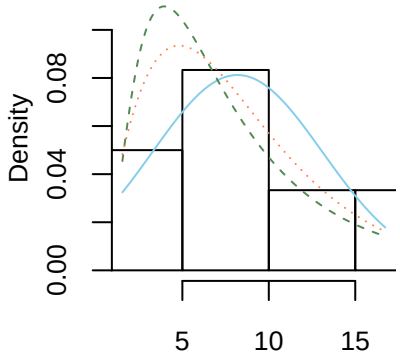


ECDF, Histogram & Q−Q (Detects Only)

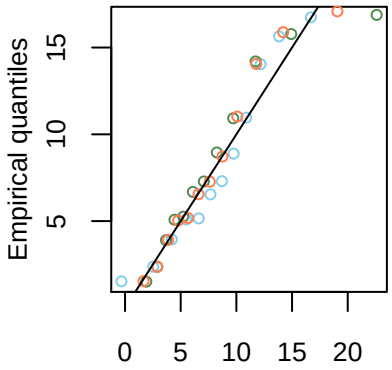
ECDF



Histogram



Q−Q



N = 12	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 8
N (detect) = 12	SD (log detect) = 0.75	Max (detect) = 17 J	Arithmetic SD = 5

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.38	0.62	–	–	–	–	76.252	77.2218
Lognormal	0.64	0.92	–	–	–	–	75.1292	76.099
Gamma	–	–	0.1206	0.27	0.1896	0.736	74.2253	75.1951

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−PCBs (Total Aroclors)

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **378**

Media:
Waterway Sediment All Depths

Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 17%	Min (detect) = 27	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 27	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in Upper Peach Island Creek−Trichloroethene

Media:
Waterway Sediment All Depths

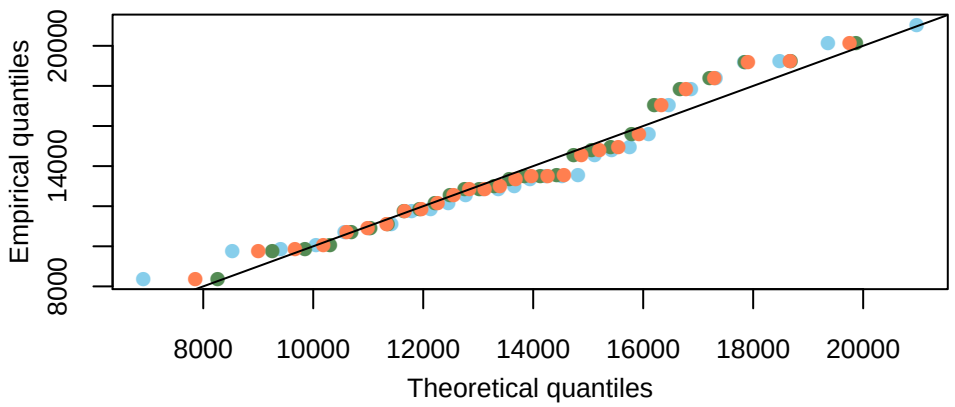
Exposure Unit:
MBC

Chemical (mg/kg):
Aluminum

Legend

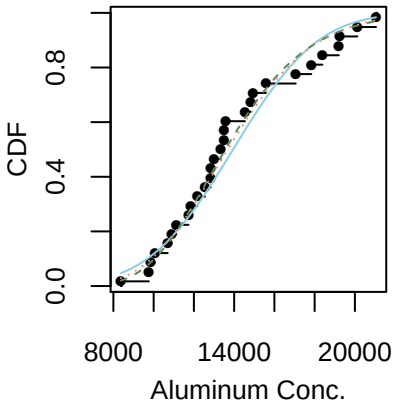
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

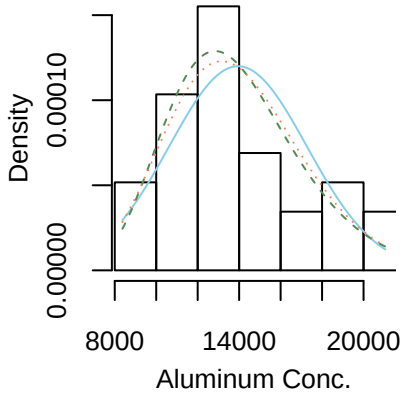


ECDF, Histogram & Q−Q (Detects Only)

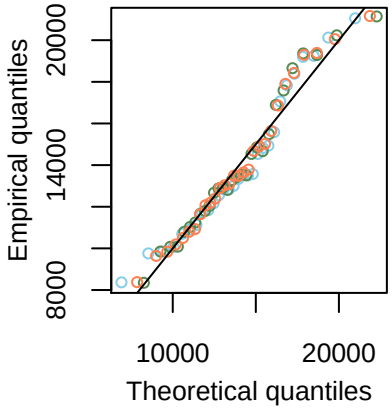
ECDF



Histogram



Q−Q



N = 29	FOD = 100%	Min (detect) = 8,400 J	Arithmetic Mean = 14,000
N (detect) = 29	SD (log detect) = 0.24	Max (detect) = 21,000	Arithmetic SD = 3,400

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.14	0.044	–	–	–	–	556.64	559.375
Lognormal	0.66	0.36	–	–	–	–	554.074	556.809
Gamma	–	–	0.1338	0.175	0.3613	0.745	554.557	557.292

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Aluminum

Exhibit 2: EPC Program and Results
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Berry's Creek Study Area Remedial Investigation

Figure **380**

Media:
Waterway Sediment All Depths

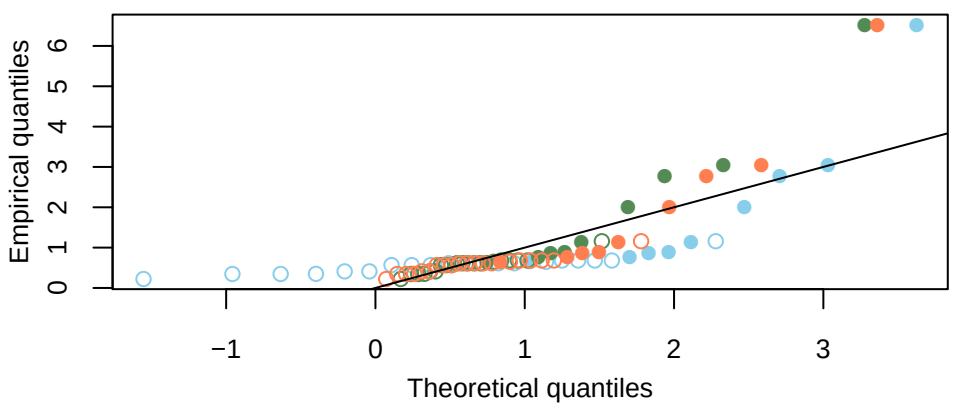
Exposure Unit:
MBC

Chemical (mg/kg):
Antimony

Legend

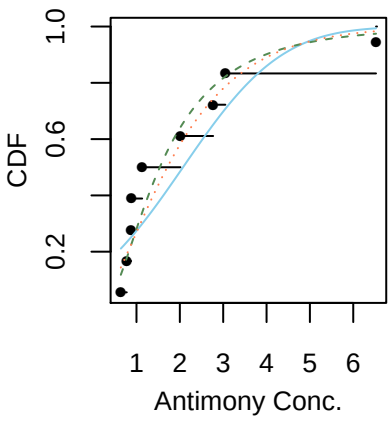
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

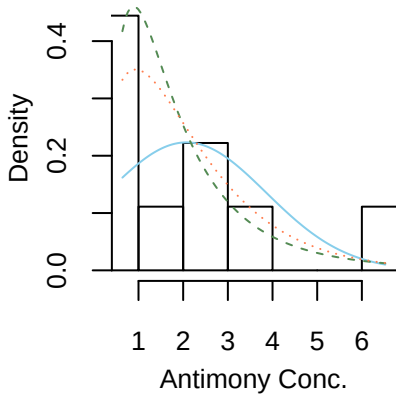


ECDF, Histogram & Q−Q (Detects Only)

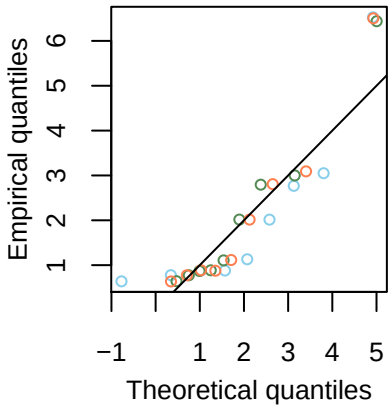
ECDF



Histogram



Q−Q



N = 29	FOD = 31%	Min (detect) = 0.64 J	Kaplan Meier Mean = 1
N (detect) = 9	SD (log detect) = 0.79	Max (detect) = 6	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.6e−09	–	–	–	–	98.0624	100.797
Lognormal	0.0017	0.00018	–	–	–	–	48.5823	51.3168
Gamma	–	–	0.2832	0.18	2.714	0.773	60.1913	62.9259

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0078	0.12	–	–	–	–	39.9892	40.3836
Lognormal	0.31	0.32	–	–	–	–	31.8804	32.2749
Gamma	–	–	0.2414	0.287	0.5388	0.743	33.5066	33.9011

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Antimony

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **381**

Media:
Waterway Sediment All Depths

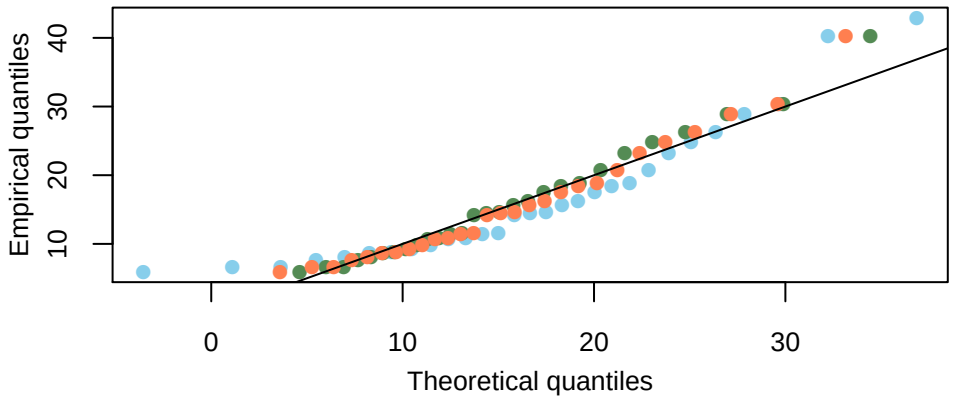
Exposure Unit:
MBC

Chemical (mg/kg):
Arsenic

Legend

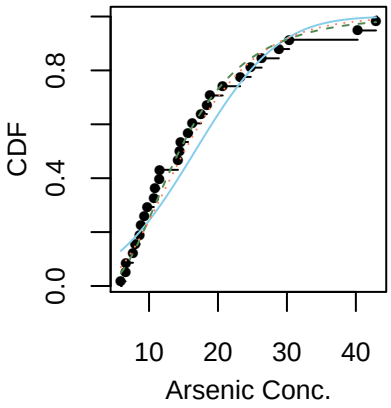
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

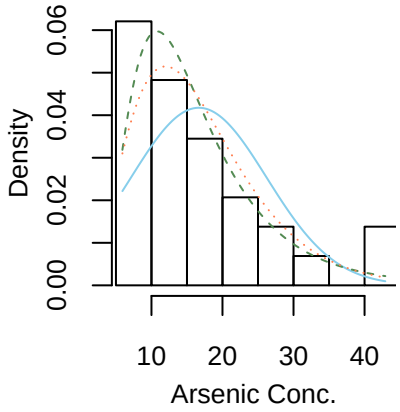


ECDF, Histogram & Q−Q (Detects Only)

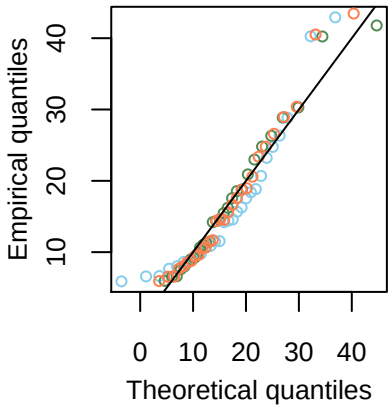
ECDF



Histogram



Q−Q



N = 29	FOD = 100%	Min (detect) = 5 J	Arithmetic Mean = 17
N (detect) = 29	SD (log detect) = 0.55	Max (detect) = 43	Arithmetic SD = 9

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0026	0.1	–	–	–	–	217.21	219.945
Lognormal	0.59	0.58	–	–	–	–	204.793	207.528
Gamma	–	–	0.1283	0.177	0.411	0.756	206.926	209.66

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Arsenic

Media:
Waterway Sediment All Depths

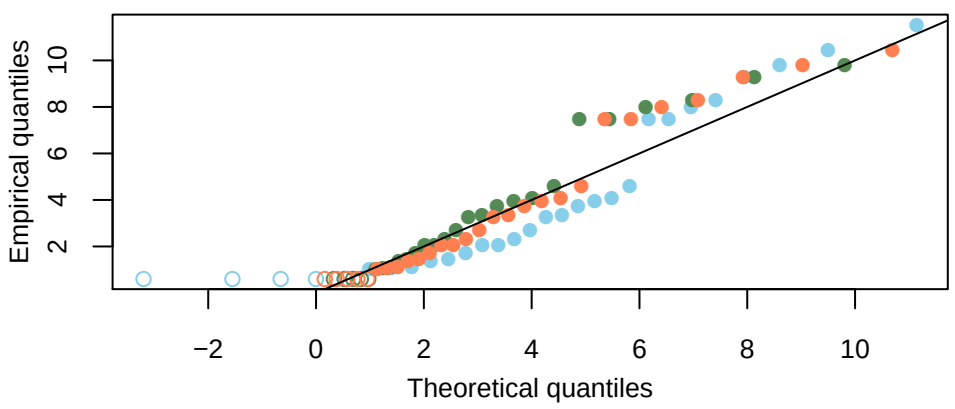
Exposure Unit:
MBC

Chemical (mg/kg):
Cadmium

Legend

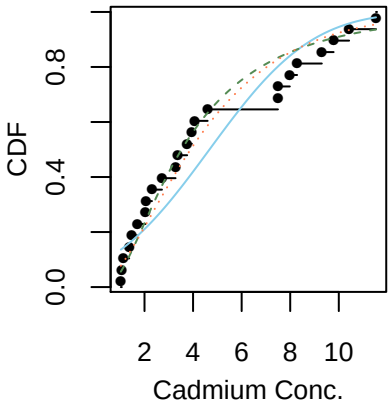
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

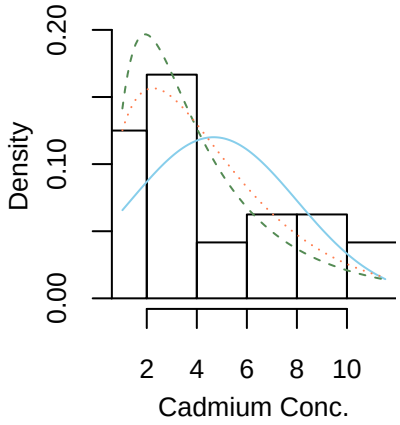


ECDF, Histogram & Q−Q (Detects Only)

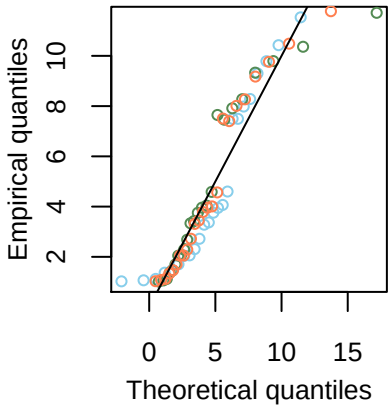
ECDF



Histogram



Q−Q



N = 29	FOD = 83%	Min (detect) = 1 J	Kaplan Meier Mean = 3
N (detect) = 24	SD (log detect) = 0.79	Max (detect) = 12 J	Kaplan Meier SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00076	0.018	–	–	–	–	157.153	159.887
Lognormal	0.044	0.21	–	–	–	–	140.148	142.883
Gamma	–	–	0.1387	0.18	0.668	0.773	140.726	143.461

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0061	0.018	–	–	–	–	129.759	132.115
Lognormal	0.11	0.11	–	–	–	–	120.537	122.893
Gamma	–	–	0.1606	0.183	0.6237	0.772	120.983	123.339

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Cadmium

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **383**

Media:
Waterway Sediment All Depths

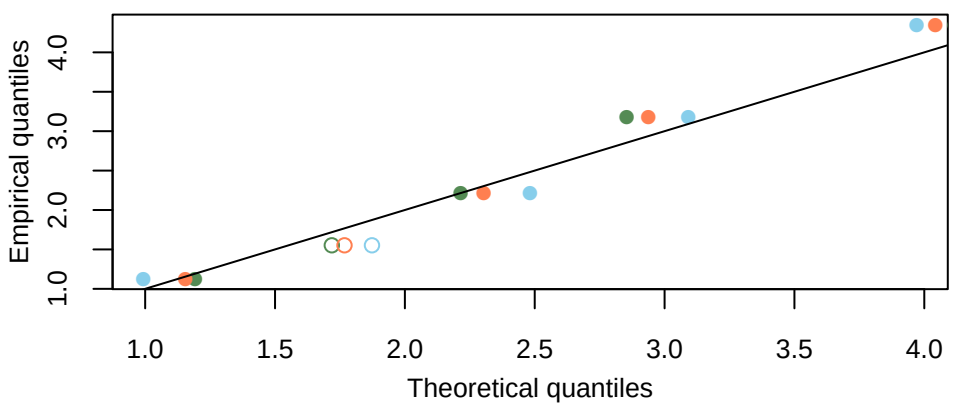
Exposure Unit:
MBC

Chemical (mg/kg):
Chromium (VI)

Legend

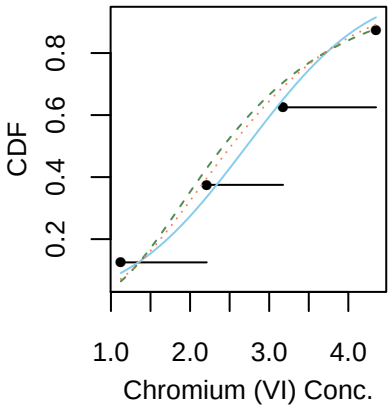
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

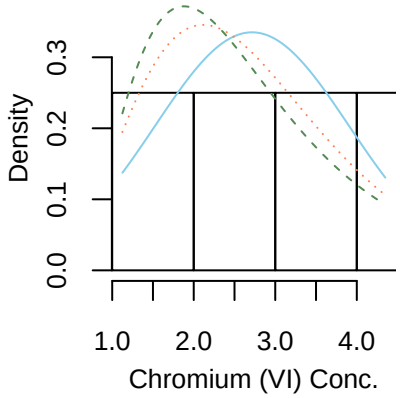


ECDF, Histogram & Q−Q (Detects Only)

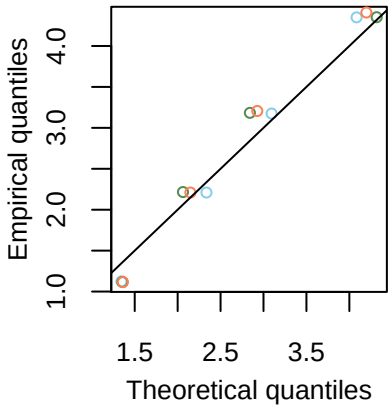
ECDF



Histogram



Q−Q



N = 5	FOD = 80%	Min (detect) = 1	Kaplan Meier Mean = 2
N (detect) = 4	SD (log detect) = 0.58	Max (detect) = 4	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.75	N<5	–	–	–	–	19.6889	18.9078
Lognormal	0.94	N<5	–	–	–	–	18.8811	18.1
Gamma	–	–	NA	NA	NA	NA	18.9375	18.1564

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.99	N<5	–	–	–	–	16.7456	15.5182
Lognormal	0.83	N<5	–	–	–	–	16.9289	15.7014
Gamma	–	–	NA	NA	NA	NA	16.6858	15.4584

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Chromium (VI)

Media:
Waterway Sediment All Depths

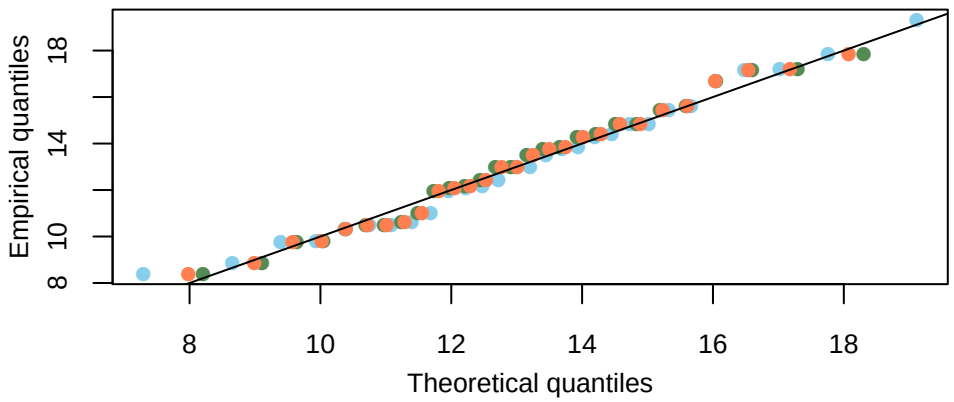
Exposure Unit:
MBC

Chemical (mg/kg):
Cobalt

Legend

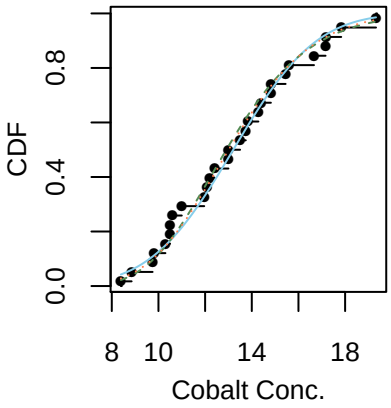
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

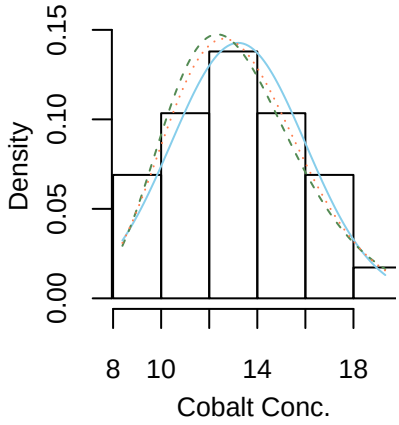


ECDF, Histogram & Q−Q (Detects Only)

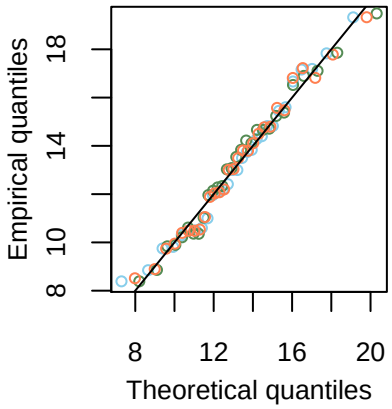
ECDF



Histogram



Q−Q



N = 29	FOD = 100%	Min (detect) = 8	Arithmetic Mean = 13
N (detect) = 29	SD (log detect) = 0.22	Max (detect) = 19	Arithmetic SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.75	0.71	–	–	–	–	145.919	148.654
Lognormal	0.84	0.76	–	–	–	–	145.341	148.076
Gamma	–	–	0.09884	0.174	0.2007	0.743	145.215	147.949

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Cobalt

Media:
Waterway Sediment All Depths

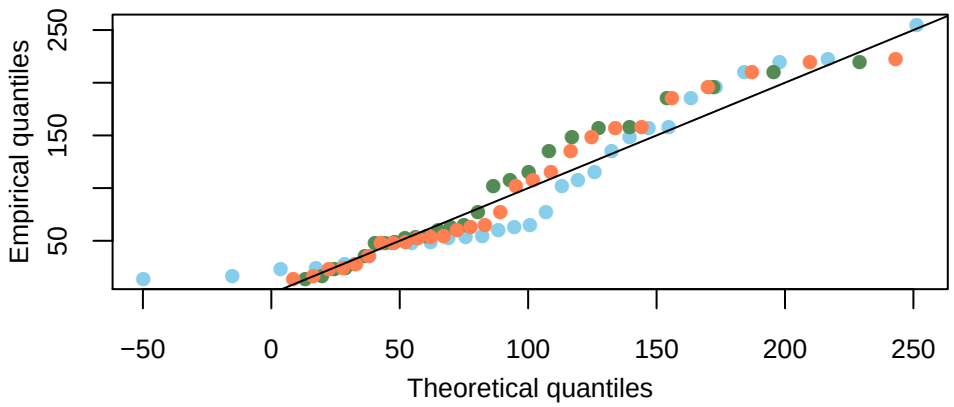
Exposure Unit:
MBC

Chemical (mg/kg):
Copper

Legend

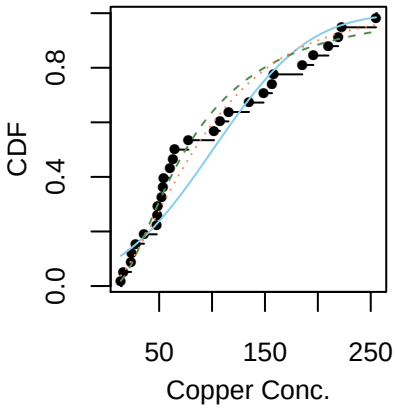
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

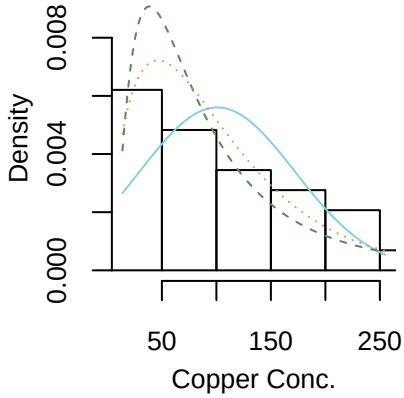


ECDF, Histogram & Q−Q (Detects Only)

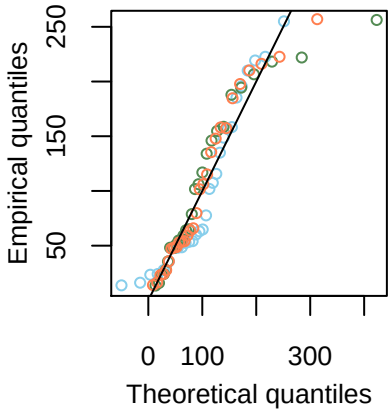
ECDF



Histogram



Q−Q



N = 29	FOD = 100%	Min (detect) = 14 J	Arithmetic Mean = 100
N (detect) = 29	SD (log detect) = 0.83	Max (detect) = 260 J	Arithmetic SD = 72

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0085	0.0025	–	–	–	–	333.701	336.435
Lognormal	0.19	0.57	–	–	–	–	325.097	327.832
Gamma	–	–	0.1365	0.18	0.4984	0.773	324.152	326.887

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Copper

Media:
Waterway Sediment All Depths

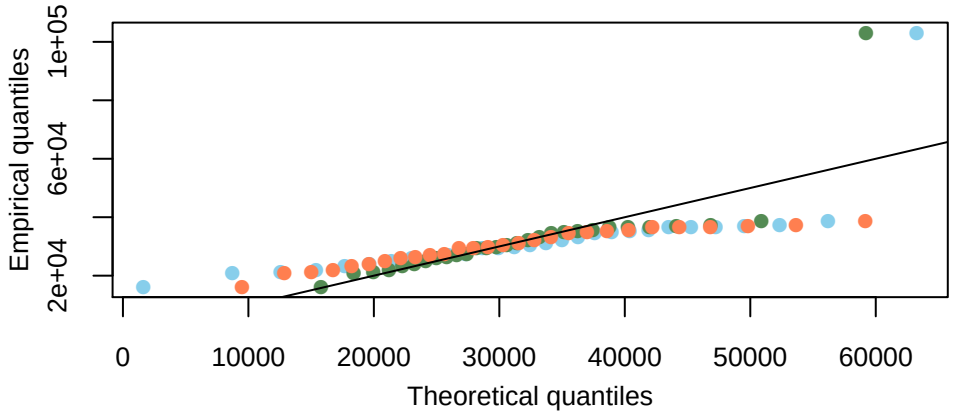
Exposure Unit:
MBC

Chemical (mg/kg):
Iron

Legend

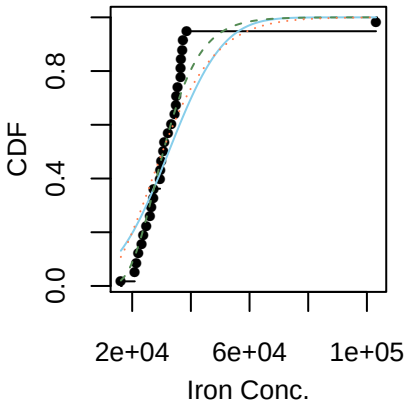
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q–Q Plot (All Data)

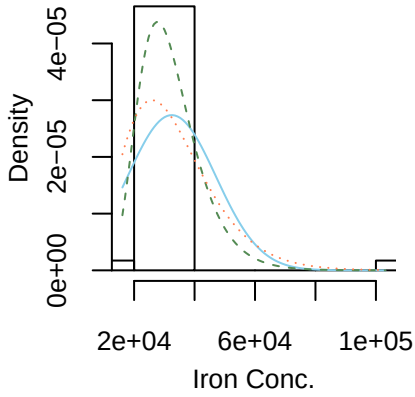


ECDF, Histogram & Q–Q (Detects Only)

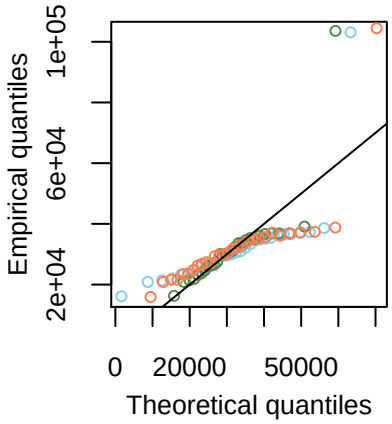
ECDF



Histogram



Q–Q



N = 29	FOD = 100%	Min (detect) = 16,000	Arithmetic Mean = 32,000
N (detect) = 29	SD (log detect) = 0.32	Max (detect) = 100,000 J	Arithmetic SD = 15,000

Goodness of Fit (All Data)

Distribution	S–W (p–value)	Lilliefors (p–value)	K–S (statistic)	K–S (crit val)	A–D (statistic)	A–D (crit val)	AIC	BIC
Normal	0	1.9e−07	–	–	–	–	642.349	645.083
Lognormal	0.00041	0.0052	–	–	–	–	617.884	620.619
Gamma	–	–	0.2582	0.177	2.514	0.756	627.977	630.712

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A–D = Anderson–Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K–S = Kolmogorov–Smirnov
N = number of samples
Q–Q = quantile–quantile
ROS = Regression on order statistics
S–W = Shapiro–Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC–Iron

Media:
Waterway Sediment All Depths

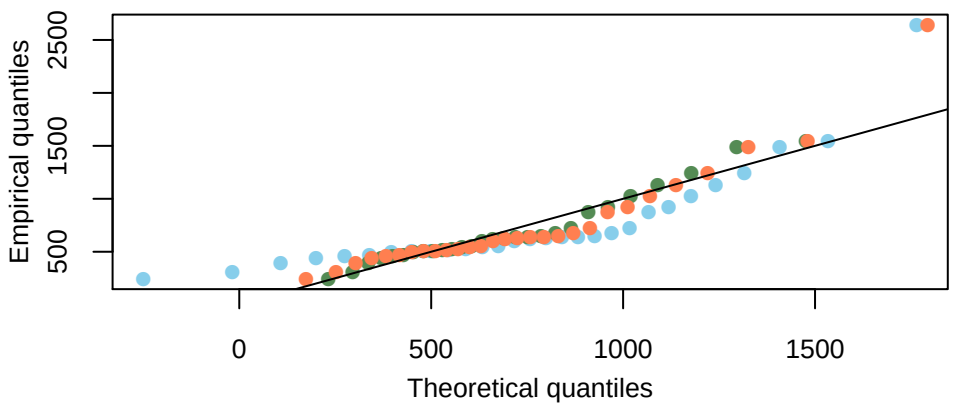
Exposure Unit:
MBC

Chemical (mg/kg):
Manganese

Legend

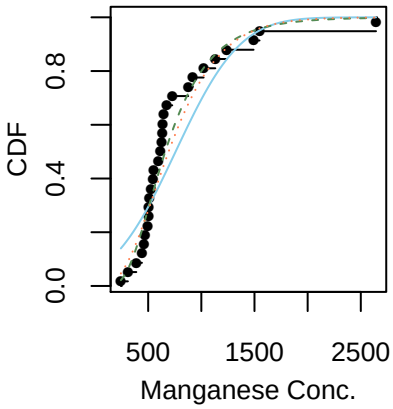
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

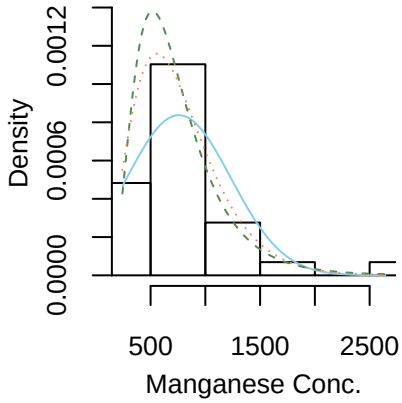


ECDF, Histogram & Q−Q (Detects Only)

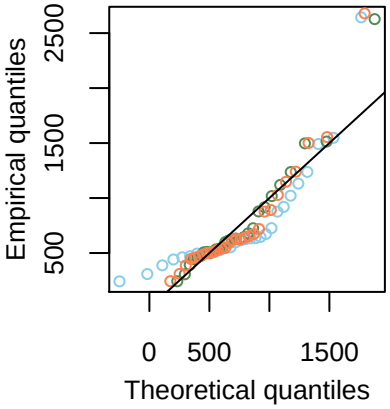
ECDF



Histogram



Q−Q



N = 29	FOD = 100%	Min (detect) = 240 J	Arithmetic Mean = 760
N (detect) = 29	SD (log detect) = 0.5	Max (detect) = 2,600 J	Arithmetic SD = 480

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	2.8e−05	–	–	–	–	443.945	446.679
Lognormal	0.14	0.024	–	–	–	–	421.999	424.733
Gamma	–	–	0.2109	0.177	1.189	0.756	426.821	429.556

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Manganese

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **388**

Media:
Waterway Sediment All Depths

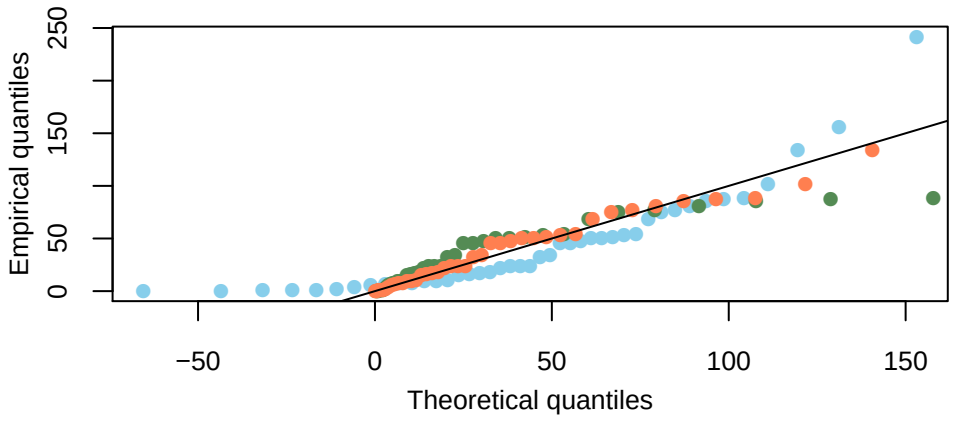
Exposure Unit:
MBC

Chemical (mg/kg):
Mercury

Legend

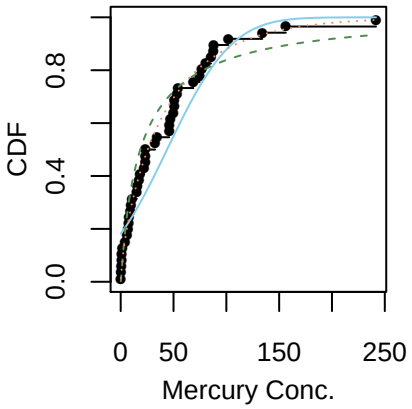
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

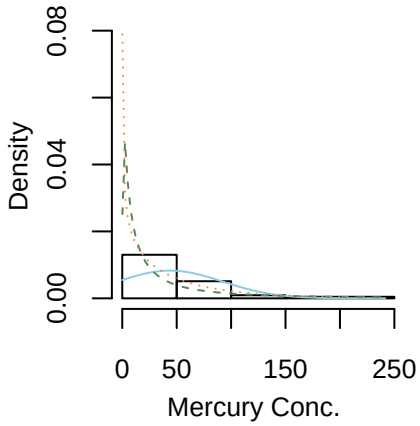


ECDF, Histogram & Q−Q (Detects Only)

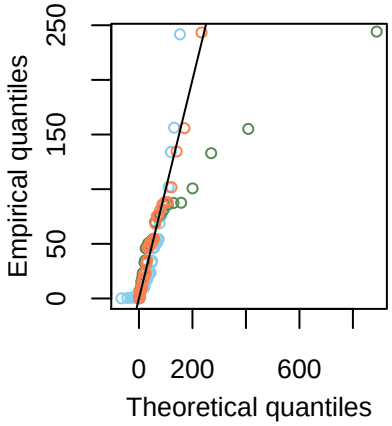
ECDF



Histogram



Q−Q



N = 43	FOD = 100%	Min (detect) = 0.12 J	Arithmetic Mean = 44
N (detect) = 43	SD (log detect) = 1.7	Max (detect) = 240 J	Arithmetic SD = 49

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	8e−04	–	–	–	–	459.246	462.768
Lognormal	0.0016	0.029	–	–	–	–	423.09	426.613
Gamma	–	–	0.1119	0.148	0.3215	0.813	411.102	414.624

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Mercury

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **389**

Media:
Waterway Sediment All Depths

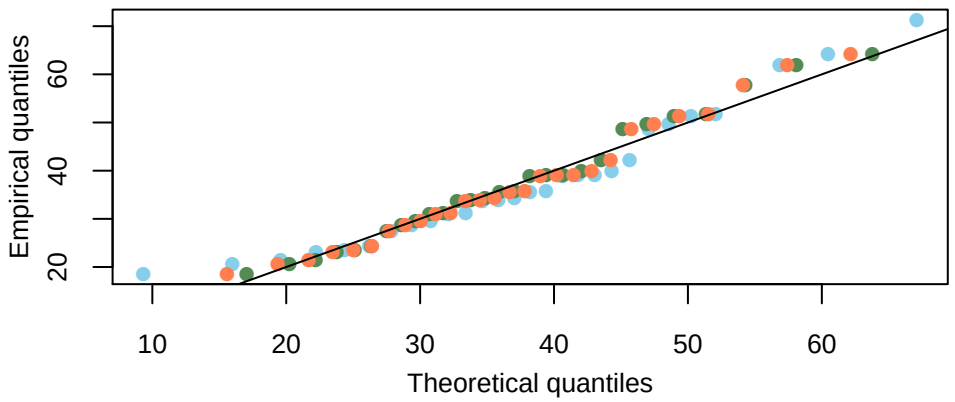
Exposure Unit:
MBC

Chemical (mg/kg):
Nickel

Legend

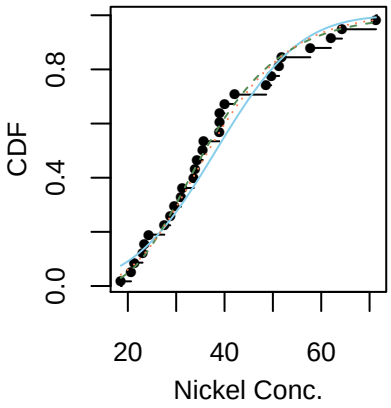
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

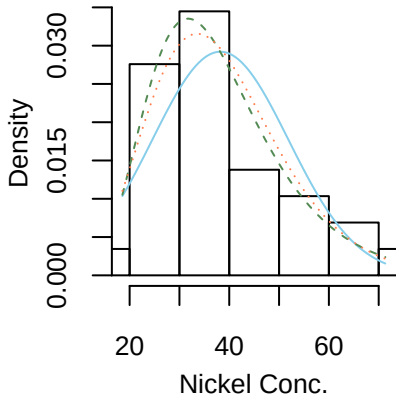


ECDF, Histogram & Q−Q (Detects Only)

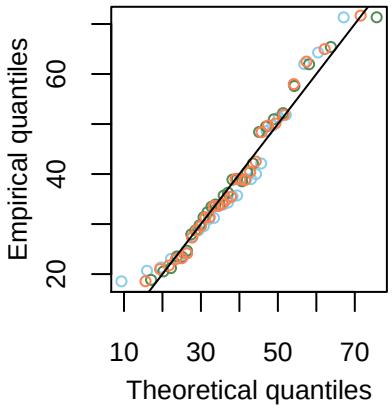
ECDF



Histogram



Q−Q



N = 29	FOD = 100%	Min (detect) = 19	Arithmetic Mean = 38
N (detect) = 29	SD (log detect) = 0.36	Max (detect) = 71 J	Arithmetic SD = 14

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.11	0.17	–	–	–	–	237.928	240.663
Lognormal	0.81	0.94	–	–	–	–	233.532	236.266
Gamma	–	–	0.09174	0.175	0.2596	0.747	234.118	236.852

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Nickel

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **390**

Media:
Waterway Sediment All Depths

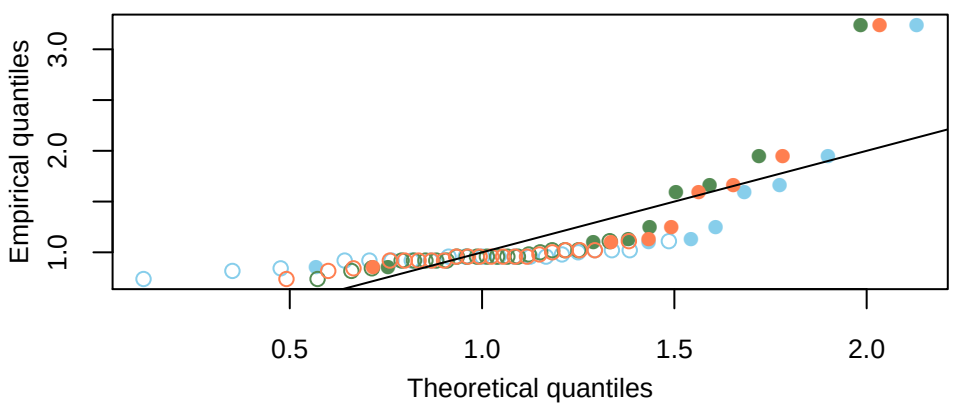
Exposure Unit:
MBC

Chemical (mg/kg):
Thallium

Legend

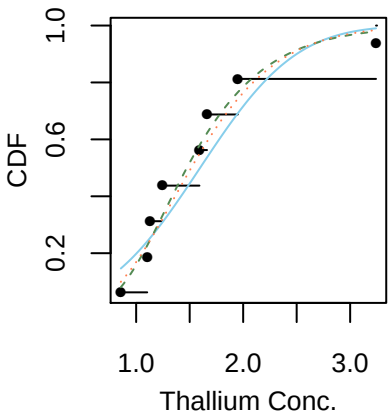
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

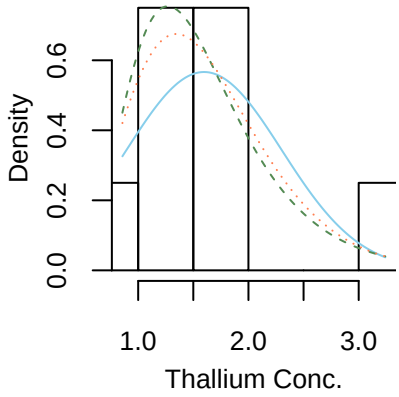


ECDF, Histogram & Q−Q (Detects Only)

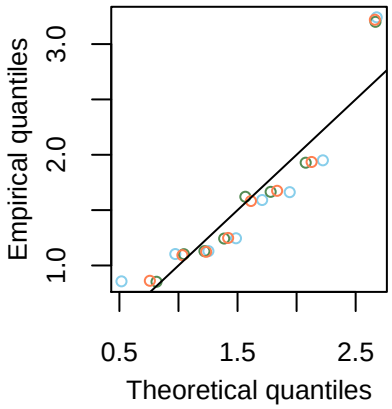
ECDF



Histogram



Q−Q



N = 29	FOD = 28%	Min (detect) = 0.86 J	Kaplan Meier Mean = 1
N (detect) = 8	SD (log detect) = 0.41	Max (detect) = 3 J	Kaplan Meier SD = 0.48

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2e−08	–	–	–	–	43.1808	45.9154
Lognormal	1e−05	2.8e−06	–	–	–	–	18.9917	21.7263
Gamma	–	–	0.2969	0.175	3.423	0.747	26.1194	28.854

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.072	0.33	–	–	–	–	21.0918	21.2507
Lognormal	0.72	0.81	–	–	–	–	17.7112	17.8701
Gamma	–	–	0.1798	0.295	0.3487	0.719	18.5327	18.6916

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Thallium

Media:
Waterway Sediment All Depths

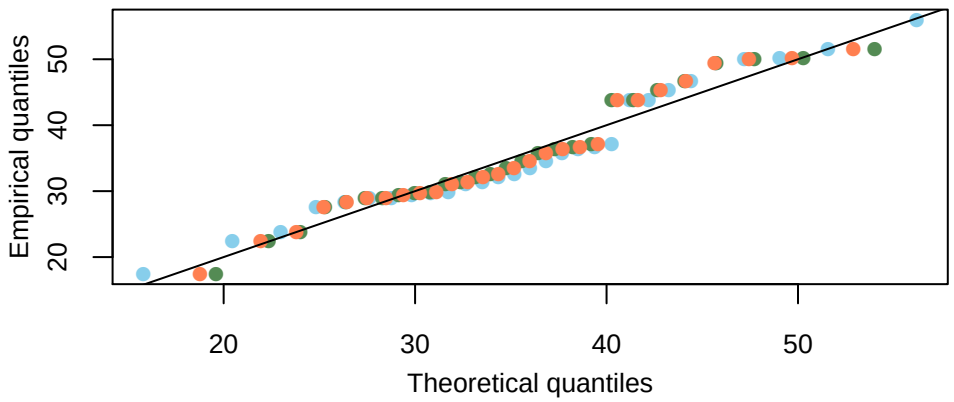
Exposure Unit:
MBC

Chemical (mg/kg):
Vanadium

Legend

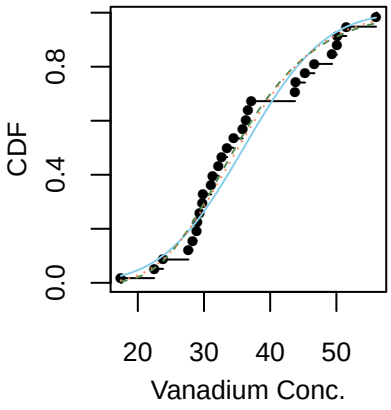
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

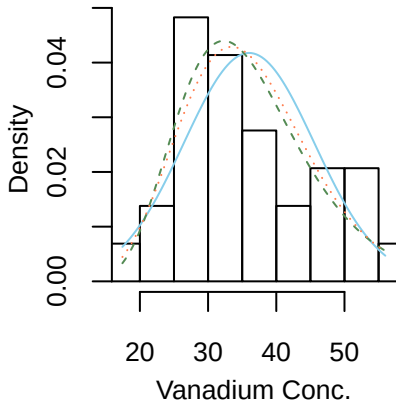


ECDF, Histogram & Q−Q (Detects Only)

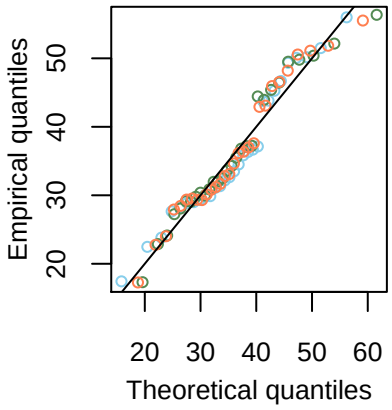
ECDF



Histogram



Q−Q



N = 29	FOD = 100%	Min (detect) = 17 J	Arithmetic Mean = 36
N (detect) = 29	SD (log detect) = 0.28	Max (detect) = 56	Arithmetic SD = 9

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.19	0.13	–	–	–	–	217.191	219.925
Lognormal	0.38	0.51	–	–	–	–	216.322	219.056
Gamma	–	–	0.1107	0.175	0.4952	0.745	216.021	218.756

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Vanadium

Media:
Waterway Sediment All Depths

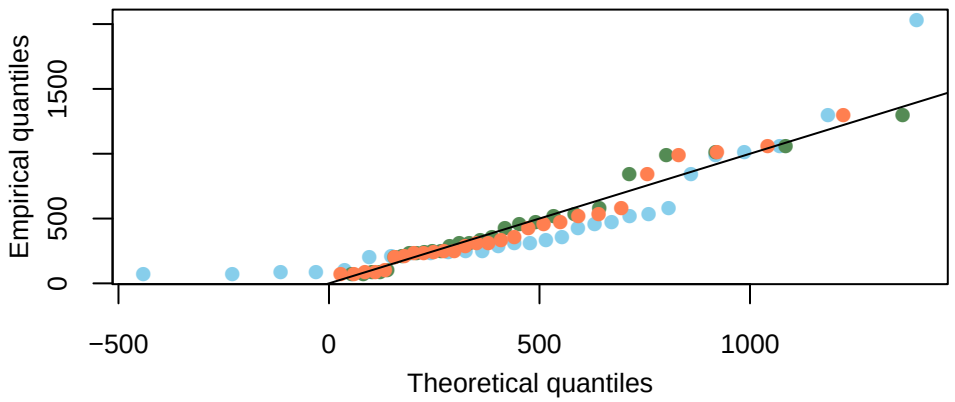
Exposure Unit:
MBC

Chemical (mg/kg):
Zinc

Legend

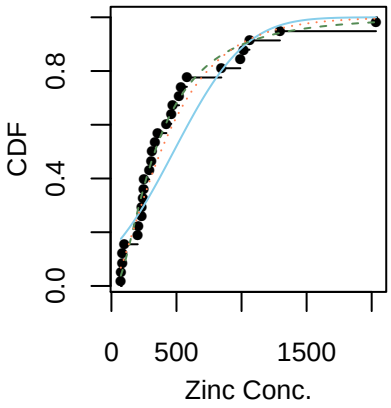
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

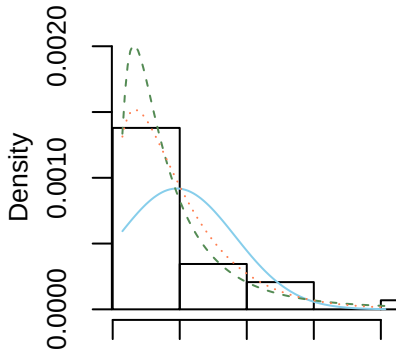


ECDF, Histogram & Q−Q (Detects Only)

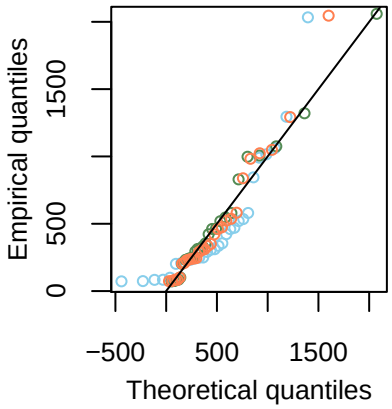
ECDF



Histogram



Q−Q



N = 29	FOD = 100%	Min (detect) = 72	Arithmetic Mean = 480
N (detect) = 29	SD (log detect) = 0.88	Max (detect) = 2,000 J	Arithmetic SD = 440

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	5e−05	0.0026	–	–	–	–	438.583	441.317
Lognormal	0.39	0.46	–	–	–	–	414.812	417.547
Gamma	–	–	0.1149	0.18	0.5223	0.773	416.961	419.696

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Zinc

Exhibit 2: EPC Program and Results
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Berry's Creek Study Area Remedial Investigation

Figure **393**

Media:
Waterway Sediment All Depths

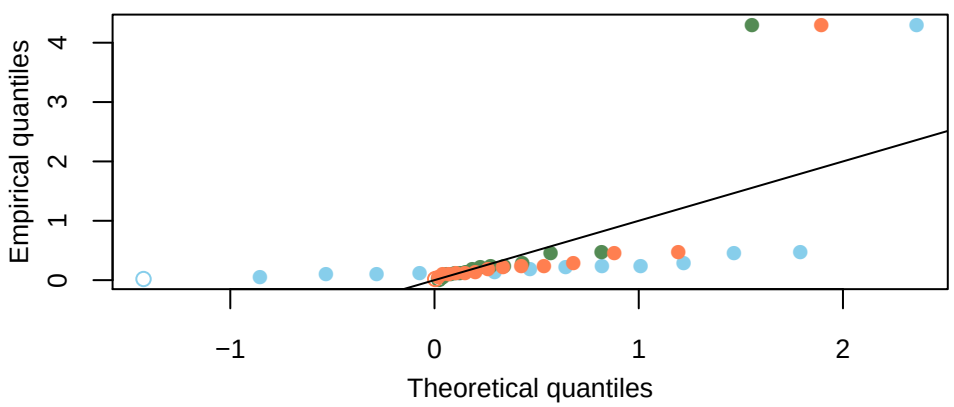
Exposure Unit:
MBC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

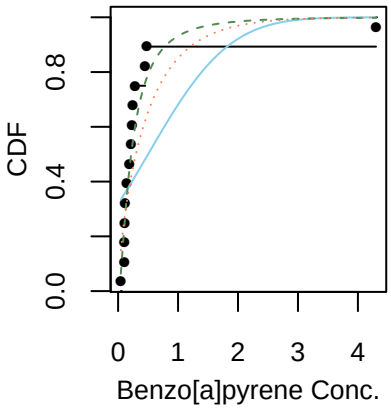
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

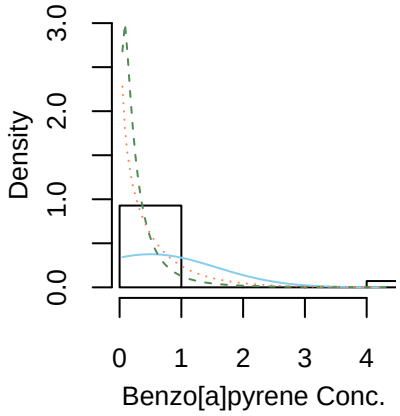


ECDF, Histogram & Q−Q (Detects Only)

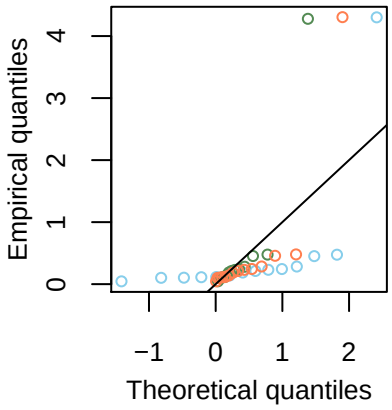
ECDF



Histogram



Q−Q



N = 15	FOD = 93%	Min (detect) = 0.045	Kaplan Meier Mean = 0.47
N (detect) = 14	SD (log detect) = 1.1	Max (detect) = 4 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.6e−08	–	–	–	–	47.5248	48.9409
Lognormal	0.17	0.23	–	–	–	–	0.410395	1.8265
Gamma	–	–	0.2783	0.234	1.607	0.793	9.15391	10.57

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.4e−08	–	–	–	–	45.3983	46.6765
Lognormal	0.029	0.21	–	–	–	–	1.71739	2.9955
Gamma	–	–	0.2973	0.281	1.848	0.777	11.5004	12.7785

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Benzo[a]pyrene

Media:
Waterway Sediment All Depths

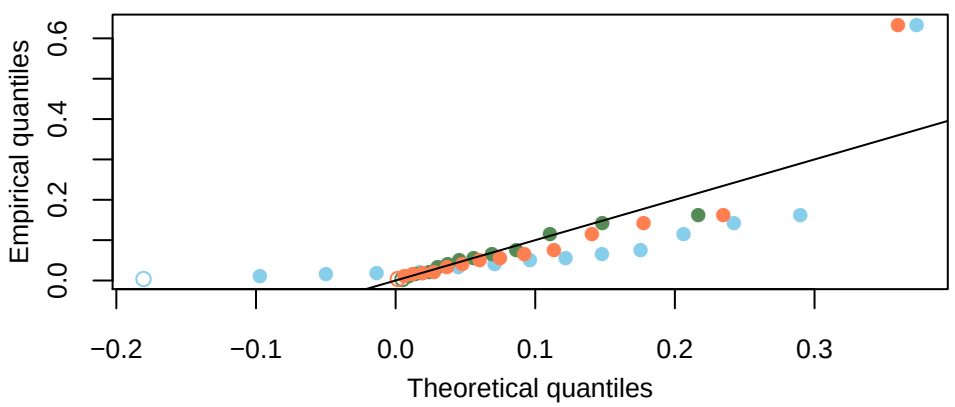
Exposure Unit:
MBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

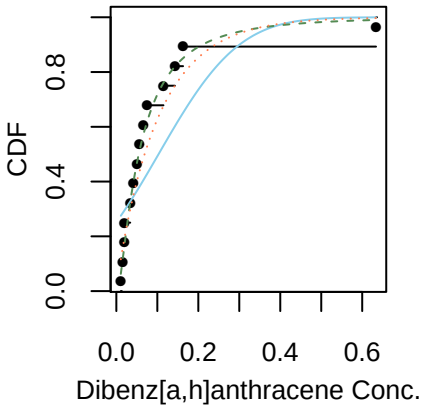
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

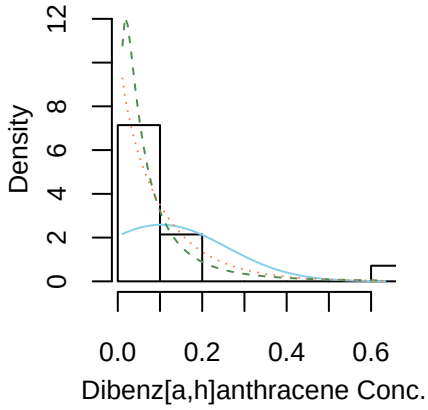


ECDF, Histogram & Q−Q (Detects Only)

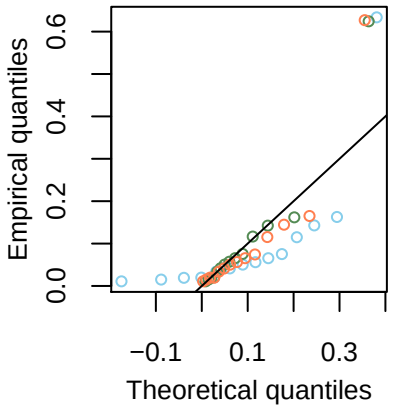
ECDF



Histogram



Q−Q



N = 15	FOD = 93%	Min (detect) = 0.011	Kaplan Meier Mean = 0.096
N (detect) = 14	SD (log detect) = 1.1	Max (detect) = 0.63 J	Kaplan Meier SD = 0.15

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.0016	–	–	–	–	−10.1467	−8.73065
Lognormal	1	0.99	–	–	–	–	−40.1659	−38.7498
Gamma	–	–	0.1649	0.234	0.5005	0.793	−36.7493	−35.3332

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−05	0.0033	–	–	–	–	−8.61914	−7.34102
Lognormal	0.8	0.92	–	–	–	–	−36.282	−35.0039
Gamma	–	–	0.185	0.281	0.6441	0.777	−31.7143	−30.4361

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment All Depths in MBC−Dibenz[a,h]anthracene

Exhibit 2: EPC Program and Results
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Berry's Creek Study Area Remedial Investigation

Figure **395**

Media:
Waterway Sediment All Depths

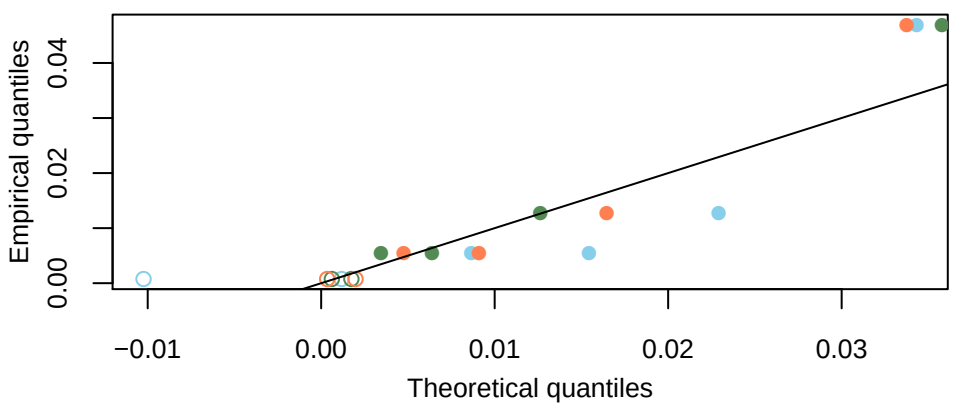
Exposure Unit:
MBC

Chemical (mg/kg):
Aldrin

Legend

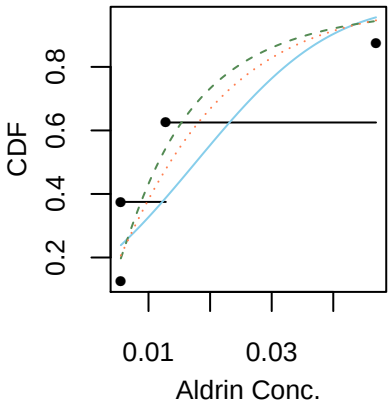
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

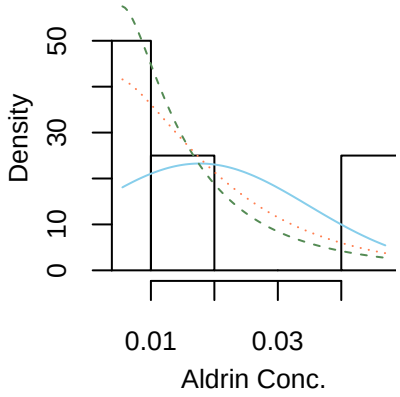


ECDF, Histogram & Q−Q (Detects Only)

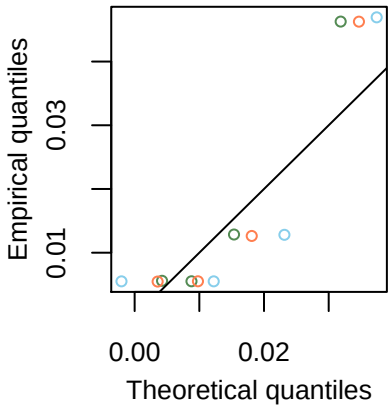
ECDF



Histogram



Q−Q



N = 6	FOD = 67%	Min (detect) = 0.0055 J	Kaplan Meier Mean = 0.012
N (detect) = 4	SD (log detect) = 1	Max (detect) = 0.047 J	Kaplan Meier SD = 0.016

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0065	0.061	–	–	–	–	−28.5083	−28.9247
Lognormal	0.46	0.59	–	–	–	–	−38.7045	−39.121
Gamma	–	–	NA	NA	NA	NA	−37.9228	−38.3393

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.038	N<5	–	–	–	–	−17.1752	−18.4026
Lognormal	0.22	N<5	–	–	–	–	−21.342	−22.5694
Gamma	–	–	NA	NA	NA	NA	−20.4646	−21.692

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Aldrin

Media:
Waterway Sediment All Depths

Exposure Unit:
MBC

Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 17%	Min (detect) = 0.0047 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0047 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Heptachlor

Media:
Waterway Sediment All Depths

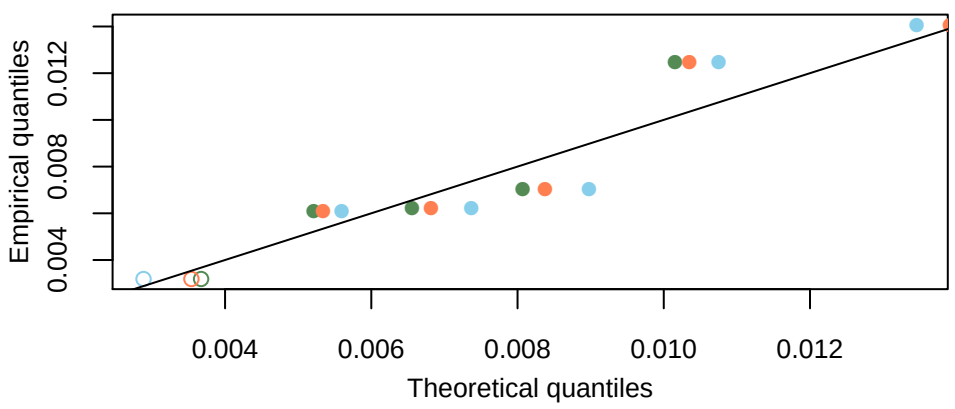
Exposure Unit:
MBC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

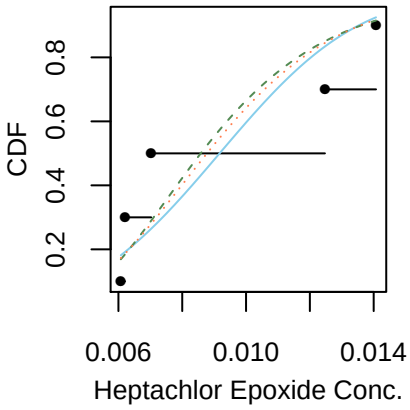
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

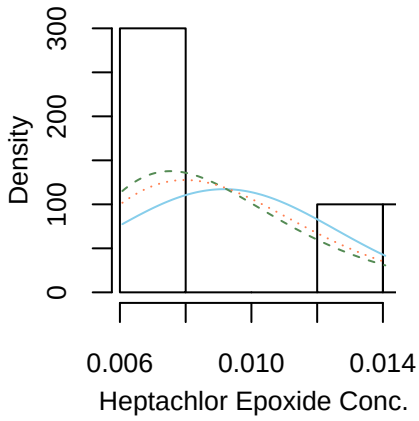


ECDF, Histogram & Q−Q (Detects Only)

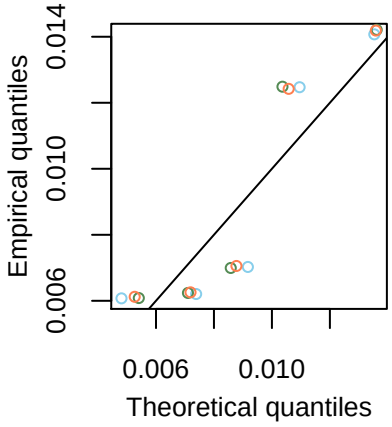
ECDF



Histogram



Q−Q



N = 6	FOD = 83%	Min (detect) = 0.0061 J	Kaplan Meier Mean = 0.0077
N (detect) = 5	SD (log detect) = 0.4	Max (detect) = 0.014 J	Kaplan Meier SD = 0.0046

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.35	0.17	–	–	–	–	−45.7703	−46.1868
Lognormal	0.58	0.61	–	–	–	–	−46.5089	−46.9254
Gamma	–	–	NA	NA	NA	NA	−46.5659	−46.9823

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.089	N<5	–	–	–	–	−38.6413	−39.4224
Lognormal	0.11	N<5	–	–	–	–	−39.6041	−40.3853
Gamma	–	–	NA	NA	NA	NA	−39.3661	−40.1472

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Heptachlor Epoxide

Media:
Waterway Sediment All Depths

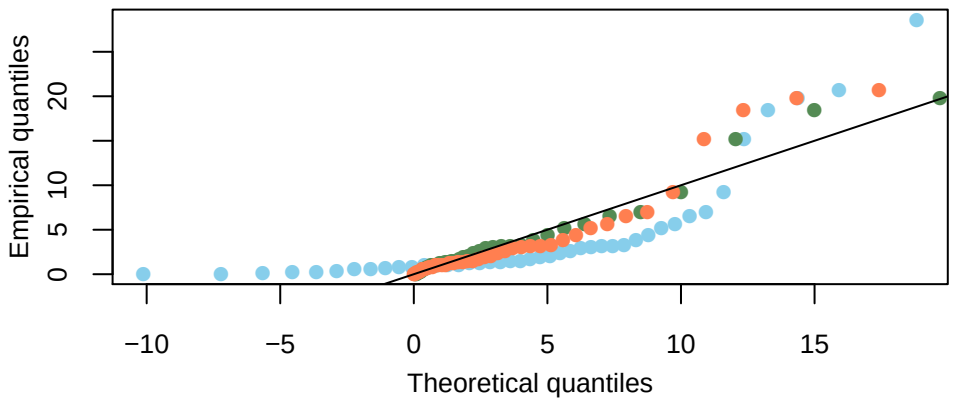
Exposure Unit:
MBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

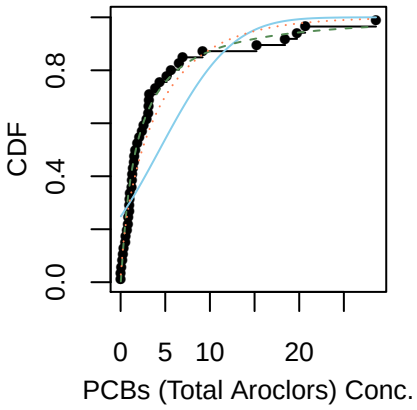
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

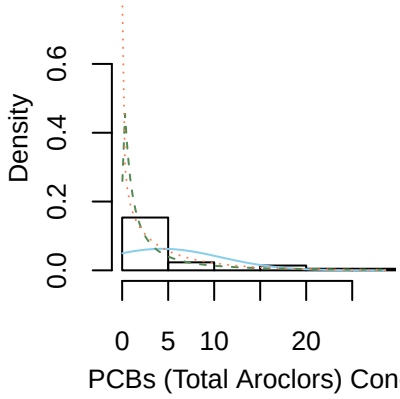


ECDF, Histogram & Q−Q (Detects Only)

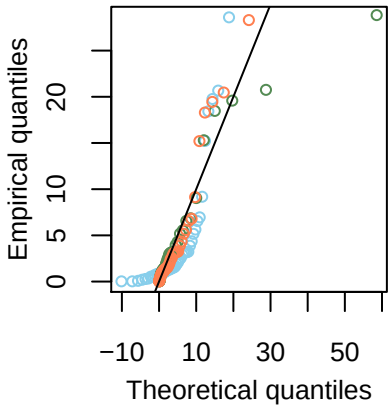
ECDF



Histogram



Q−Q



N = 43	FOD = 100%	Min (detect) = 0.025 J	Arithmetic Mean = 4
N (detect) = 43	SD (log detect) = 1.6	Max (detect) = 29	Arithmetic SD = 6

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.1e−10	–	–	–	–	285.373	288.896
Lognormal	0.067	0.2	–	–	–	–	209.882	213.404
Gamma	–	–	0.143	0.148	0.9017	0.813	210.205	213.727

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−PCBs (Total Aroclors)

Media:
Waterway Sediment All Depths

Exposure Unit:
MBC

Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 15	FOD = 7%	Min (detect) = 0.0012 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0012 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−Trichloroethene

Media:
Waterway Sediment All Depths

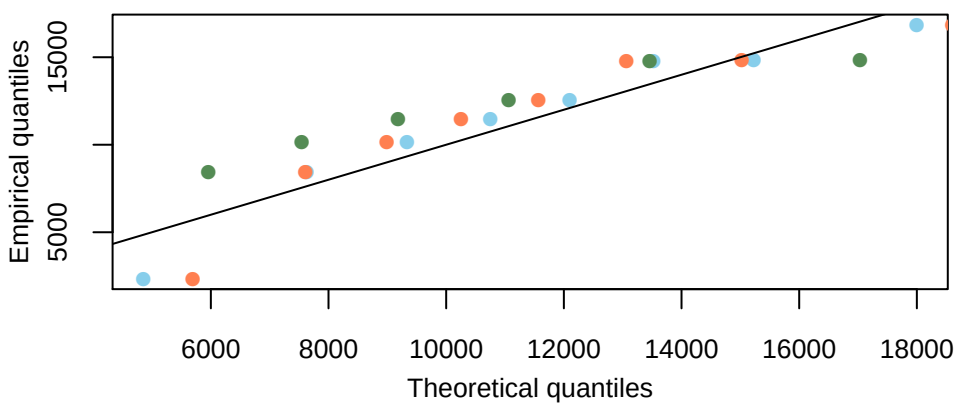
Exposure Unit:
BCC

Chemical (mg/kg):
Aluminum

Legend

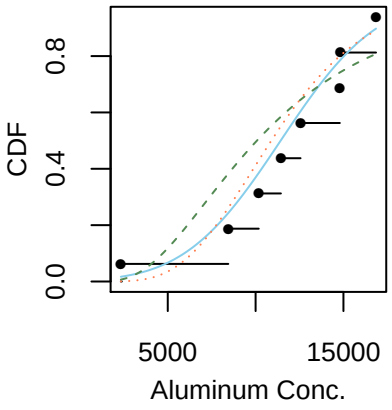
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

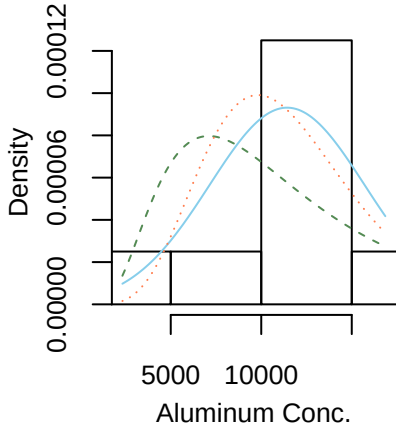


ECDF, Histogram & Q−Q (Detects Only)

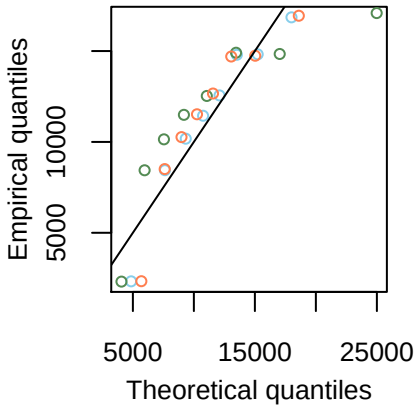
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 2,300 J	Arithmetic Mean = 11,000
N (detect) = 8	SD (log detect) = 0.63	Max (detect) = 17,000 J	Arithmetic SD = 4,600

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.5	0.9	–	–	–	–	160.505	160.664
Lognormal	0.0074	0.1	–	–	–	–	165.799	165.958
Gamma	–	–	0.18	0.295	0.8155	0.719	165.004	165.163

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Aluminum

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **401**

Media:
Waterway Sediment All Depths

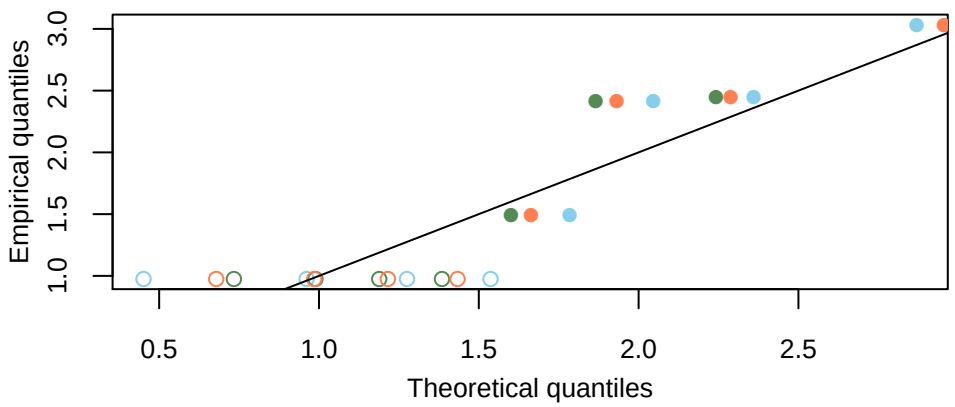
Exposure Unit:
BCC

Chemical (mg/kg):
Antimony

Legend

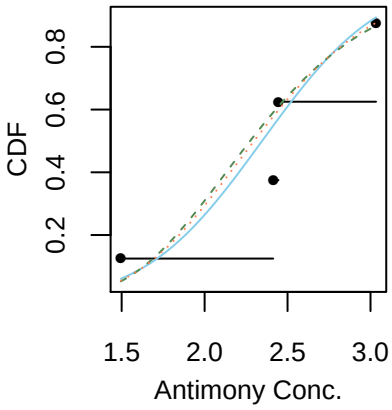
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

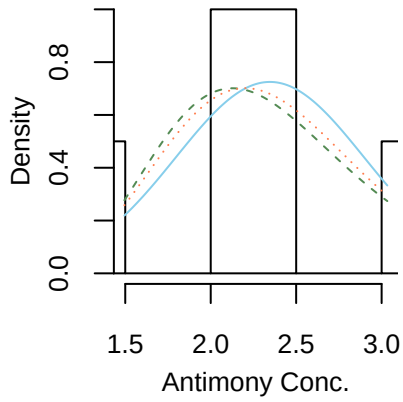


ECDF, Histogram & Q−Q (Detects Only)

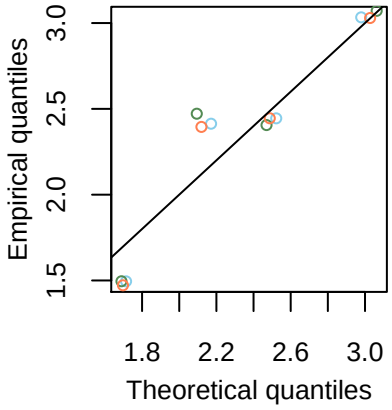
ECDF



Histogram



Q−Q



N = 8	FOD = 50%	Min (detect) = 1 J	Kaplan Meier Mean = 1
N (detect) = 4	SD (log detect) = 0.3	Max (detect) = 3 J	Kaplan Meier SD = 0.98

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.027	0.043	–	–	–	–	22.9023	23.0612
Lognormal	0.023	0.028	–	–	–	–	20.6972	20.856
Gamma	–	–	NA	NA	NA	NA	21.1837	21.3426

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.61	N<5	–	–	–	–	10.5721	9.34465
Lognormal	0.39	N<5	–	–	–	–	11.109	9.88155
Gamma	–	–	NA	NA	NA	NA	10.881	9.65364

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Antimony

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **402**

Media:
Waterway Sediment All Depths

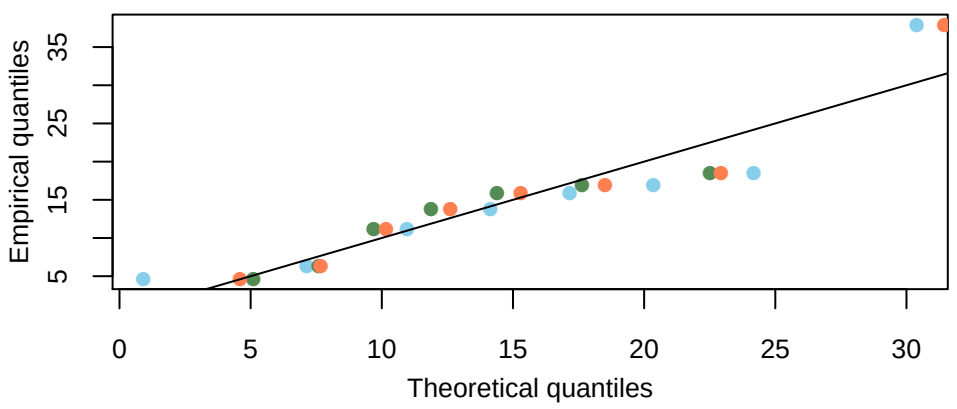
Exposure Unit:
BCC

Chemical (mg/kg):
Arsenic

Legend

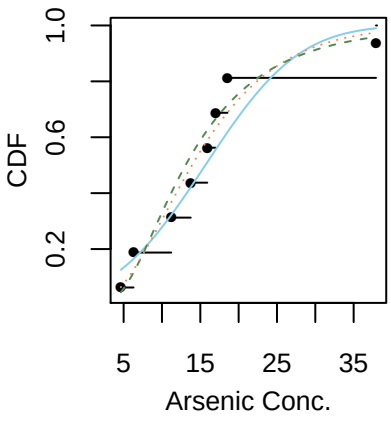
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

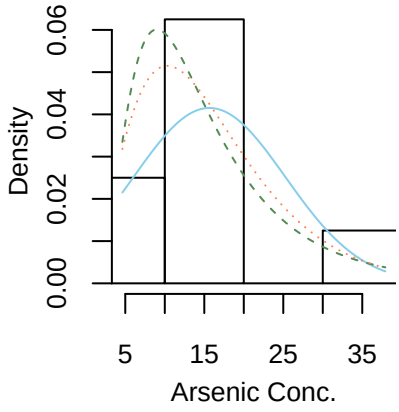


ECDF, Histogram & Q−Q (Detects Only)

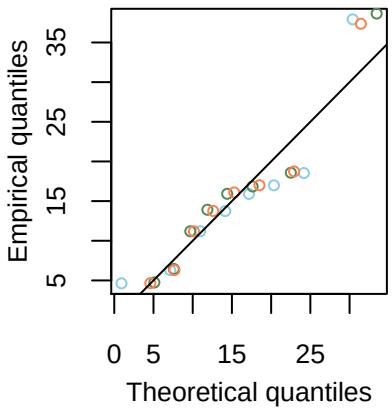
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 4 J	Arithmetic Mean = 16
N (detect) = 8	SD (log detect) = 0.65	Max (detect) = 38 J	Arithmetic SD = 10

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.11	0.1	–	–	–	–	62.9044	63.0633
Lognormal	0.79	0.7	–	–	–	–	59.9891	60.148
Gamma	–	–	0.1865	0.297	0.282	0.724	60.1342	60.2931

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Arsenic

Media:
Waterway Sediment All Depths

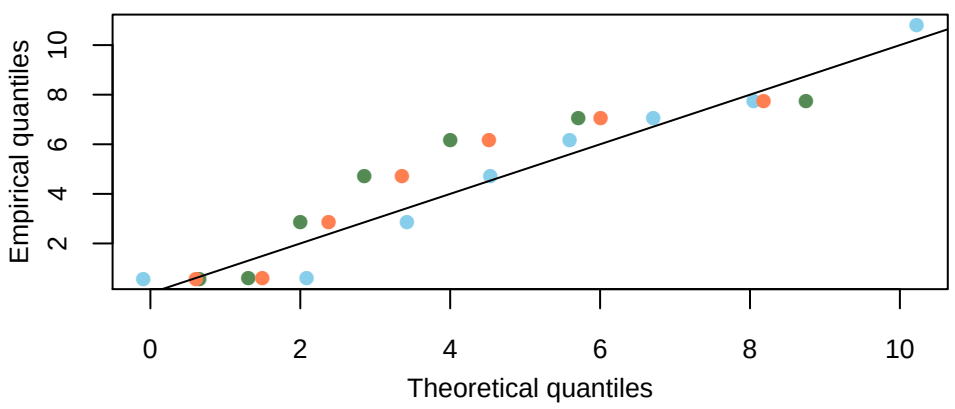
Exposure Unit:
BCC

Chemical (mg/kg):
Cadmium

Legend

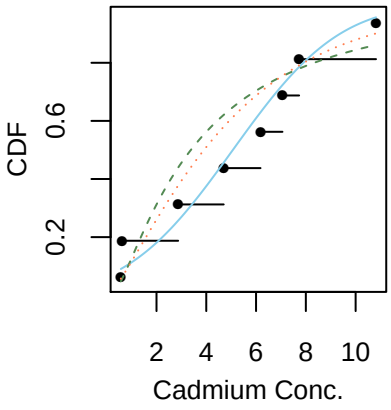
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

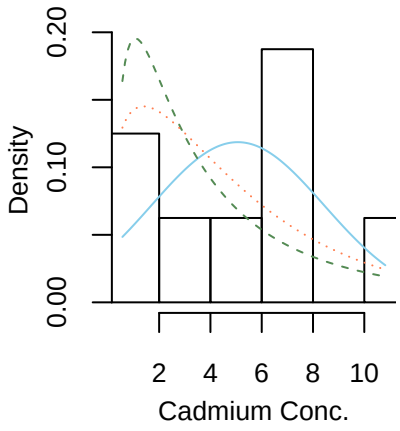


ECDF, Histogram & Q−Q (Detects Only)

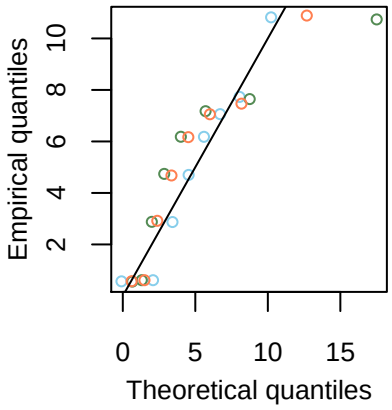
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 0.57 J	Arithmetic Mean = 5
N (detect) = 8	SD (log detect) = 1.1	Max (detect) = 11 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.72	0.9	–	–	–	–	46.1073	46.2662
Lognormal	0.058	0.2	–	–	–	–	47.3032	47.4621
Gamma	–	–	0.2048	0.301	0.4979	0.736	45.5035	45.6624

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Cadmium

Media:
Waterway Sediment All Depths

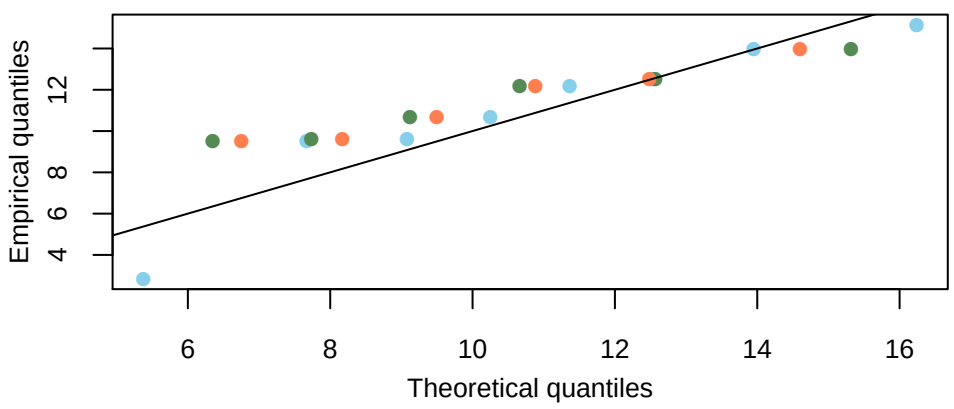
Exposure Unit:
BCC

Chemical (mg/kg):
Cobalt

Legend

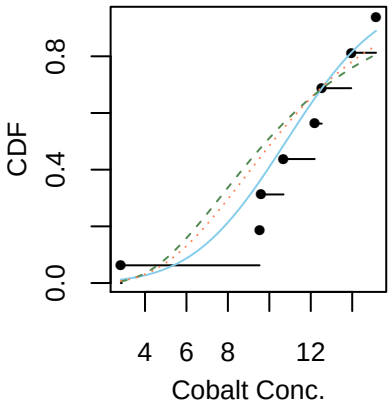
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

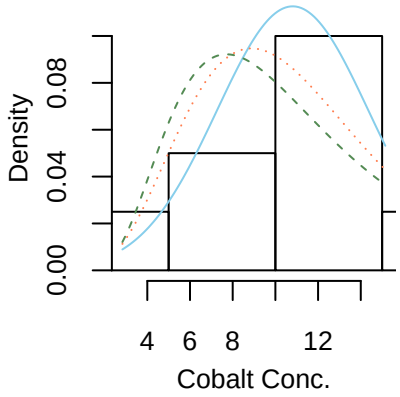


ECDF, Histogram & Q−Q (Detects Only)

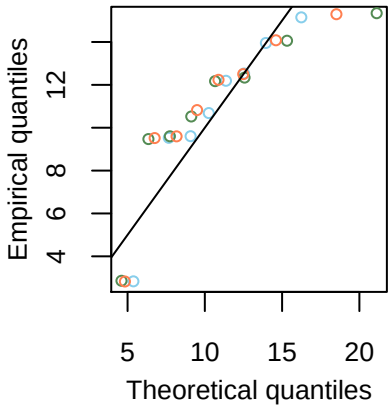
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 11
N (detect) = 8	SD (log detect) = 0.53	Max (detect) = 15 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.23	0.18	–	–	–	–	46.9347	47.0935
Lognormal	0.0035	0.0047	–	–	–	–	52.1148	52.2737
Gamma	–	–	0.3155	0.295	0.8072	0.719	49.9989	50.1578

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Cobalt

Media:
Waterway Sediment All Depths

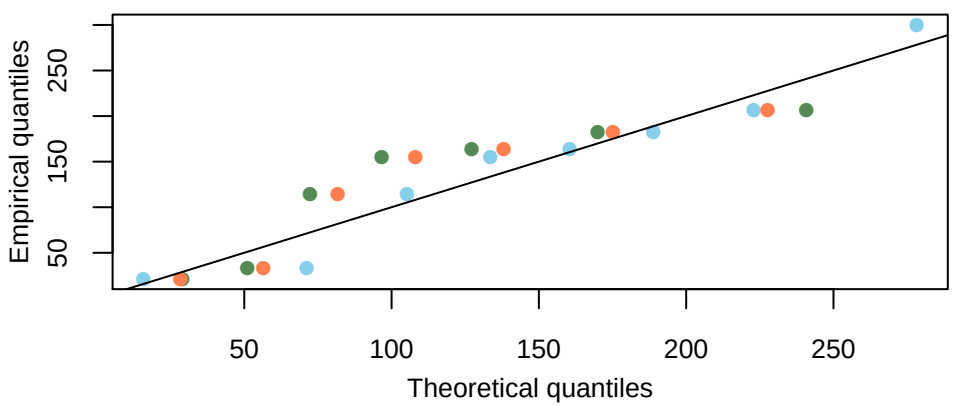
Exposure Unit:
BCC

Chemical (mg/kg):
Copper

Legend

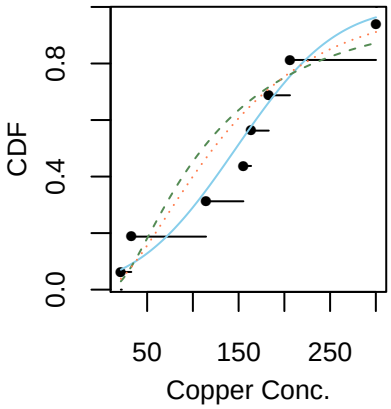
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

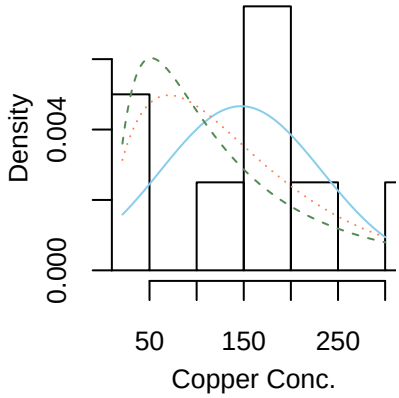


ECDF, Histogram & Q−Q (Detects Only)

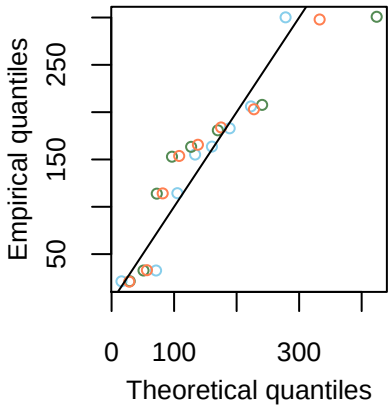
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 21 J	Arithmetic Mean = 150
N (detect) = 8	SD (log detect) = 0.93	Max (detect) = 300 J	Arithmetic SD = 91

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.73	0.79	–	–	–	–	97.8885	98.0473
Lognormal	0.08	0.099	–	–	–	–	99.8886	100.048
Gamma	–	–	0.2494	0.301	0.5212	0.736	98.1831	98.342

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Copper

Media:
Waterway Sediment All Depths

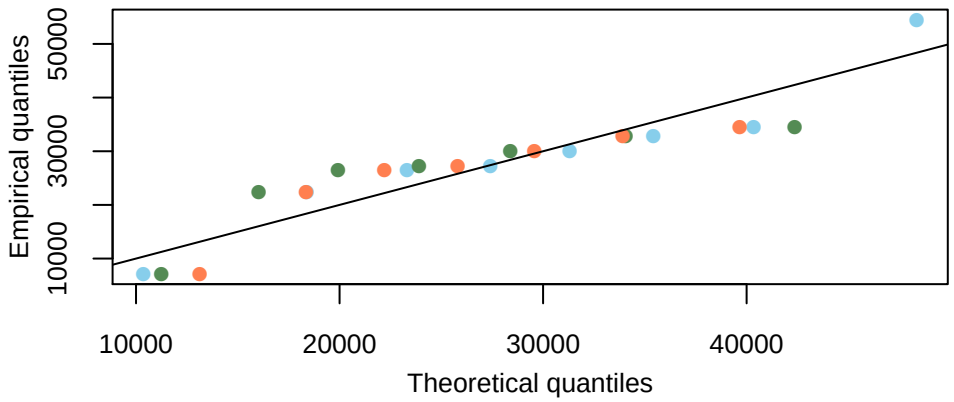
Exposure Unit:
BCC

Chemical (mg/kg):
Iron

Legend

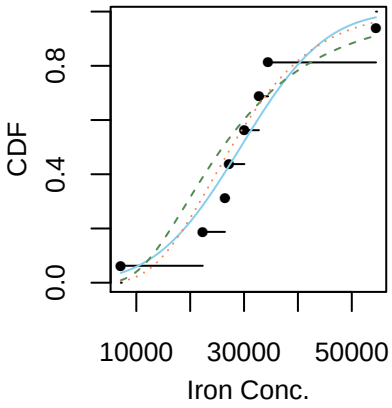
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

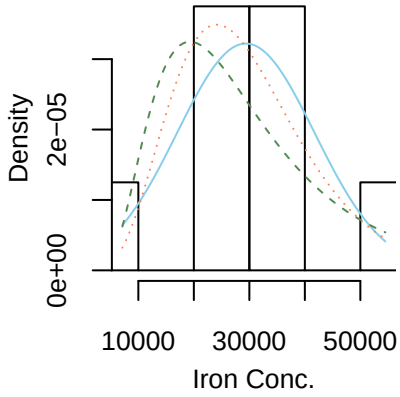


ECDF, Histogram & Q−Q (Detects Only)

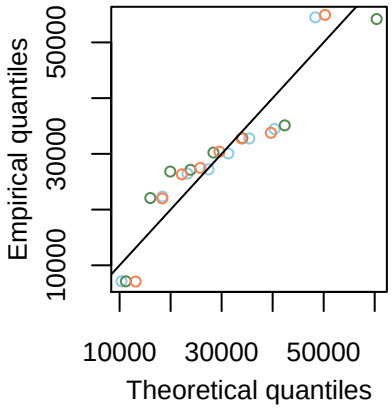
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 7,100 J	Arithmetic Mean = 29,000
N (detect) = 8	SD (log detect) = 0.59	Max (detect) = 54,000 J	Arithmetic SD = 13,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.51	0.27	–	–	–	–	177.489	177.648
Lognormal	0.058	0.085	–	–	–	–	179.765	179.924
Gamma	–	–	0.2097	0.295	0.5601	0.719	178.591	178.75

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Iron

Media:
Waterway Sediment All Depths

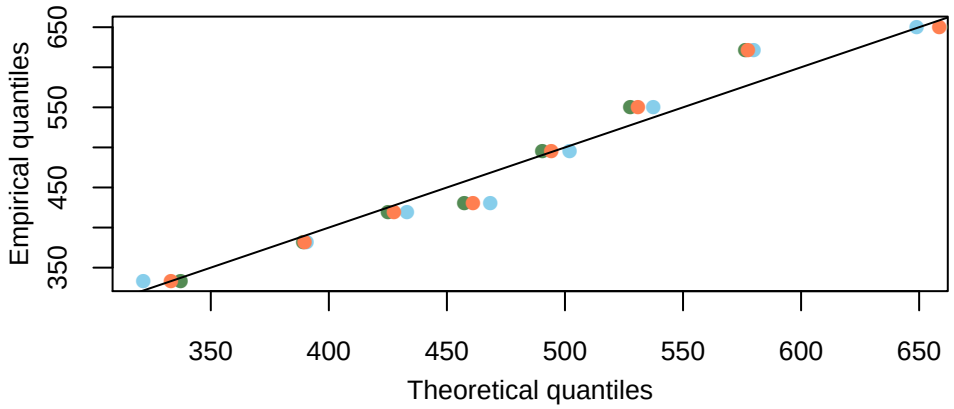
Exposure Unit:
BCC

Chemical (mg/kg):
Manganese

Legend

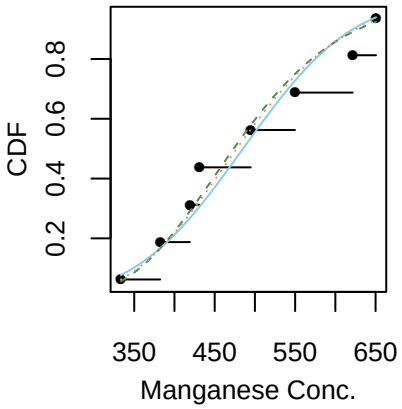
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

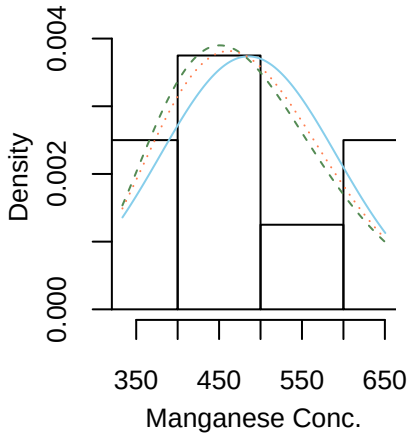


ECDF, Histogram & Q−Q (Detects Only)

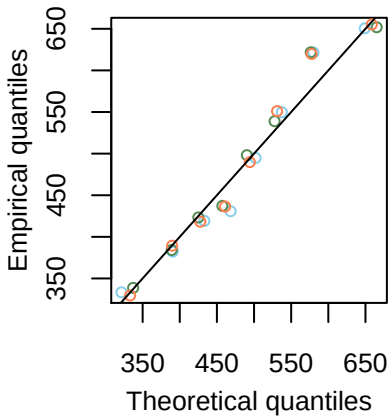
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 330 J	Arithmetic Mean = 490
N (detect) = 8	SD (log detect) = 0.24	Max (detect) = 650 J	Arithmetic SD = 110

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.7	0.59	–	–	–	–	101.43	101.589
Lognormal	0.82	0.82	–	–	–	–	101.14	101.299
Gamma	–	–	0.1761	0.294	0.2288	0.716	101.161	101.32

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Manganese

Exhibit 2: EPC Program and Results
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Figure **408**

Media:
Waterway Sediment All Depths

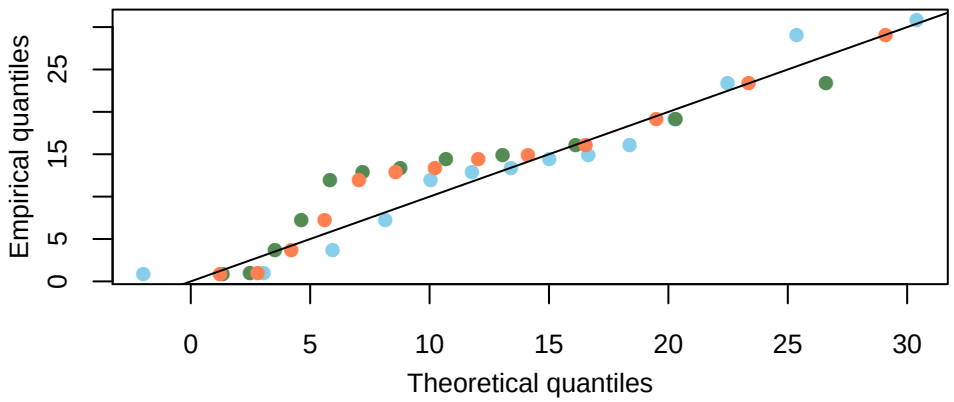
Exposure Unit:
BCC

Chemical (mg/kg):
Mercury

Legend

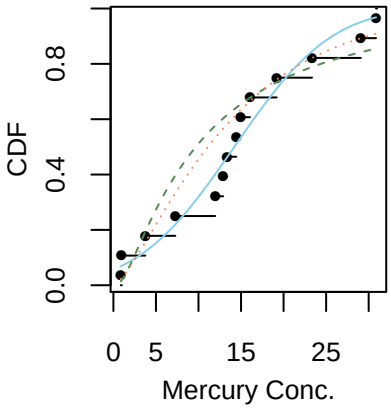
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

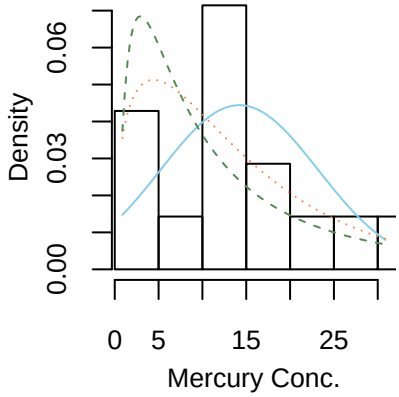


ECDF, Histogram & Q−Q (Detects Only)

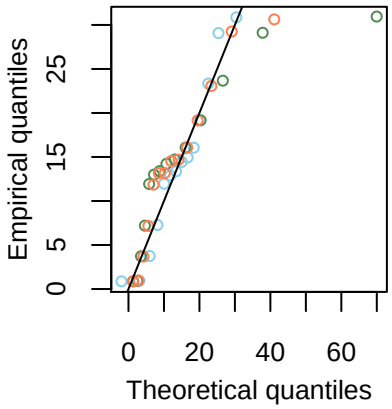
ECDF



Histogram



Q−Q



N = 14	FOD = 100%	Min (detect) = 0.87 J	Arithmetic Mean = 14
N (detect) = 14	SD (log detect) = 1.1	Max (detect) = 31 J	Arithmetic SD = 9

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.54	0.69	–	–	–	–	105.196	106.474
Lognormal	0.006	0.0026	–	–	–	–	109.905	111.183
Gamma	–	–	0.2469	0.274	0.6969	0.748	105.257	106.535

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Mercury

Media:
Waterway Sediment All Depths

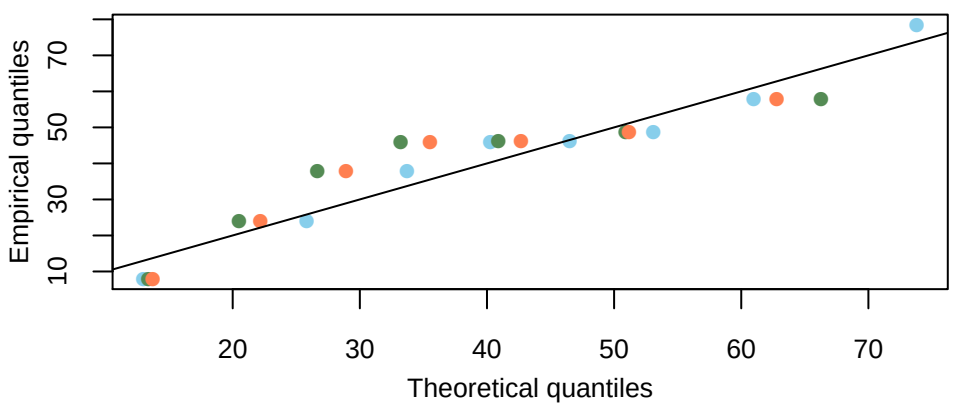
Exposure Unit:
BCC

Chemical (mg/kg):
Nickel

Legend

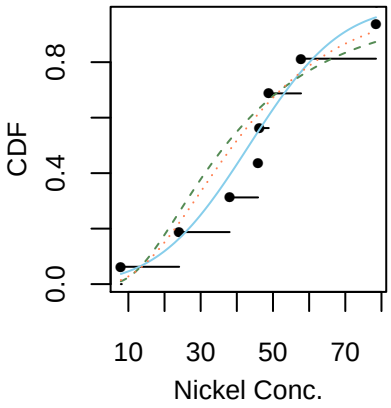
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

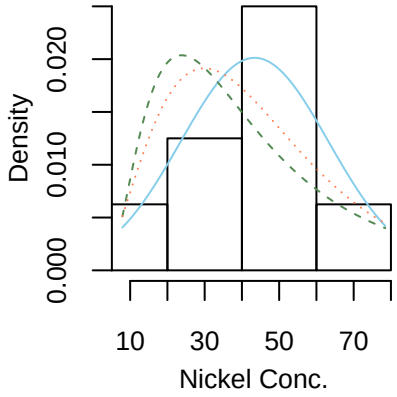


ECDF, Histogram & Q−Q (Detects Only)

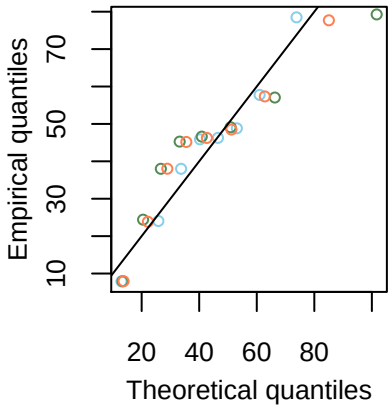
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 7 J	Arithmetic Mean = 43
N (detect) = 8	SD (log detect) = 0.71	Max (detect) = 78 J	Arithmetic SD = 21

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.91	0.7	–	–	–	–	74.4937	74.6525
Lognormal	0.067	0.096	–	–	–	–	77.8013	77.9602
Gamma	–	–	0.2379	0.297	0.4704	0.724	75.8988	76.0577

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Nickel

Media:
Waterway Sediment All Depths

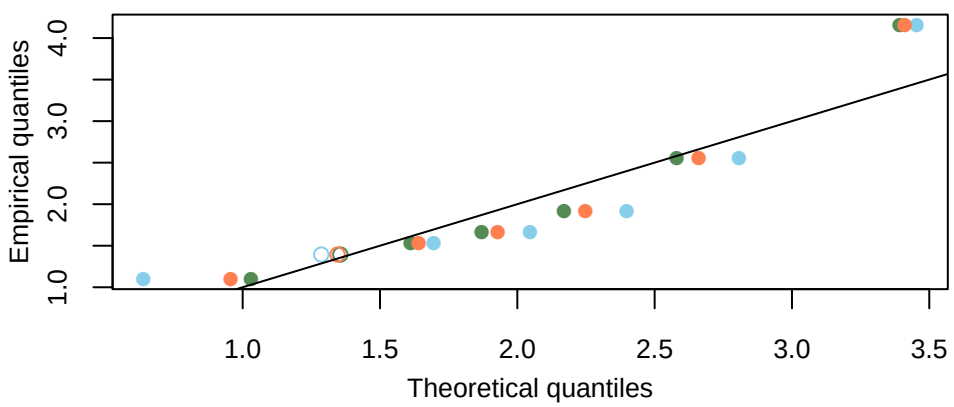
Exposure Unit:
BCC

Chemical (mg/kg):
Thallium

Legend

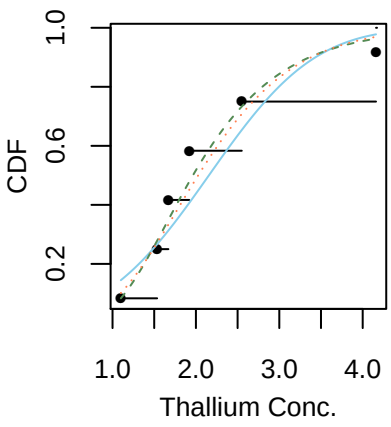
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

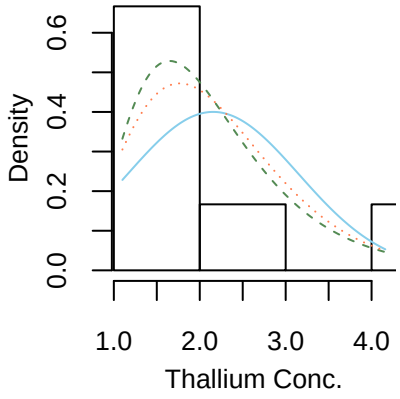


ECDF, Histogram & Q−Q (Detects Only)

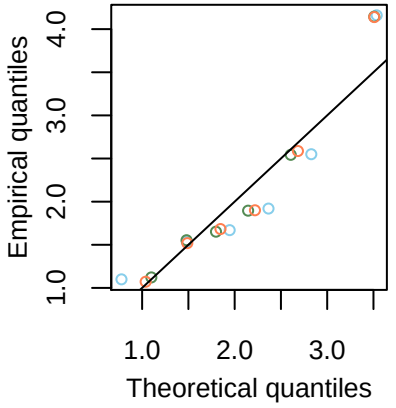
ECDF



Histogram



Q−Q



N = 8	FOD = 75%	Min (detect) = 1 J	Kaplan Meier Mean = 2
N (detect) = 6	SD (log detect) = 0.46	Max (detect) = 4 J	Kaplan Meier SD = 0.96

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.075	0.15	–	–	–	–	23.3061	23.1979
Lognormal	0.66	0.62	–	–	–	–	20.0255	19.9173
Gamma	–	–	NA	NA	NA	NA	20.8568	20.7486

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.22	0.27	–	–	–	–	20.9922	20.5757
Lognormal	0.87	0.74	–	–	–	–	18.7016	18.2851
Gamma	–	–	NA	NA	NA	NA	19.2262	18.8098

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Thallium

Exhibit 2: EPC Program and Results
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Berry's Creek Study Area Remedial Investigation

Figure **411**

Media:
Waterway Sediment All Depths

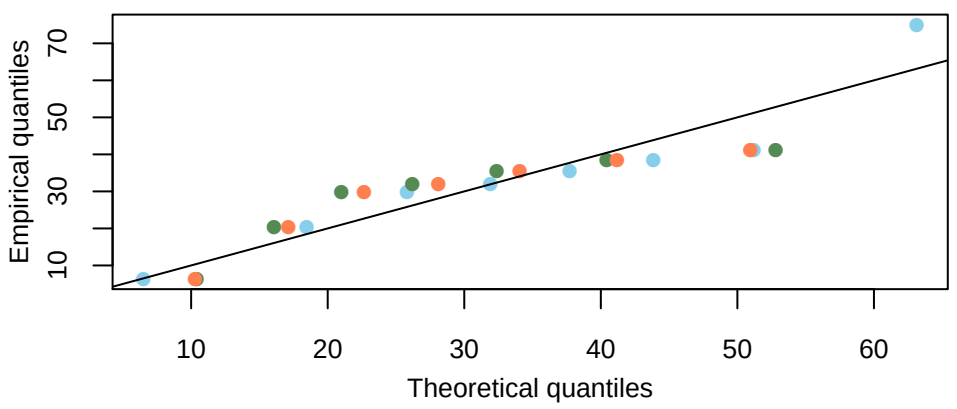
Exposure Unit:
BCC

Chemical (mg/kg):
Vanadium

Legend

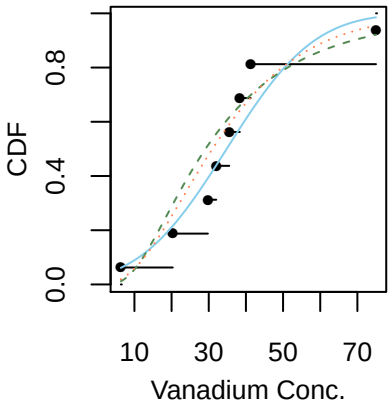
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

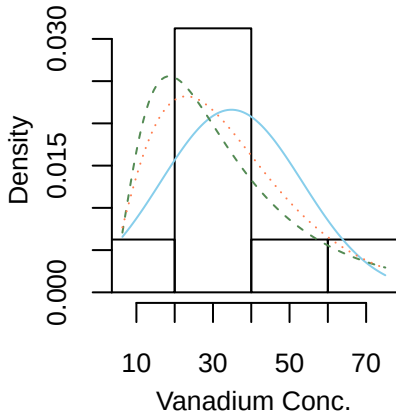


ECDF, Histogram & Q−Q (Detects Only)

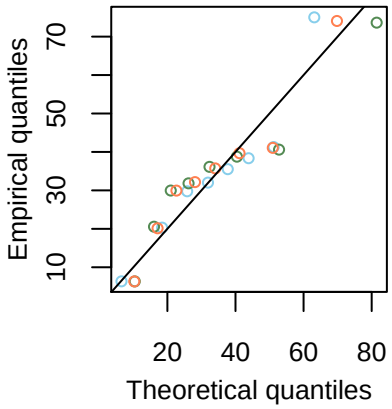
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 6 J	Arithmetic Mean = 35
N (detect) = 8	SD (log detect) = 0.72	Max (detect) = 75 J	Arithmetic SD = 20

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.38	0.16	–	–	–	–	73.35	73.5089
Lognormal	0.15	0.11	–	–	–	–	74.2522	74.411
Gamma	–	–	0.224	0.297	0.416	0.724	72.8823	73.0411

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Vanadium

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **412**

Media:
Waterway Sediment All Depths

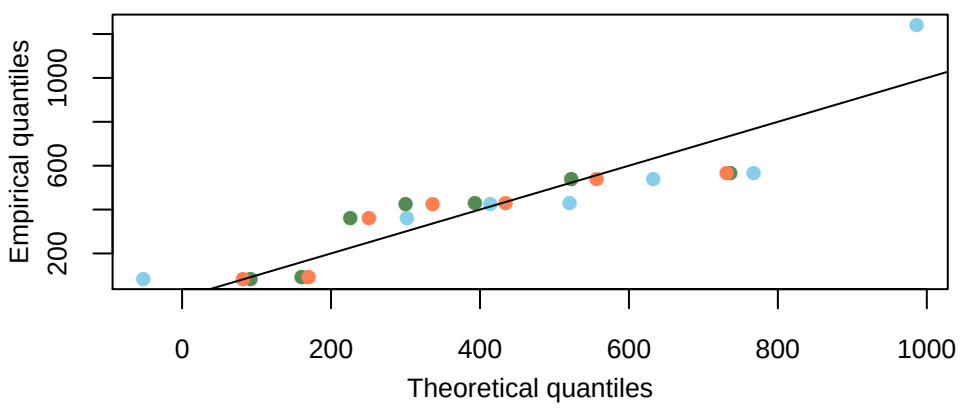
Exposure Unit:
BCC

Chemical (mg/kg):
Zinc

Legend

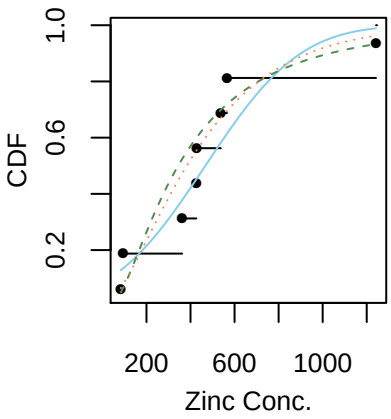
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

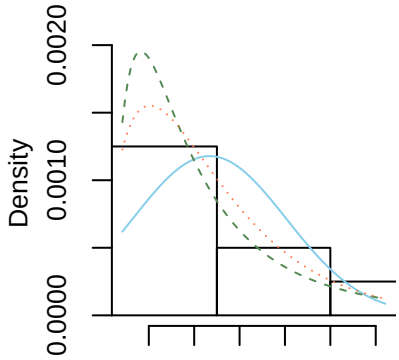


ECDF, Histogram & Q−Q (Detects Only)

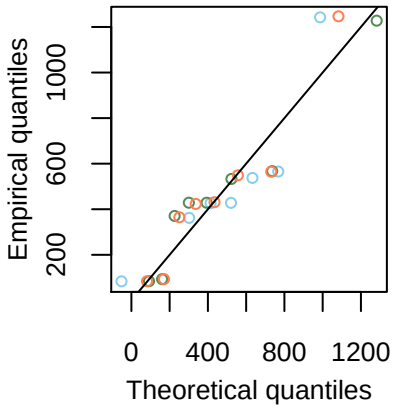
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 84 J	Arithmetic Mean = 470
N (detect) = 8	SD (log detect) = 0.92	Max (detect) = 1,200 J	Arithmetic SD = 360

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.09	0.094	–	–	–	–	119.893	120.052
Lognormal	0.17	0.082	–	–	–	–	117.695	117.854
Gamma	–	–	0.2224	0.301	0.4635	0.736	117.02	117.179

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Zinc

Media:
Waterway Sediment All Depths

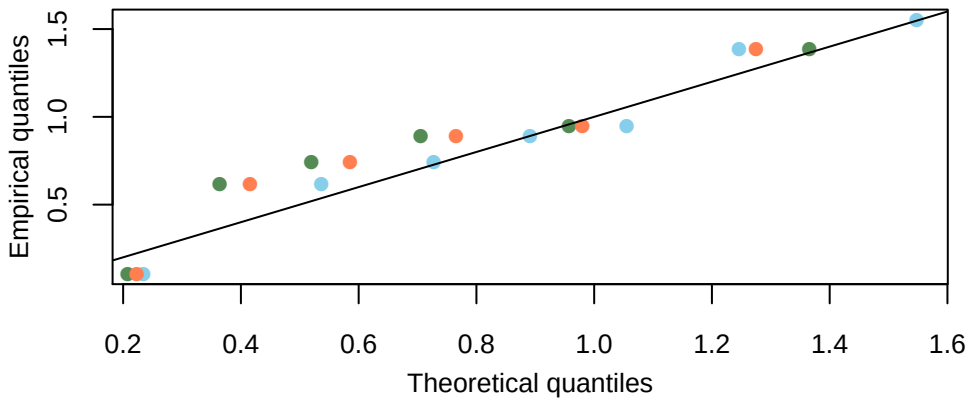
Exposure Unit:
BCC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

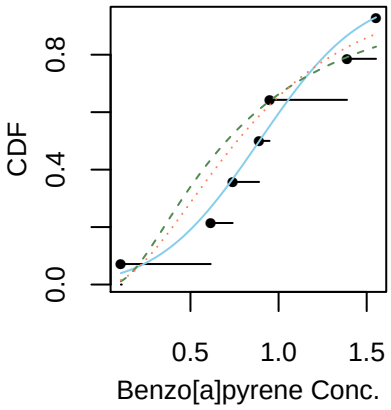
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

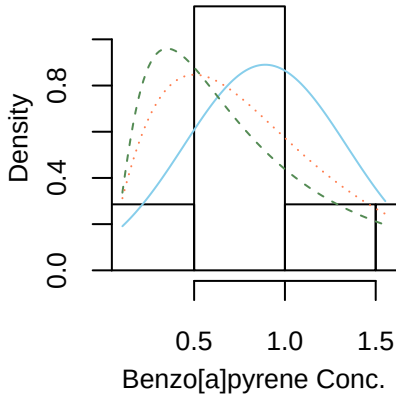


ECDF, Histogram & Q−Q (Detects Only)

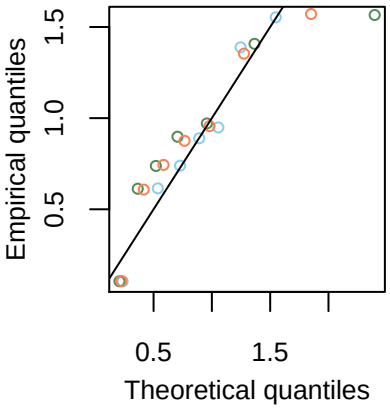
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 0.1 J	Arithmetic Mean = 0.89
N (detect) = 7	SD (log detect) = 0.9	Max (detect) = 1 J	Arithmetic SD = 0.48

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.88	0.8	–	–	–	–	12.63	12.5219
Lognormal	0.032	0.062	–	–	–	–	16.447	16.3389
Gamma	–	–	NA	NA	NA	NA	14.1887	14.0806

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Benzo[a]pyrene

Media:
Waterway Sediment All Depths

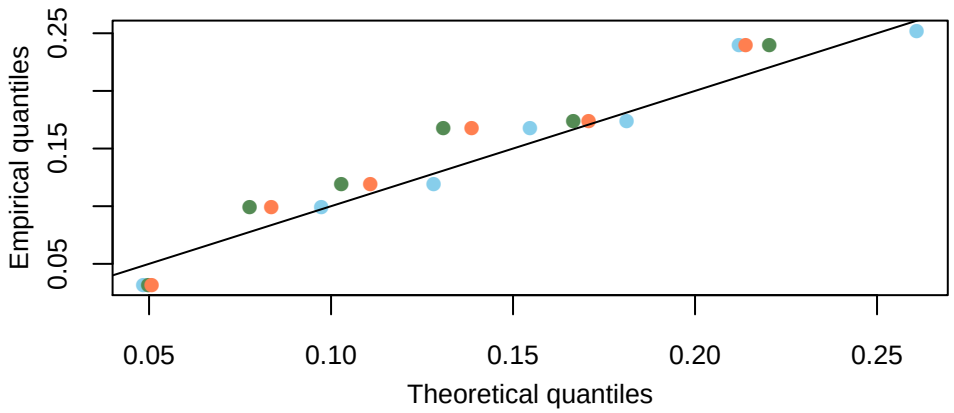
Exposure Unit:
BCC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

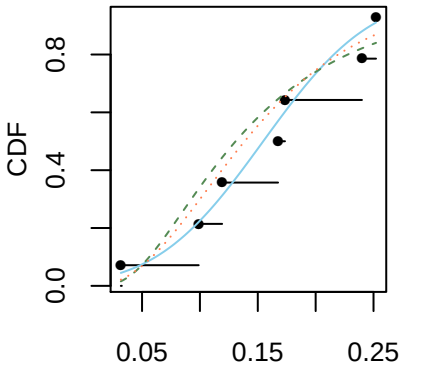
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

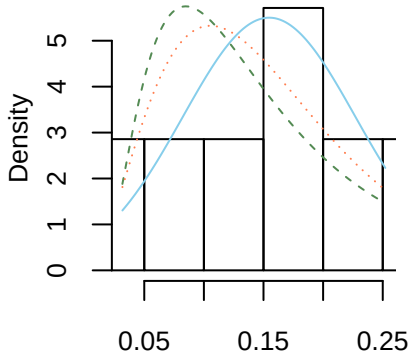


ECDF, Histogram & Q−Q (Detects Only)

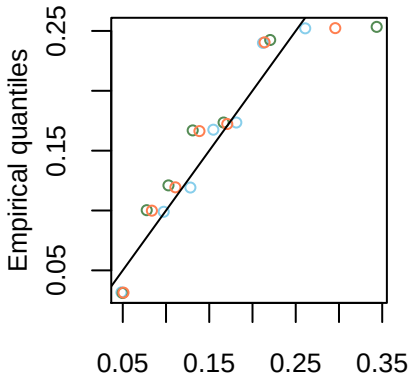
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 0.032 J	Arithmetic Mean = 0.15
N (detect) = 7	SD (log detect) = 0.71	Max (detect) = 0.25 J	Arithmetic SD = 0.078

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.8	0.92	–	–	–	–	−12.8725	−12.9807
Lognormal	0.14	0.48	–	–	–	–	−10.4479	−10.5561
Gamma	–	–	NA	NA	NA	NA	−11.8831	−11.9913

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Dibenz[a,h]anthracene

Media:
Waterway Sediment All Depths

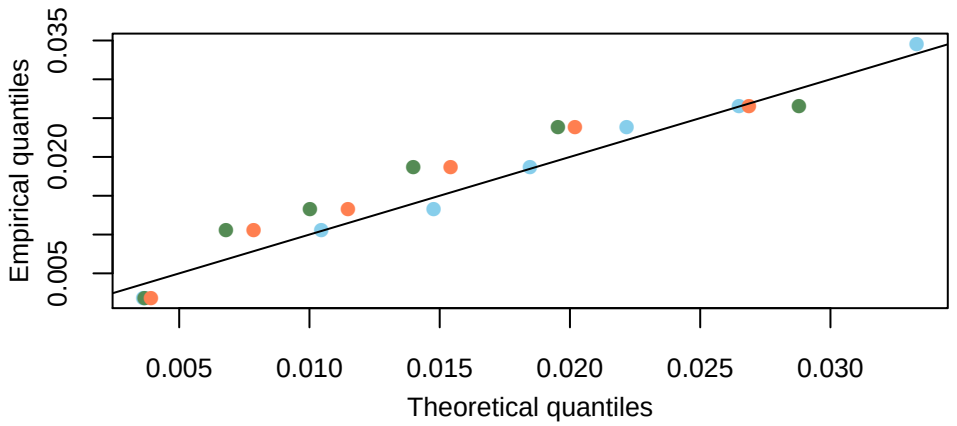
Exposure Unit:
BCC

Chemical (mg/kg):
Aldrin

Legend

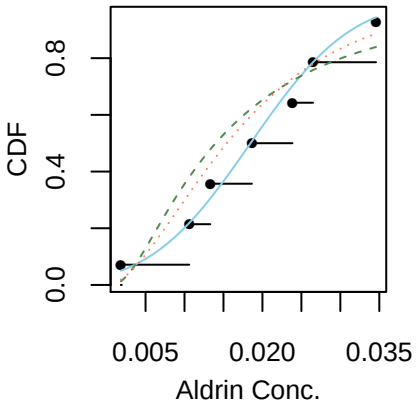
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

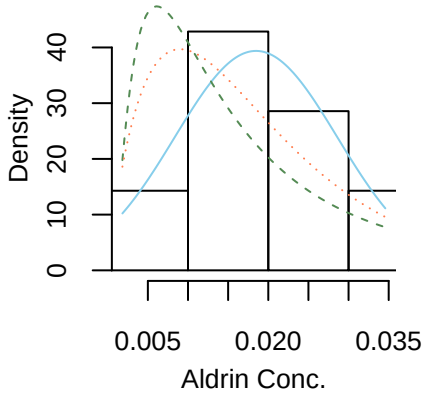


ECDF, Histogram & Q−Q (Detects Only)

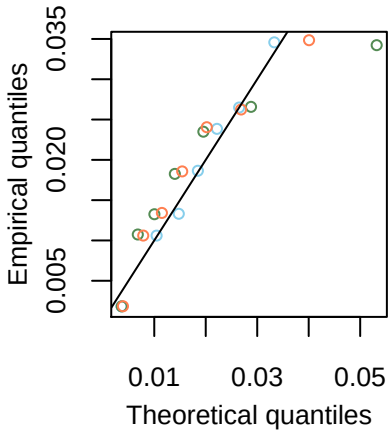
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 0.0018	Arithmetic Mean = 0.018
N (detect) = 7	SD (log detect) = 0.98	Max (detect) = 0.035 J	Arithmetic SD = 0.011

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1	0.99	–	–	–	–	−40.4263	−40.5344
Lognormal	0.073	0.22	–	–	–	–	−37.2004	−37.3086
Gamma	–	–	NA	NA	NA	NA	−39.4032	−39.5114

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Aldrin

Media:
Waterway Sediment All Depths

Exposure Unit:
BCC

Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 7	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Heptachlor

Media:
Waterway Sediment All Depths

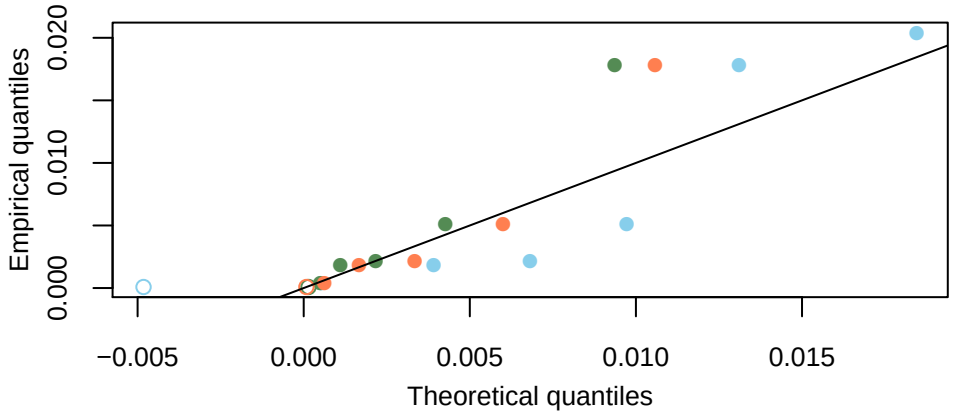
Exposure Unit:
BCC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

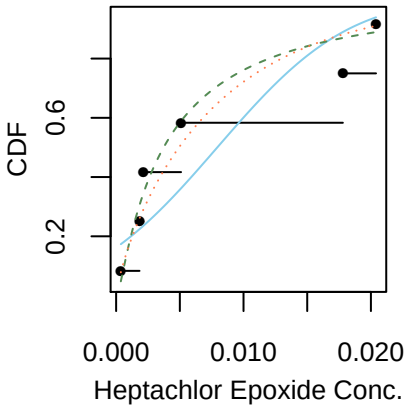
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

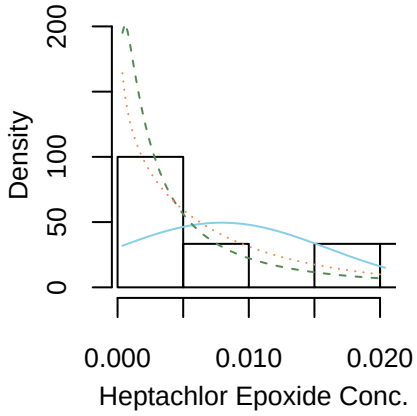


ECDF, Histogram & Q−Q (Detects Only)

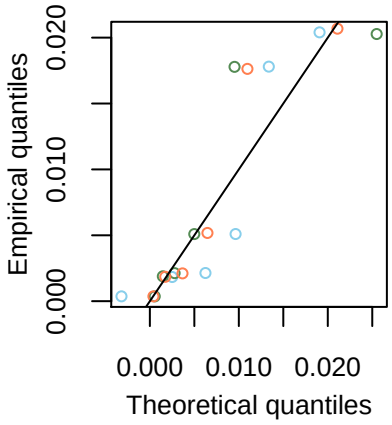
ECDF



Histogram



Q−Q



N = 7	FOD = 86%	Min (detect) = 0.00037 J	Kaplan Meier Mean = 0.0068
N (detect) = 6	SD (log detect) = 1.5	Max (detect) = 0.02 J	Kaplan Meier SD = 0.0079

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.019	0.069	–	–	–	–	−43.8301	−43.9383
Lognormal	0.64	0.7	–	–	–	–	−53.4093	−53.5175
Gamma	–	–	NA	NA	NA	NA	−54.0255	−54.1336

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.057	0.11	–	–	–	–	−36.8376	−37.2541
Lognormal	0.63	0.78	–	–	–	–	−42.1257	−42.5422
Gamma	–	–	NA	NA	NA	NA	−42.2804	−42.6968

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Heptachlor Epoxide

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **418**

Media:
Waterway Sediment All Depths

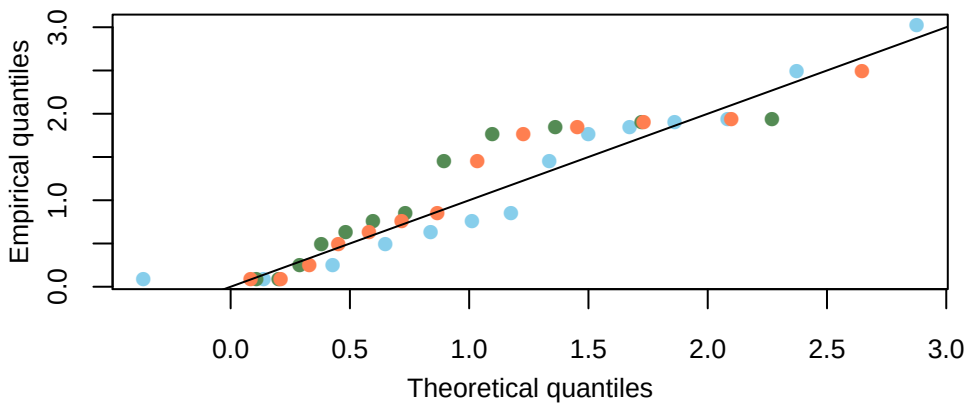
Exposure Unit:
BCC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

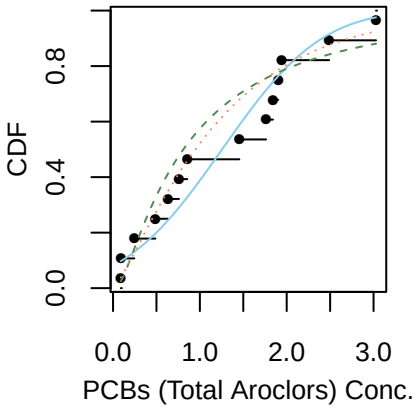
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

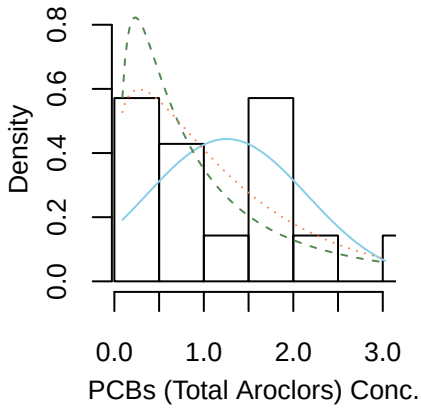


ECDF, Histogram & Q−Q (Detects Only)

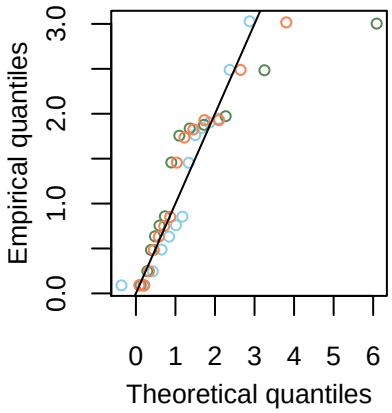
ECDF



Histogram



Q−Q



N = 14	FOD = 100%	Min (detect) = 0.09 J	Arithmetic Mean = 1
N (detect) = 14	SD (log detect) = 1.2	Max (detect) = 3 J	Arithmetic SD = 0.93

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.33	0.37	–	–	–	–	40.7547	42.0328
Lognormal	0.045	0.17	–	–	–	–	40.975	42.2531
Gamma	–	–	0.1855	0.274	0.4612	0.748	37.8808	39.1589

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−PCBs (Total Aroclors)

Media:
Waterway Sediment All Depths

Exposure Unit:
BCC

Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 7	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−Trichloroethene

Media:
Waterway Sediment All Depths

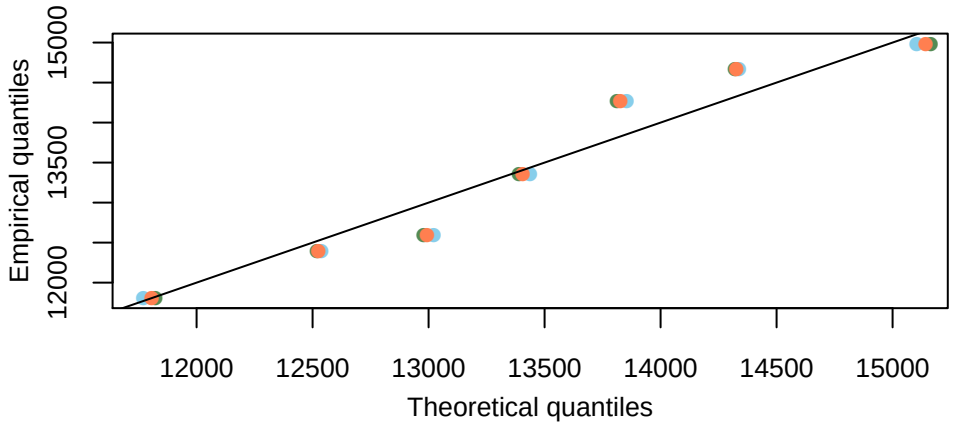
Exposure Unit:
LBC

Chemical (mg/kg):
Aluminum

Legend

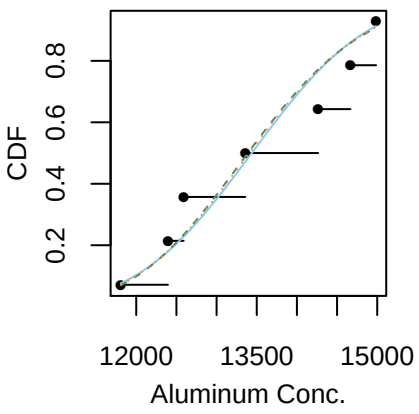
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

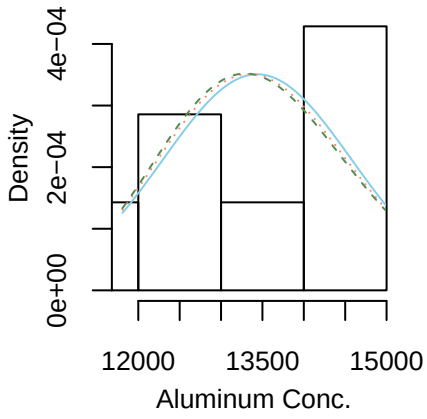


ECDF, Histogram & Q−Q (Detects Only)

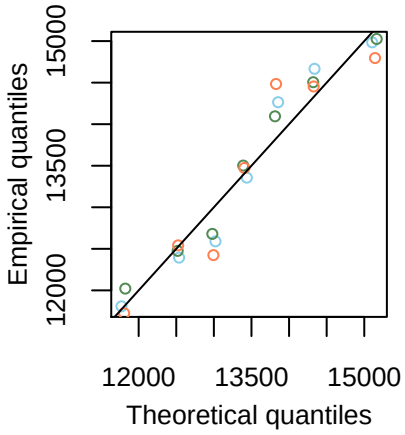
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 12,000 J	Arithmetic Mean = 13,000
N (detect) = 7	SD (log detect) = 0.092	Max (detect) = 15,000 J	Arithmetic SD = 1,200

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.56	0.68	–	–	–	–	122.377	122.269
Lognormal	0.57	0.68	–	–	–	–	122.38	122.272
Gamma	–	–	NA	NA	NA	NA	122.371	122.263

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Aluminum

Media:
Waterway Sediment All Depths

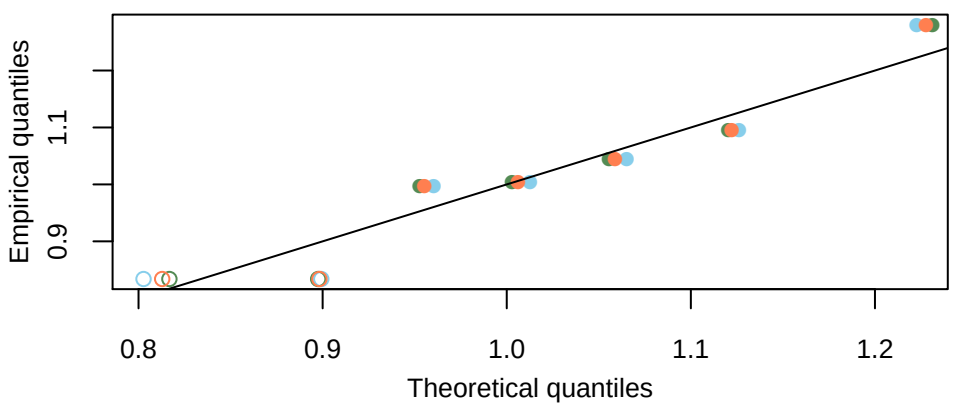
Exposure Unit:
LBC

Chemical (mg/kg):
Antimony

Legend

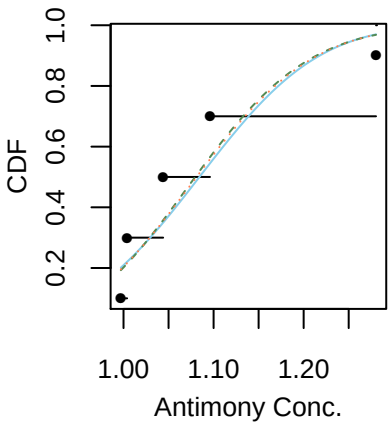
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

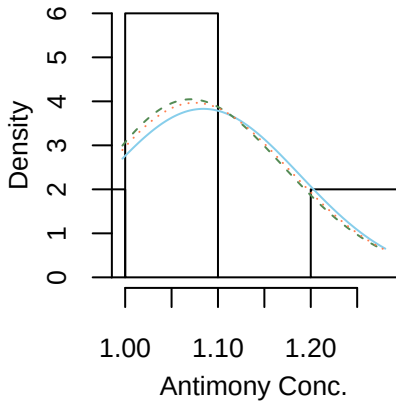


ECDF, Histogram & Q−Q (Detects Only)

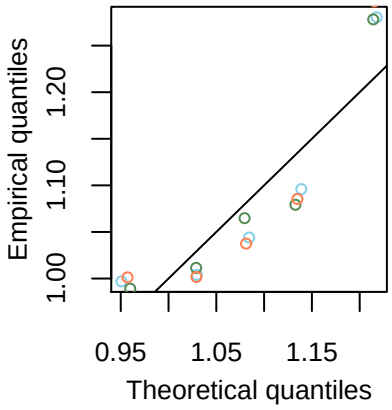
ECDF



Histogram



Q−Q



N = 7	FOD = 71%	Min (detect) = 1 J	Kaplan Meier Mean = 1
N (detect) = 5	SD (log detect) = 0.1	Max (detect) = 1 J	Kaplan Meier SD = 0.16

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.49	0.75	–	–	–	–	−3.33091	−3.43909
Lognormal	0.51	0.55	–	–	–	–	−3.61697	−3.72515
Gamma	–	–	NA	NA	NA	NA	−3.55552	−3.66369

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.11	N<5	–	–	–	–	−4.42684	−5.20796
Lognormal	0.15	N<5	–	–	–	–	−4.93725	−5.71837
Gamma	–	–	NA	NA	NA	NA	−4.7741	−5.55522

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Antimony

Media:
Waterway Sediment All Depths

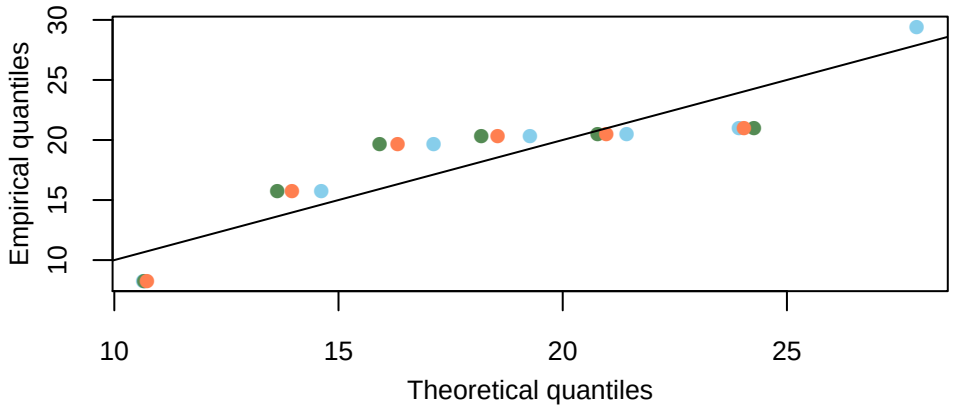
Exposure Unit:
LBC

Chemical (mg/kg):
Arsenic

Legend

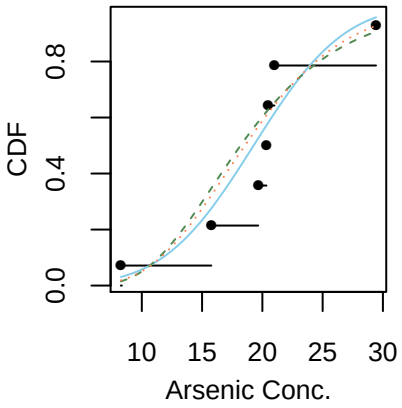
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

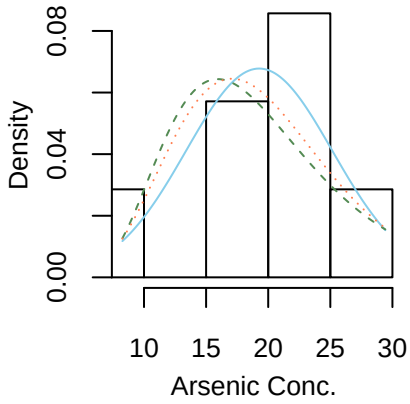


ECDF, Histogram & Q−Q (Detects Only)

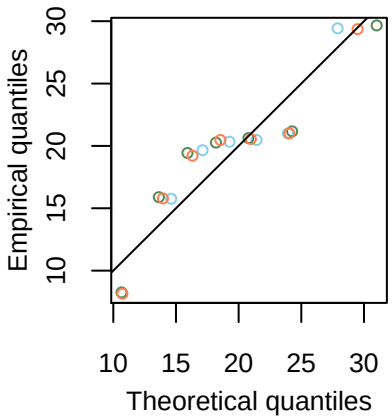
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 8 J	Arithmetic Mean = 19
N (detect) = 7	SD (log detect) = 0.39	Max (detect) = 29 J	Arithmetic SD = 6

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.43	0.2	–	–	–	–	48.679	48.5709
Lognormal	0.1	0.072	–	–	–	–	50.3344	50.2262
Gamma	–	–	NA	NA	NA	NA	49.5274	49.4192

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Arsenic

Media:
Waterway Sediment All Depths

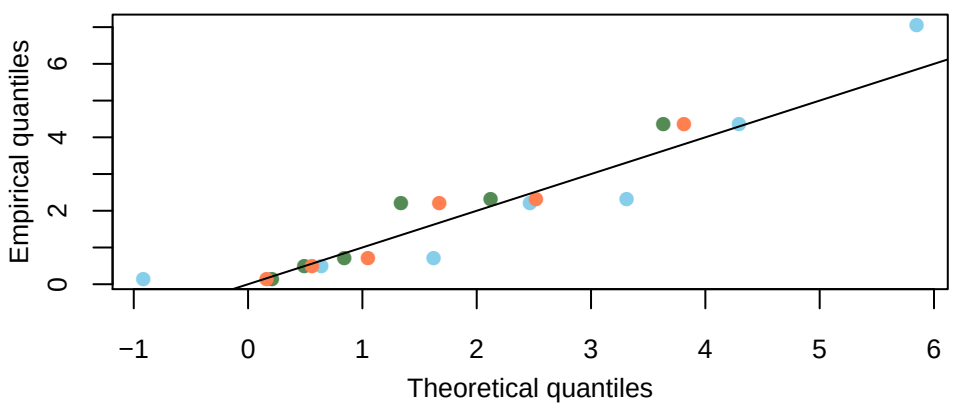
Exposure Unit:
LBC

Chemical (mg/kg):
Cadmium

Legend

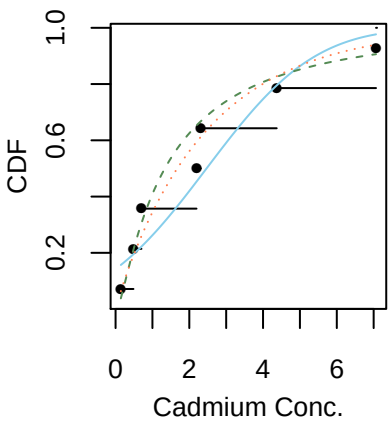
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

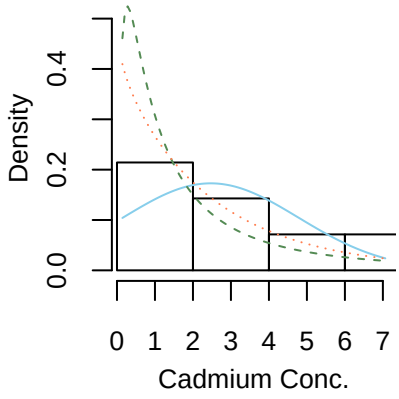


ECDF, Histogram & Q−Q (Detects Only)

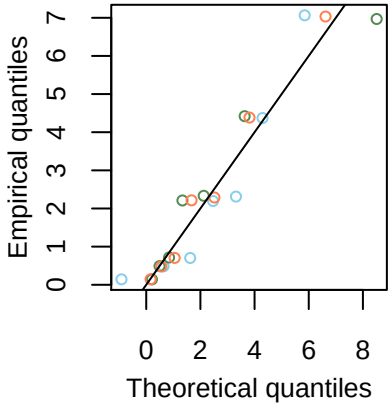
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 0.14 J	Arithmetic Mean = 2
N (detect) = 7	SD (log detect) = 1.4	Max (detect) = 7 J	Arithmetic SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.21	0.26	–	–	–	–	35.5766	35.4684
Lognormal	0.77	0.43	–	–	–	–	31.1994	31.0912
Gamma	–	–	NA	NA	NA	NA	30.633	30.5248

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Cadmium

Media:
Waterway Sediment All Depths

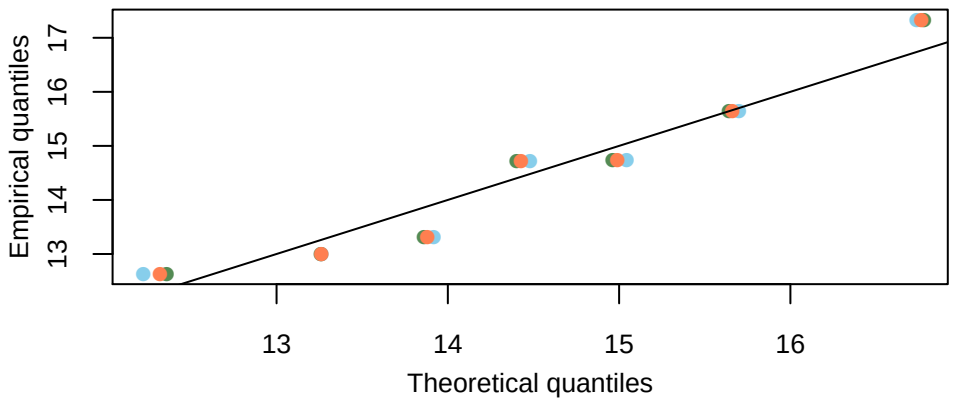
Exposure Unit:
LBC

Chemical (mg/kg):
Cobalt

Legend

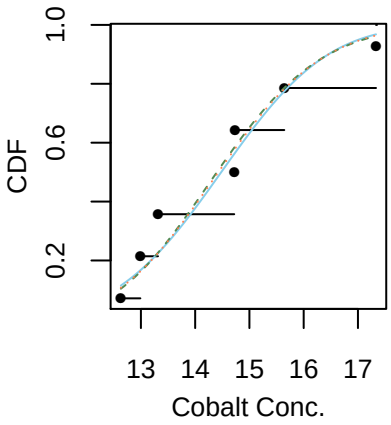
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

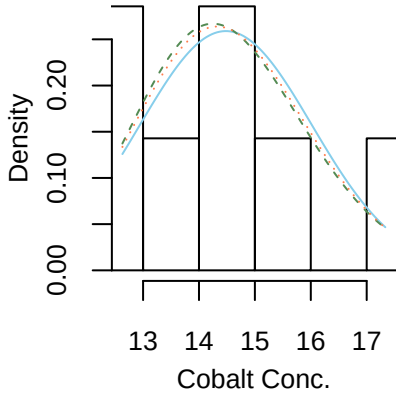


ECDF, Histogram & Q−Q (Detects Only)

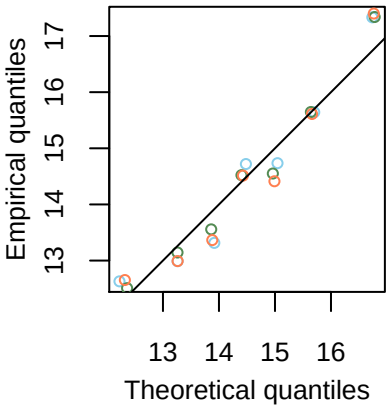
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 13 J	Arithmetic Mean = 14
N (detect) = 7	SD (log detect) = 0.11	Max (detect) = 17 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.57	0.65	–	–	–	–	29.9164	29.8082
Lognormal	0.65	0.66	–	–	–	–	29.5652	29.457
Gamma	–	–	NA	NA	NA	NA	29.6663	29.5581

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Cobalt

Media:
Waterway Sediment All Depths

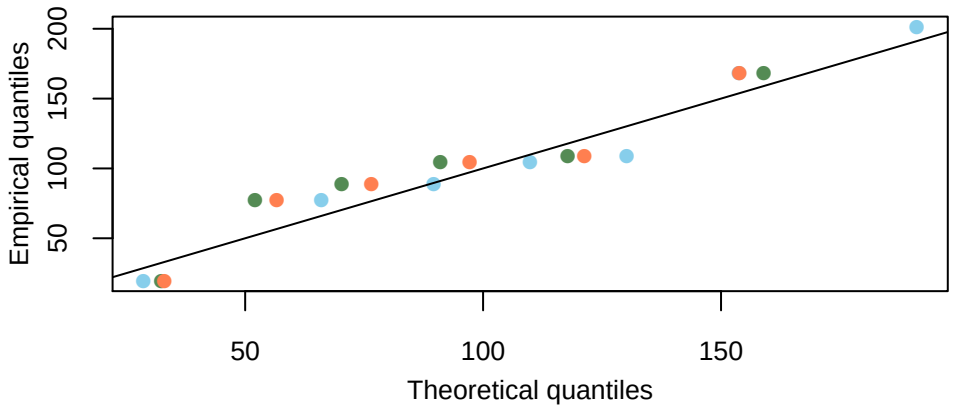
Exposure Unit:
LBC

Chemical (mg/kg):
Copper

Legend

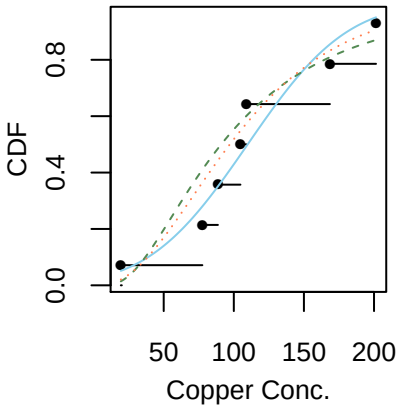
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

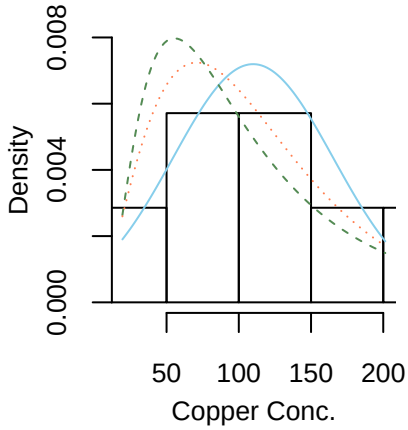


ECDF, Histogram & Q−Q (Detects Only)

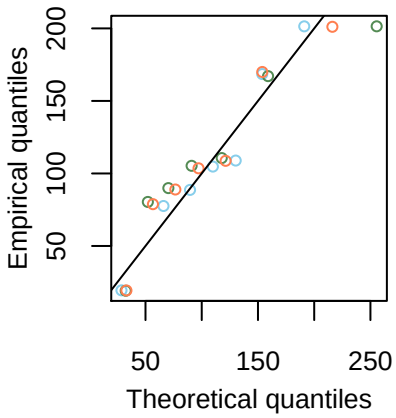
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 19 J	Arithmetic Mean = 110
N (detect) = 7	SD (log detect) = 0.76	Max (detect) = 200 J	Arithmetic SD = 60

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.83	0.38	–	–	–	–	80.0828	79.9746
Lognormal	0.13	0.12	–	–	–	–	82.117	82.0088
Gamma	–	–	NA	NA	NA	NA	80.6174	80.5092

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Copper

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **426**

Media:
Waterway Sediment All Depths

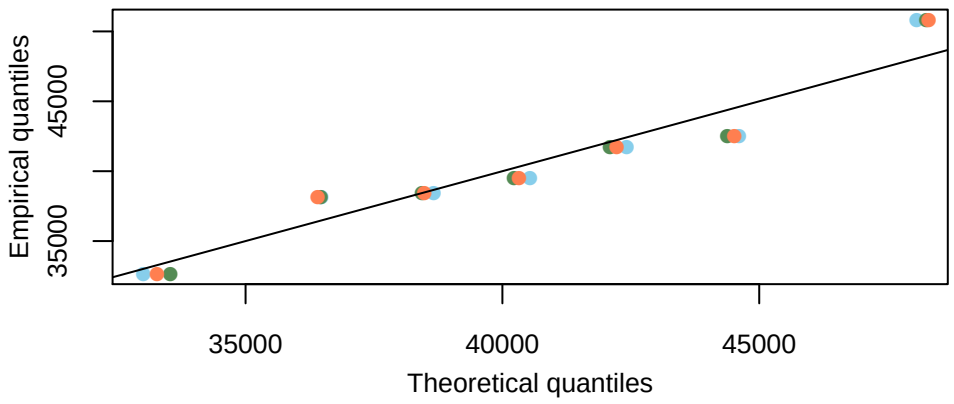
Exposure Unit:
LBC

Chemical (mg/kg):
Iron

Legend

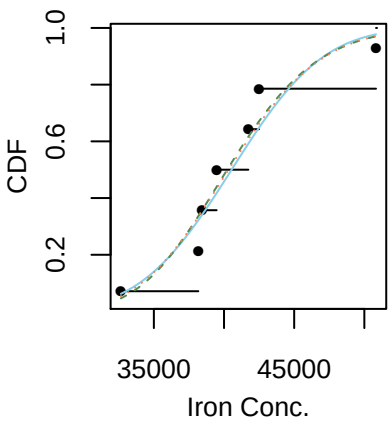
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

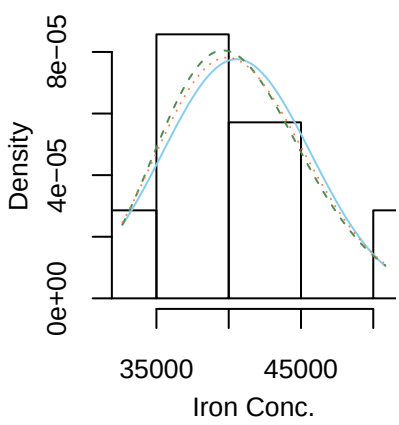


ECDF, Histogram & Q−Q (Detects Only)

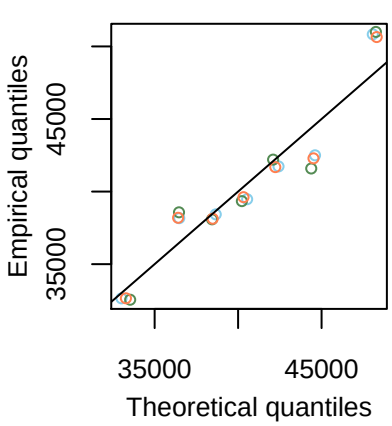
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 33,000 J	Arithmetic Mean = 41,000
N (detect) = 7	SD (log detect) = 0.13	Max (detect) = 51,000 J	Arithmetic SD = 5,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.56	0.39	–	–	–	–	143.486	143.377
Lognormal	0.72	0.5	–	–	–	–	143.093	142.985
Gamma	–	–	NA	NA	NA	NA	143.193	143.085

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Iron

Media:
Waterway Sediment All Depths

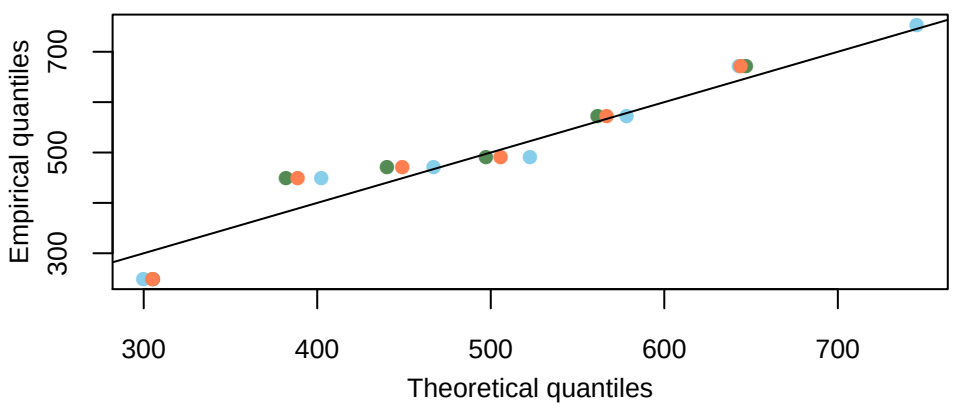
Exposure Unit:
LBC

Chemical (mg/kg):
Manganese

Legend

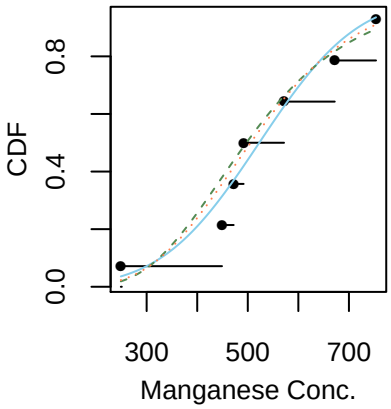
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

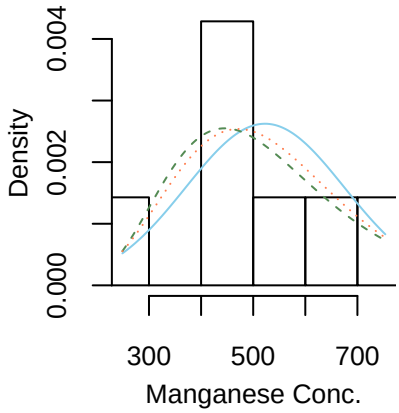


ECDF, Histogram & Q−Q (Detects Only)

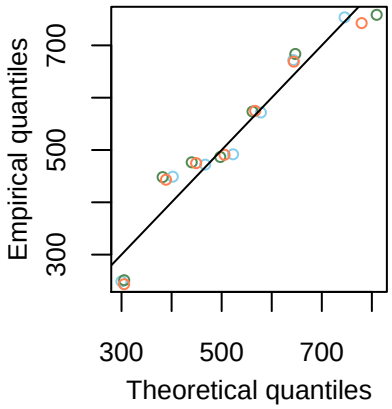
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 250 J	Arithmetic Mean = 520
N (detect) = 7	SD (log detect) = 0.36	Max (detect) = 750 J	Arithmetic SD = 160

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.89	0.67	–	–	–	–	94.2058	94.0976
Lognormal	0.39	0.23	–	–	–	–	95.3844	95.2762
Gamma	–	–	NA	NA	NA	NA	94.7937	94.6855

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Manganese

Media:
Waterway Sediment All Depths

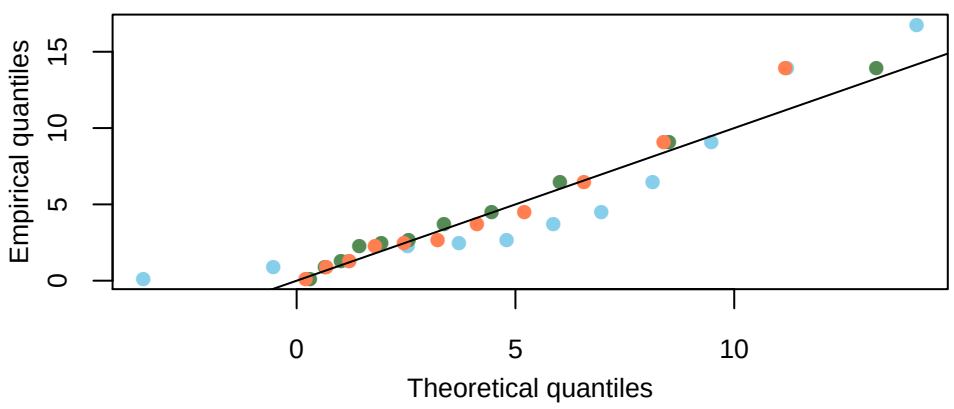
Exposure Unit:
LBC

Chemical (mg/kg):
Mercury

Legend

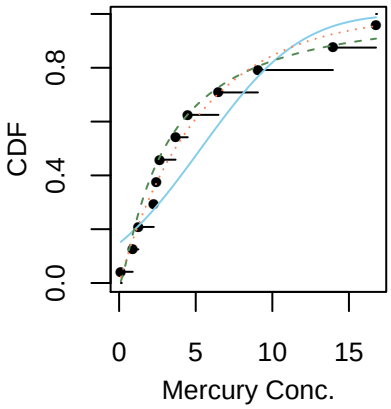
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

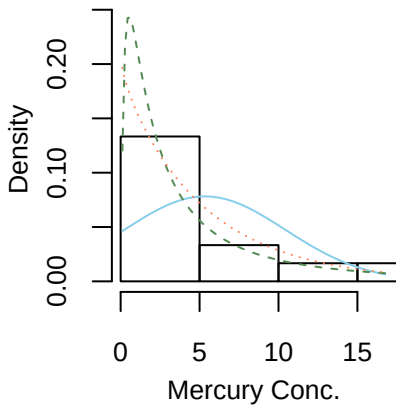


ECDF, Histogram & Q−Q (Detects Only)

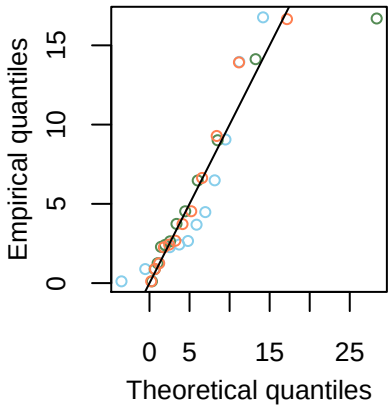
ECDF



Histogram



Q−Q



N = 12	FOD = 100%	Min (detect) = 0.11	Arithmetic Mean = 5
N (detect) = 12	SD (log detect) = 1.4	Max (detect) = 17 J	Arithmetic SD = 5

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.027	0.078	–	–	–	–	77.1689	78.1387
Lognormal	0.32	0.39	–	–	–	–	70.3821	71.3519
Gamma	–	–	0.1022	0.281	0.1733	0.777	68.1856	69.1555

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Mercury

Media:
Waterway Sediment All Depths

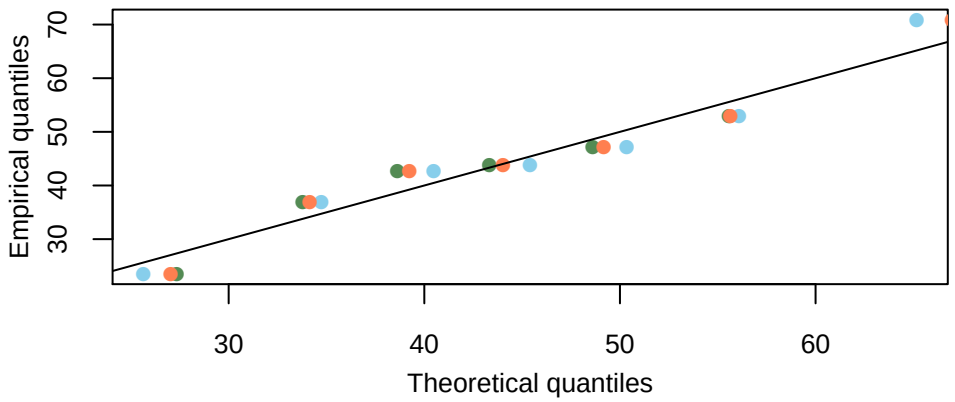
Exposure Unit:
LBC

Chemical (mg/kg):
Nickel

Legend

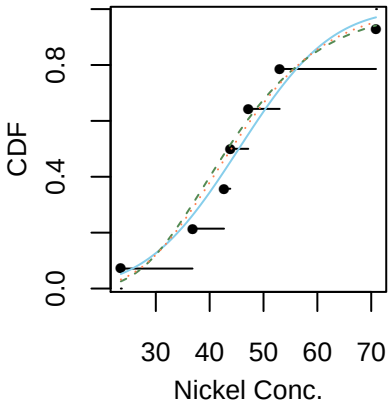
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

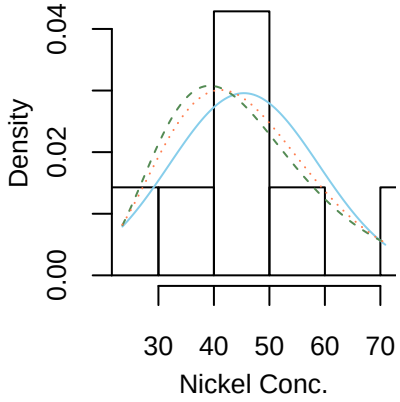


ECDF, Histogram & Q−Q (Detects Only)

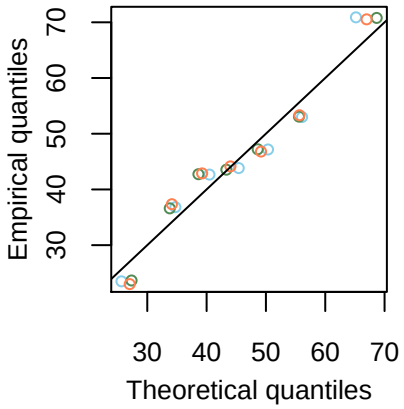
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 24 J	Arithmetic Mean = 45
N (detect) = 7	SD (log detect) = 0.34	Max (detect) = 71 J	Arithmetic SD = 15

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.86	0.81	–	–	–	–	60.2916	60.1834
Lognormal	0.77	0.57	–	–	–	–	60.4226	60.3144
Gamma	–	–	NA	NA	NA	NA	60.1707	60.0626

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Nickel

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **430**

Media:
Waterway Sediment All Depths

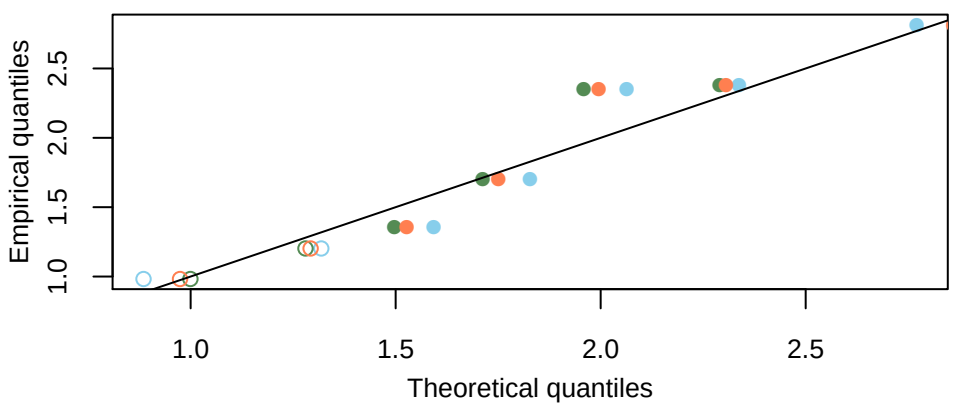
Exposure Unit:
LBC

Chemical (mg/kg):
Thallium

Legend

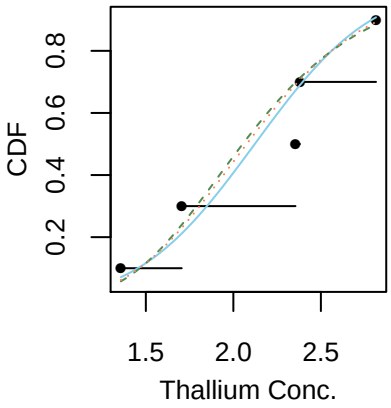
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

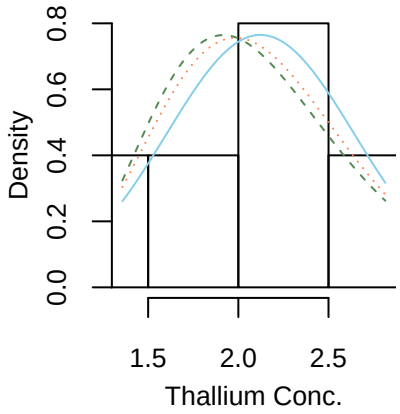


ECDF, Histogram & Q−Q (Detects Only)

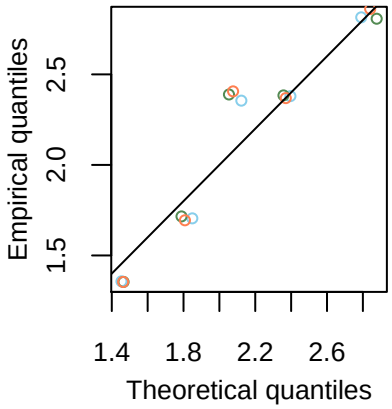
ECDF



Histogram



Q−Q



N = 7	FOD = 71%	Min (detect) = 1 J	Kaplan Meier Mean = 1
N (detect) = 5	SD (log detect) = 0.29	Max (detect) = 2 J	Kaplan Meier SD = 0.61

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.53	0.51	–	–	–	–	17.6959	17.5877
Lognormal	0.61	0.4	–	–	–	–	17.3744	17.2662
Gamma	–	–	NA	NA	NA	NA	17.3234	17.2152

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.68	N<5	–	–	–	–	11.6796	10.8985
Lognormal	0.55	N<5	–	–	–	–	12.0329	11.2517
Gamma	–	–	NA	NA	NA	NA	11.8565	11.0753

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Thallium

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **431**

Media:
Waterway Sediment All Depths

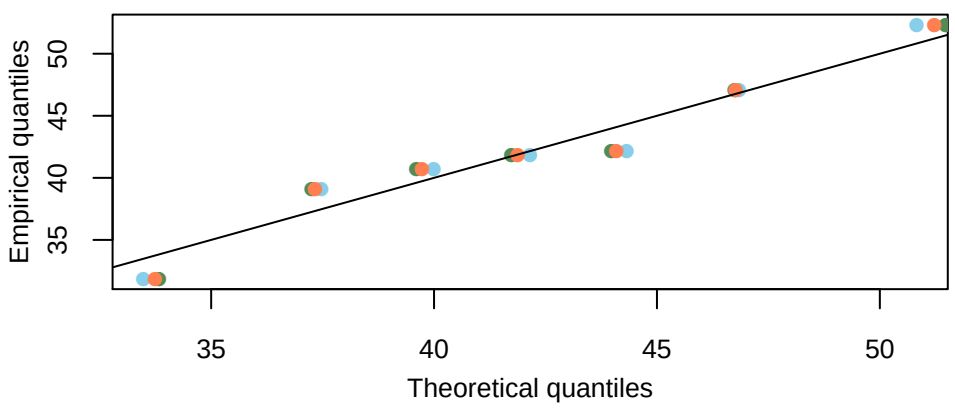
Exposure Unit:
LBC

Chemical (mg/kg):
Vanadium

Legend

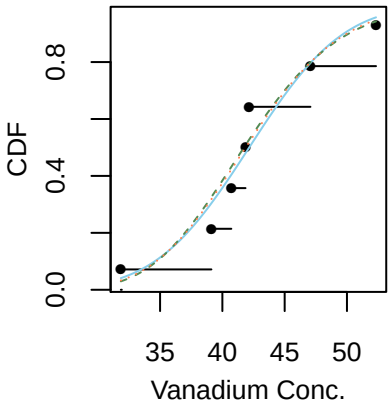
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

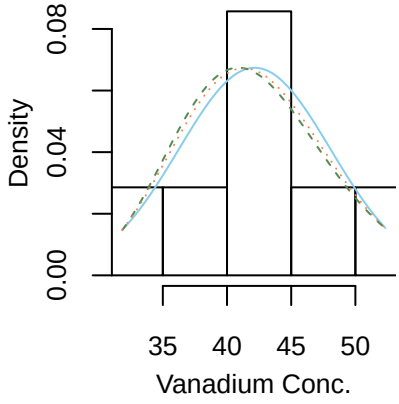


ECDF, Histogram & Q−Q (Detects Only)

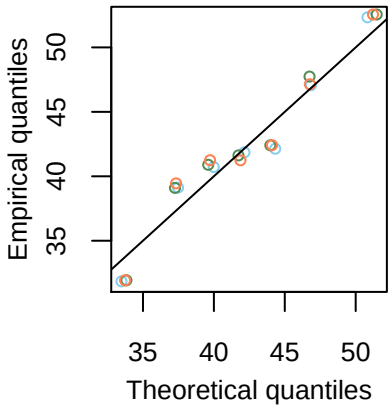
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 32 J	Arithmetic Mean = 42
N (detect) = 7	SD (log detect) = 0.15	Max (detect) = 52 J	Arithmetic SD = 6

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.85	0.42	–	–	–	–	48.7613	48.6531
Lognormal	0.77	0.58	–	–	–	–	48.8988	48.7906
Gamma	–	–	NA	NA	NA	NA	48.8105	48.7024

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Vanadium

Media:
Waterway Sediment All Depths

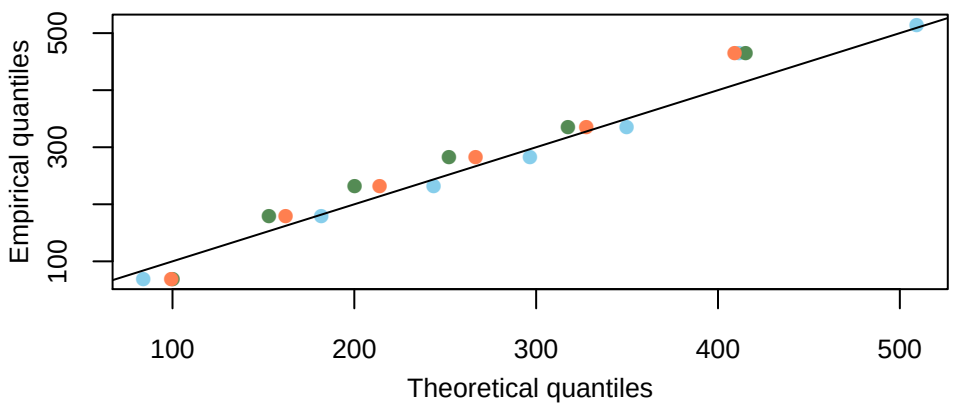
Exposure Unit:
LBC

Chemical (mg/kg):
Zinc

Legend

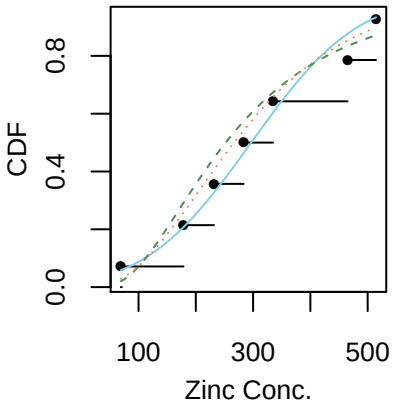
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

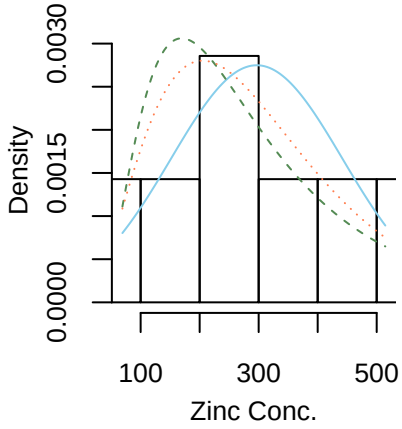


ECDF, Histogram & Q−Q (Detects Only)

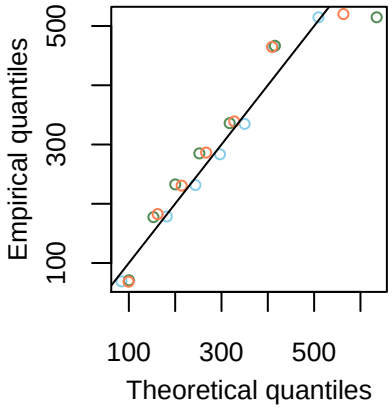
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 69 J	Arithmetic Mean = 300
N (detect) = 7	SD (log detect) = 0.68	Max (detect) = 510 J	Arithmetic SD = 160

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.93	0.93	–	–	–	–	93.5517	93.4435
Lognormal	0.42	0.82	–	–	–	–	94.8243	94.7161
Gamma	–	–	NA	NA	NA	NA	93.795	93.6869

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Zinc

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **433**

Media:
Waterway Sediment All Depths

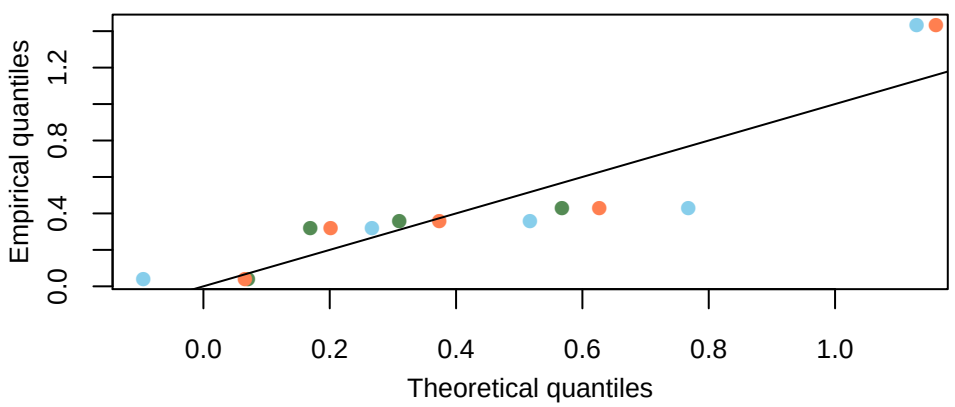
Exposure Unit:
LBC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

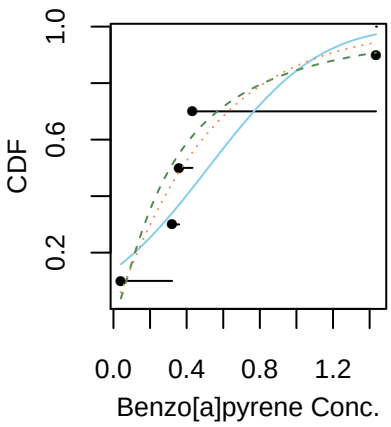
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

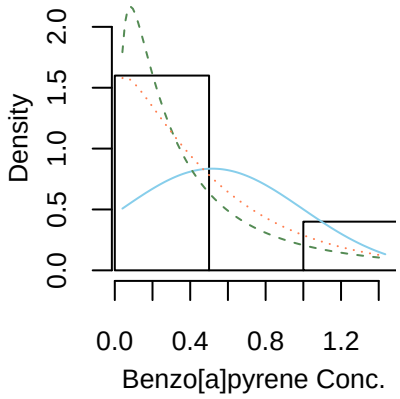


ECDF, Histogram & Q−Q (Detects Only)

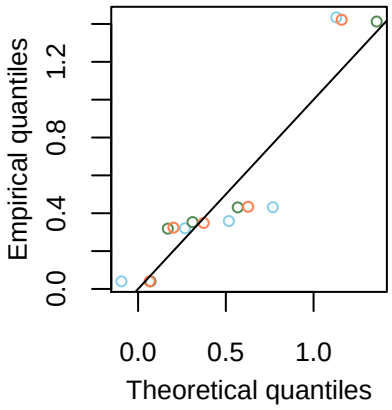
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.04	Arithmetic Mean = 0.52
N (detect) = 5	SD (log detect) = 1.3	Max (detect) = 1 J	Arithmetic SD = 0.53

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.078	N<5	–	–	–	–	10.8009	10.0198
Lognormal	0.41	N<5	–	–	–	–	7.90787	7.12674
Gamma	–	–	NA	NA	NA	NA	7.37356	6.59243

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Benzo[a]pyrene

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **434**

Media:
Waterway Sediment All Depths

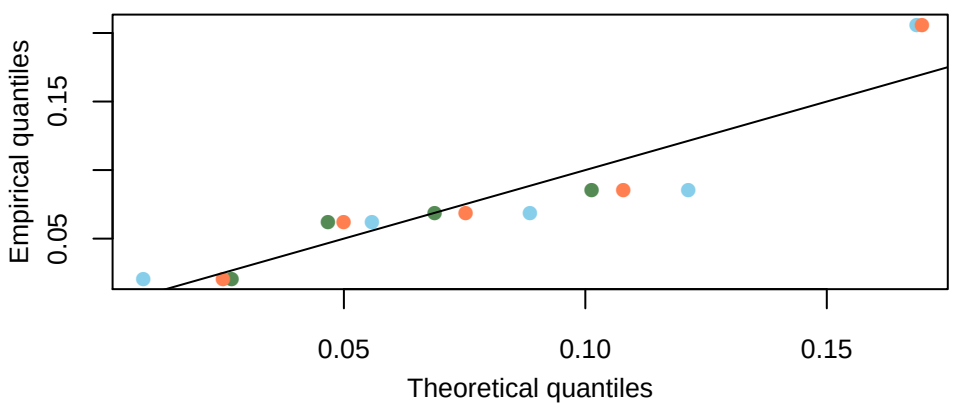
Exposure Unit:
LBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

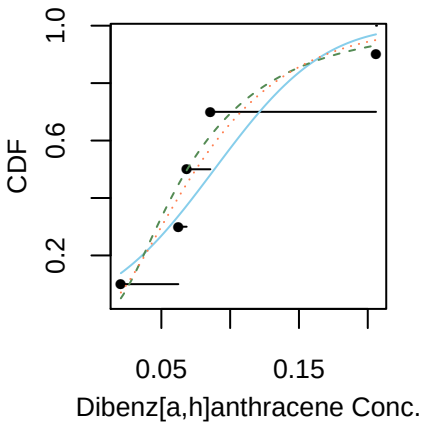
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

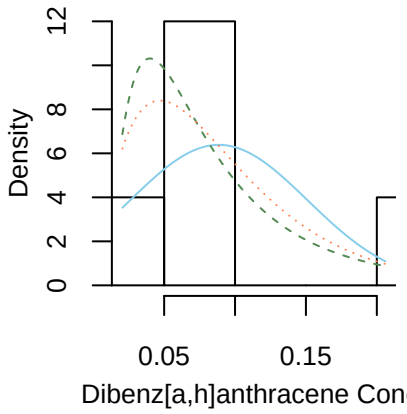


ECDF, Histogram & Q−Q (Detects Only)

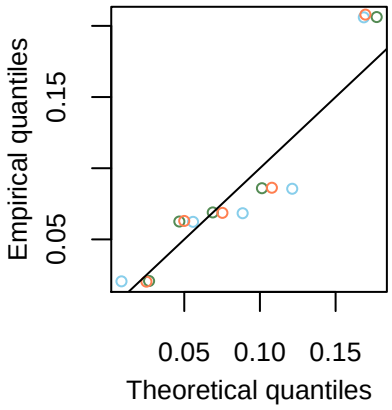
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.021 J	Arithmetic Mean = 0.089
N (detect) = 5	SD (log detect) = 0.82	Max (detect) = 0.21 J	Arithmetic SD = 0.07

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.2	N<5	–	–	–	–	−9.53947	−10.3206
Lognormal	0.75	N<5	–	–	–	–	−11.6146	−12.3958
Gamma	–	–	NA	NA	NA	NA	−11.5914	−12.3725

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Dibenz[a,h]anthracene

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **435**

Media:
Waterway Sediment All Depths

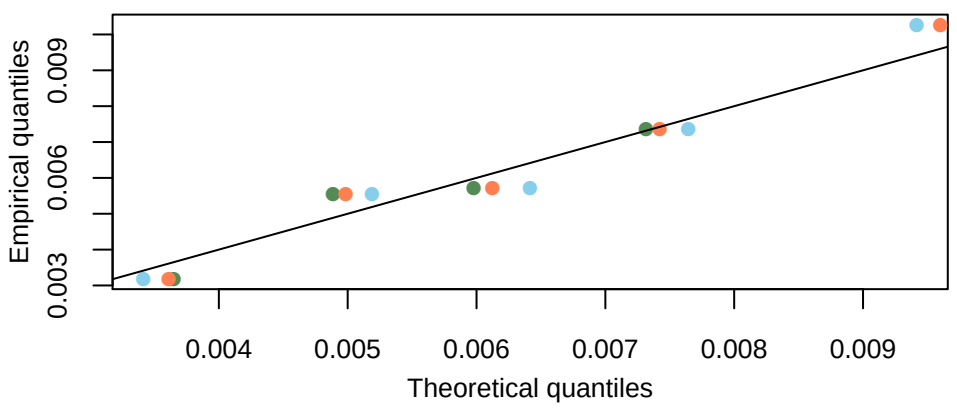
Exposure Unit:
LBC

Chemical (mg/kg):
Aldrin

Legend

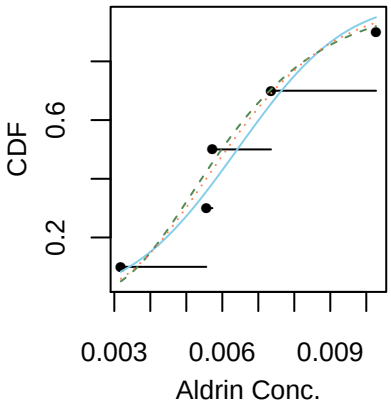
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

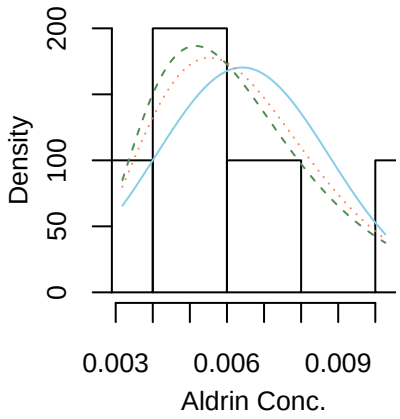


ECDF, Histogram & Q−Q (Detects Only)

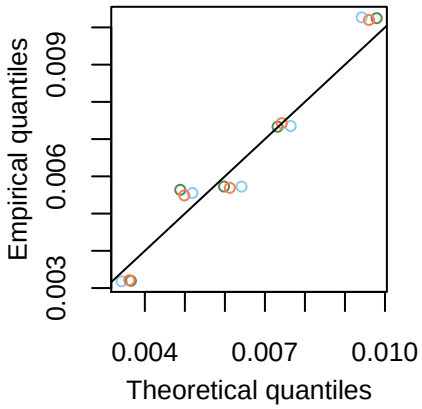
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.0032	Arithmetic Mean = 0.0064
N (detect) = 5	SD (log detect) = 0.43	Max (detect) = 0.01 J	Arithmetic SD = 0.0026

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.85	N<5	–	–	–	–	−42.3788	−43.1599
Lognormal	0.86	N<5	–	–	–	–	−42.5513	−43.3324
Gamma	–	–	NA	NA	NA	NA	−42.6692	−43.4503

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Aldrin

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **436**

Media:
Waterway Sediment All Depths

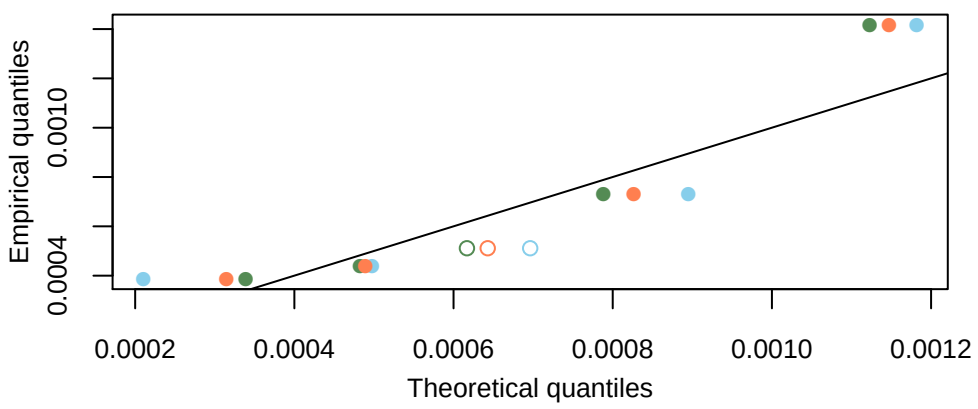
Exposure Unit:
LBC

Chemical (mg/kg):
Heptachlor

Legend

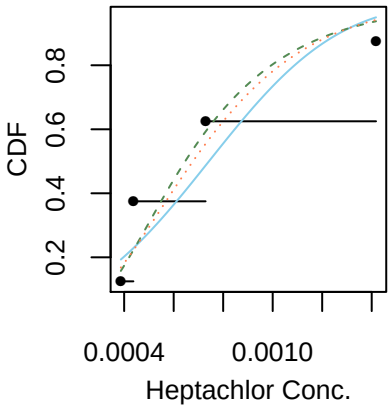
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

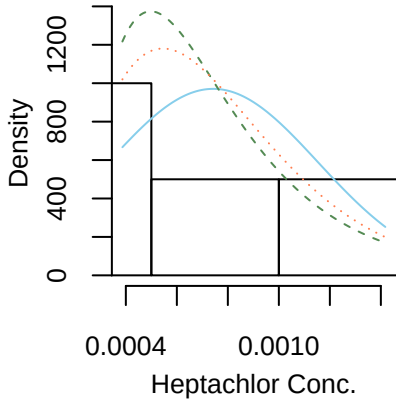


ECDF, Histogram & Q−Q (Detects Only)

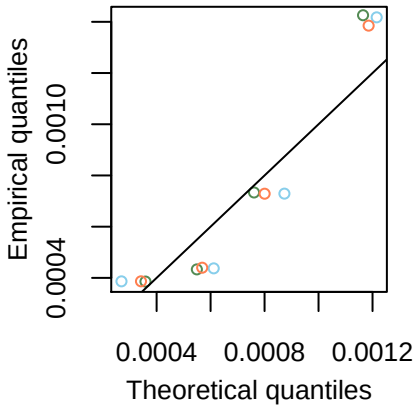
ECDF



Histogram



Q−Q



N = 5	FOD = 80%	Min (detect) = 0.00039 J	Kaplan Meier Mean = 7e−04
N (detect) = 4	SD (log detect) = 0.59	Max (detect) = 0.0014	Kaplan Meier SD = 0.00038

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.073	N<5	–	–	–	–	−60.5882	−61.3693
Lognormal	0.37	N<5	–	–	–	–	−63.3253	−64.1064
Gamma	–	–	NA	NA	NA	NA	−62.6074	−63.3885

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.22	N<5	–	–	–	–	−47.0235	−48.2509
Lognormal	0.5	N<5	–	–	–	–	−48.7569	−49.9843
Gamma	–	–	NA	NA	NA	NA	−48.3518	−49.5792

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Heptachlor

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **437**

Media:
Waterway Sediment All Depths

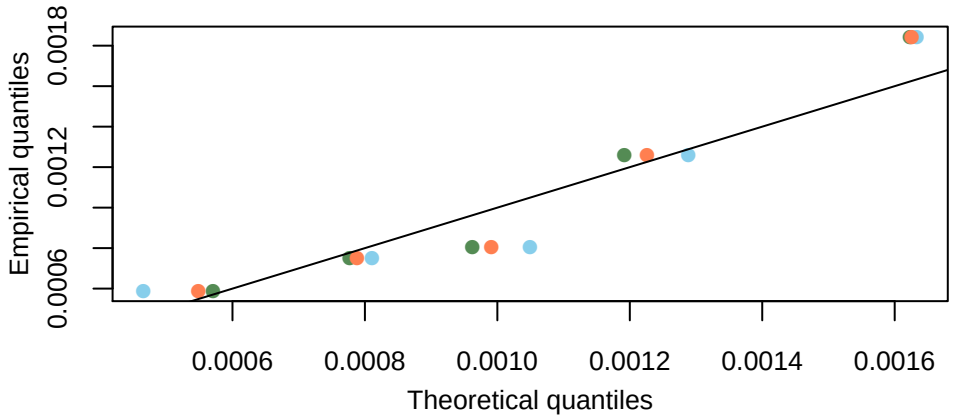
Exposure Unit:
LBC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

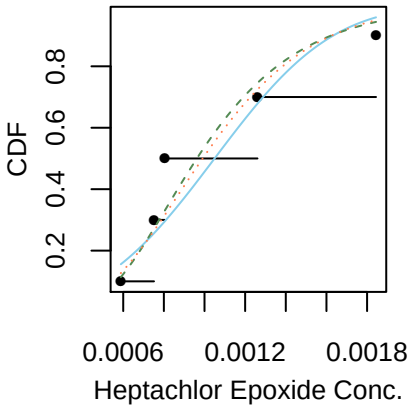
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

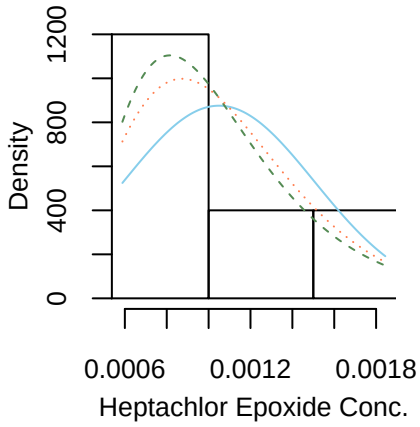


ECDF, Histogram & Q−Q (Detects Only)

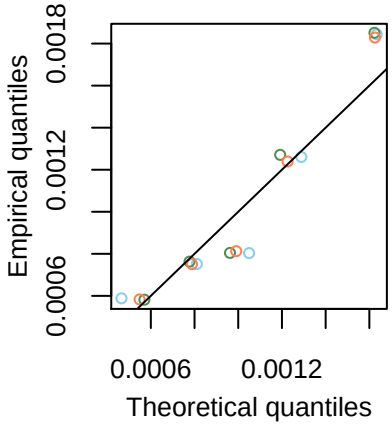
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.00059 J	Arithmetic Mean = 0.001
N (detect) = 5	SD (log detect) = 0.46	Max (detect) = 0.0018 J	Arithmetic SD = 0.00051

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.32	N<5	–	–	–	–	−58.7492	−59.5304
Lognormal	0.67	N<5	–	–	–	–	−60.2388	−61.0199
Gamma	–	–	NA	NA	NA	NA	−59.8899	−60.671

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Heptachlor Epoxide

Media:
Waterway Sediment All Depths

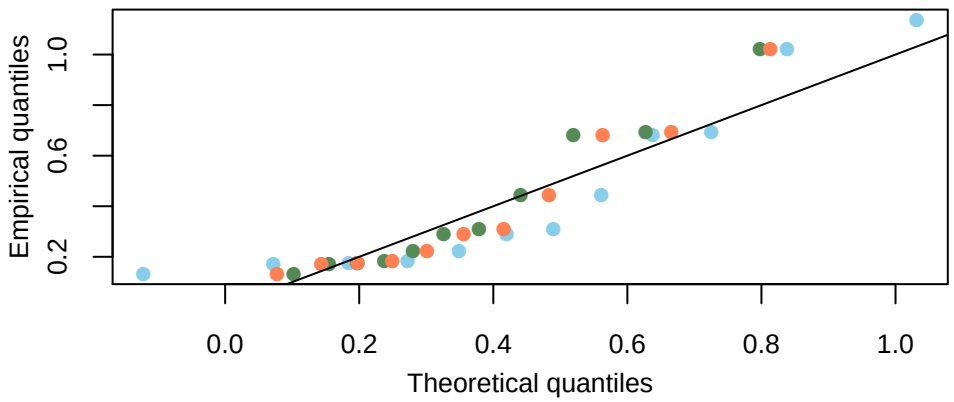
Exposure Unit:
LBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

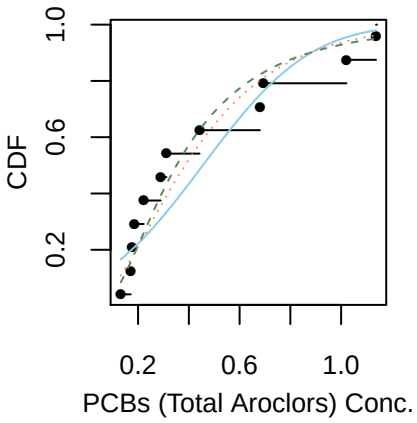
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

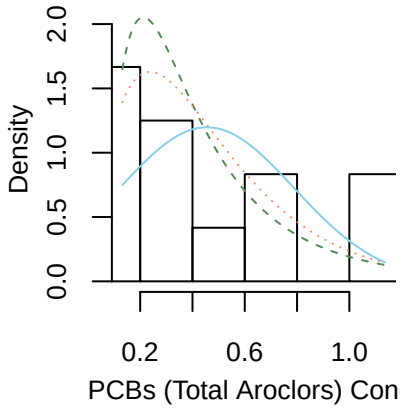


ECDF, Histogram & Q−Q (Detects Only)

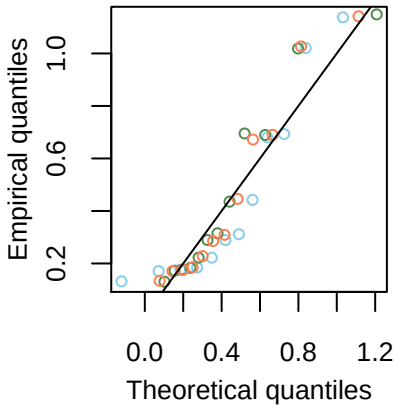
ECDF



Histogram



Q−Q



N = 12	FOD = 100%	Min (detect) = 0.13 J	Arithmetic Mean = 0.46
N (detect) = 12	SD (log detect) = 0.74	Max (detect) = 1 J	Arithmetic SD = 0.35

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.024	0.048	–	–	–	–	11.6697	12.6395
Lognormal	0.28	0.66	–	–	–	–	4.83711	5.80692
Gamma	–	–	0.1922	0.27	0.5477	0.736	6.01362	6.98343

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−PCBs (Total Aroclors)

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **439**

Media:
Waterway Sediment All Depths

Exposure Unit:
LBC

Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 5	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−Trichloroethene

Media:
White Perch Fillet
Exposure Unit:
UBC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in UBC−Antimony

Media:
White Perch Fillet
Exposure Unit:
UBC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 67%	Min (detect) = 1 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 1 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in UBC−Copper

Media:
White Perch Fillet
Exposure Unit:
UBC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 5 J	Arithmetic Mean = 10
N (detect) = 3	SD (log detect) = 0	Max (detect) = 16	Arithmetic SD = 5

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in UBC−Iron

Media:
White Perch Fillet
Exposure Unit:
UBC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.23 J	Arithmetic Mean = 0.35
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.5 J	Arithmetic SD = 0.14

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

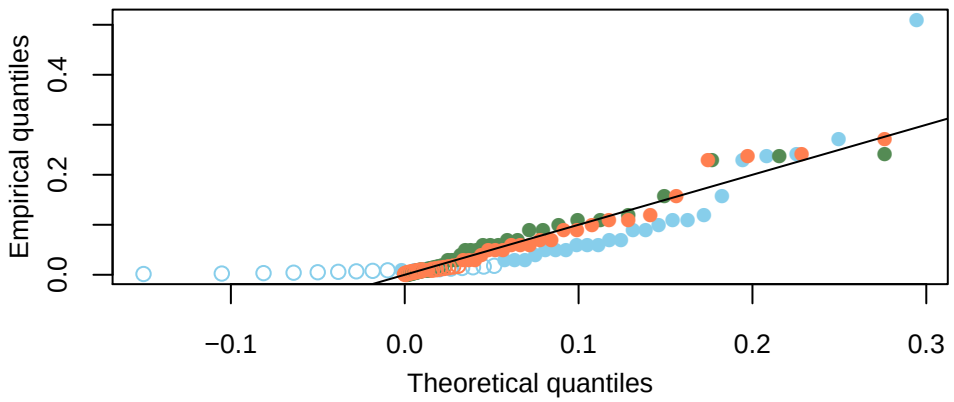
DRAFT

Distribution: White Perch Fillet in UBC−Manganese

Media:
White Perch Fillet
Exposure Unit:
UBC
Chemical (mg/kg):
Mercury (Inorganic)

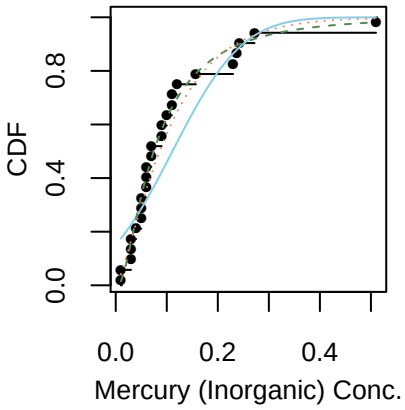
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

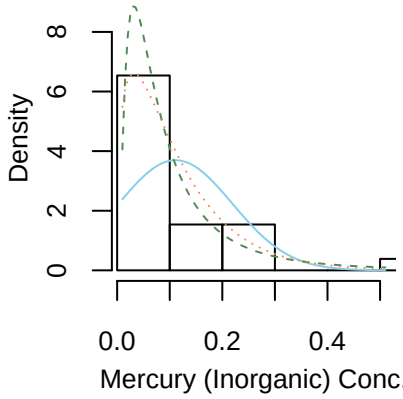


ECDF, Histogram & Q−Q (Detects Only)

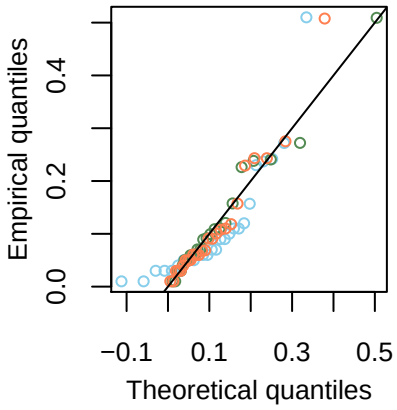
ECDF



Histogram



Q−Q



N = 42	FOD = 62%	Min (detect) = 0.01	Kaplan Meier Mean = 0.069
N (detect) = 26	SD (log detect) = 0.94	Max (detect) = 0.51 J	Kaplan Meier SD = 0.1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2e−06	–	–	–	–	−71.578	−68.1027
Lognormal	0.57	0.23	–	–	–	–	−140.484	−137.008
Gamma	–	–	0.1288	0.148	0.6525	0.813	−136.601	−133.126

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	3e−05	0.00062	–	–	–	–	−37.9724	−35.4562
Lognormal	0.61	0.65	–	–	–	–	−61.3527	−58.8366
Gamma	–	–	0.1229	0.18	0.4766	0.773	−59.893	−57.3768

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

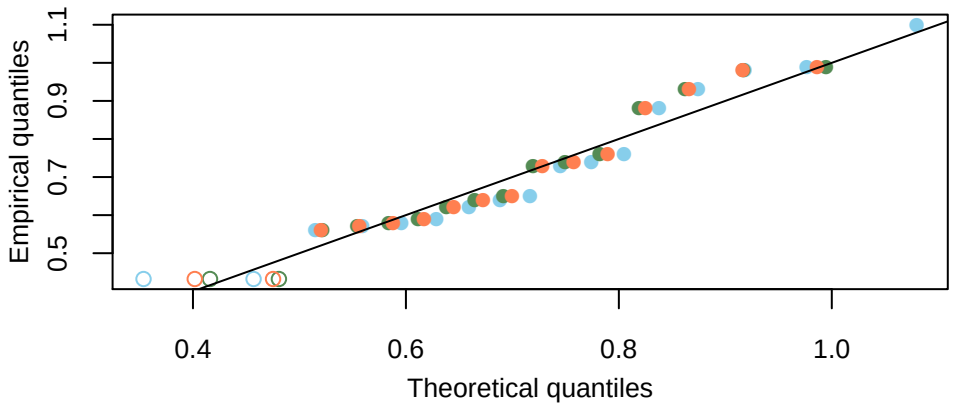
DRAFT

Distribution: White Perch Fillet in UBC−Mercury (Inorganic)

Media:
White Perch Fillet
Exposure Unit:
UBC
Chemical (mg/kg):
Selenium

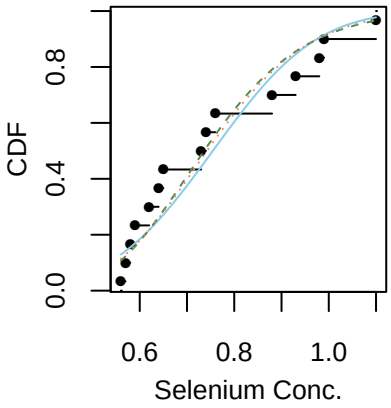
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

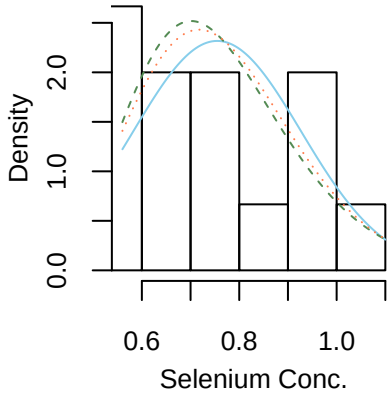


ECDF, Histogram & Q−Q (Detects Only)

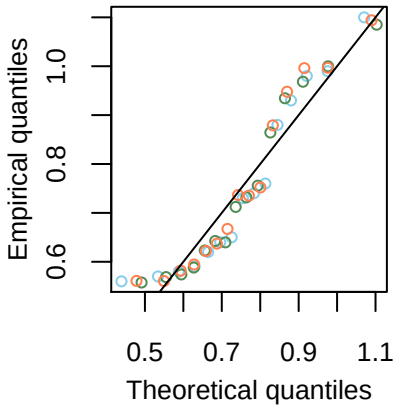
ECDF



Histogram



Q−Q



N = 17	FOD = 88%	Min (detect) = 0.56 J	Kaplan Meier Mean = 0.71
N (detect) = 15	SD (log detect) = 0.23	Max (detect) = 1	Kaplan Meier SD = 0.2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.34	0.28	–	–	–	–	−3.82913	−2.1627
Lognormal	0.55	0.77	–	–	–	–	−4.95502	−3.28859
Gamma	–	–	0.1363	0.209	0.3376	0.739	−4.86444	−3.19801

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.076	0.16	–	–	–	–	−6.2122	−4.7961
Lognormal	0.14	0.26	–	–	–	–	−7.98021	−6.56411
Gamma	–	–	0.1861	0.221	0.5862	0.735	−7.5217	−6.1056

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in UBC−Selenium

Exhibit 2: EPC Program and Results
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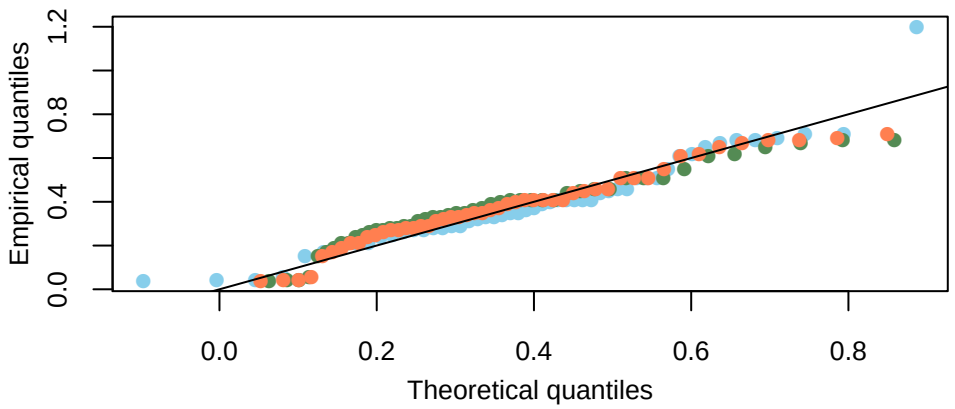
Figure **446**

Media:
White Perch Fillet
Exposure Unit:
UBC
Chemical (mg/kg):
Methyl Mercury

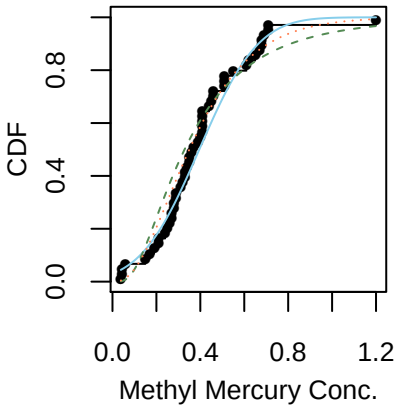
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

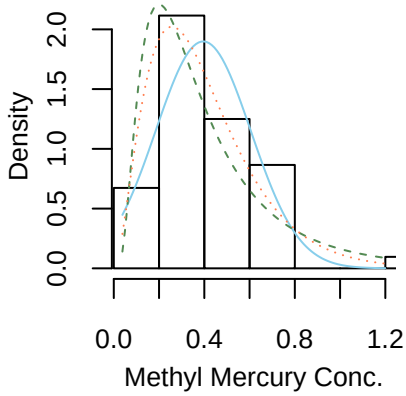


ECDF, Histogram & Q−Q (Detects Only)

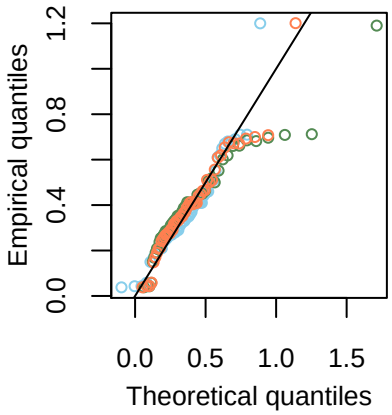
ECDF



Histogram



Q−Q



N = 52	FOD = 100%	Min (detect) = 0.038	Arithmetic Mean = 0.4
N (detect) = 52	SD (log detect) = 0.71	Max (detect) = 1 J	Arithmetic SD = 0.21

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0052	0.038	–	–	–	–	−10.6964	−6.79394
Lognormal	1e−05	0.0017	–	–	–	–	−0.540145	3.36234
Gamma	–	–	0.1139	0.127	1.059	0.763	−12.6289	−8.72638

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in UBC−Methyl Mercury

Exhibit 2: EPC Program and Results
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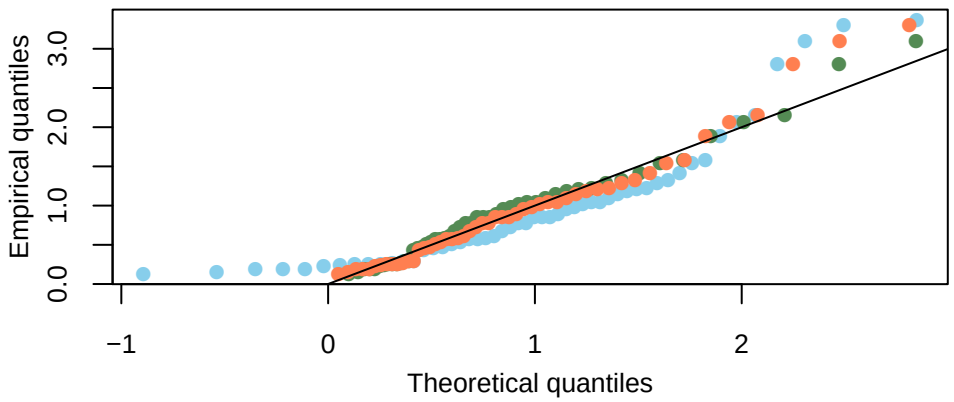
Berry's Creek Study Area Remedial Investigation

Figure **447**

Media:
White Perch Fillet
Exposure Unit:
UBC
Chemical (mg/kg):
PCBs (Total Aroclors)

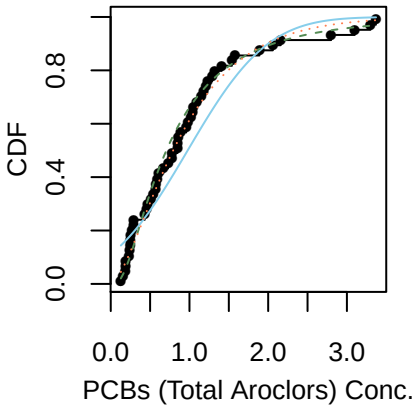
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

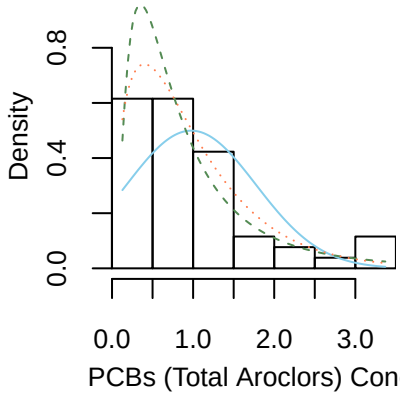


ECDF, Histogram & Q−Q (Detects Only)

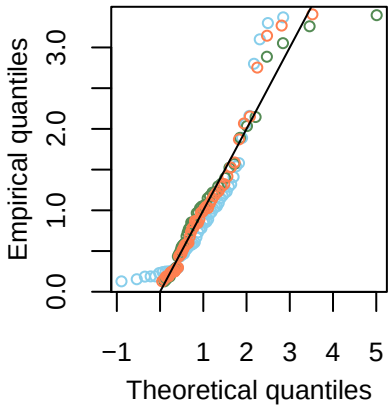
ECDF



Histogram



Q−Q



N = 52	FOD = 100%	Min (detect) = 0.13	Arithmetic Mean = 0.98
N (detect) = 52	SD (log detect) = 0.84	Max (detect) = 3	Arithmetic SD = 0.81

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.0073	–	–	–	–	128.199	132.101
Lognormal	0.21	0.2	–	–	–	–	96.8956	100.798
Gamma	–	–	0.09815	0.129	0.4529	0.78	98.2409	102.143

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in UBC−PCBs (Total Aroclors)

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **448**

Media:
White Perch Fillet
Exposure Unit:
MBC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in MBC−Antimony

Media:
White Perch Fillet
Exposure Unit:
MBC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 1
N (detect) = 3	SD (log detect) = 0	Max (detect) = 1 J	Arithmetic SD = 0.15

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in MBC−Copper

Media:
White Perch Fillet
Exposure Unit:
MBC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 7 J	Arithmetic Mean = 9
N (detect) = 3	SD (log detect) = 0	Max (detect) = 11	Arithmetic SD = 1

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in MBC−Iron

Media:
White Perch Fillet
Exposure Unit:
MBC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.33 J	Arithmetic Mean = 0.41
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.53 J	Arithmetic SD = 0.11

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

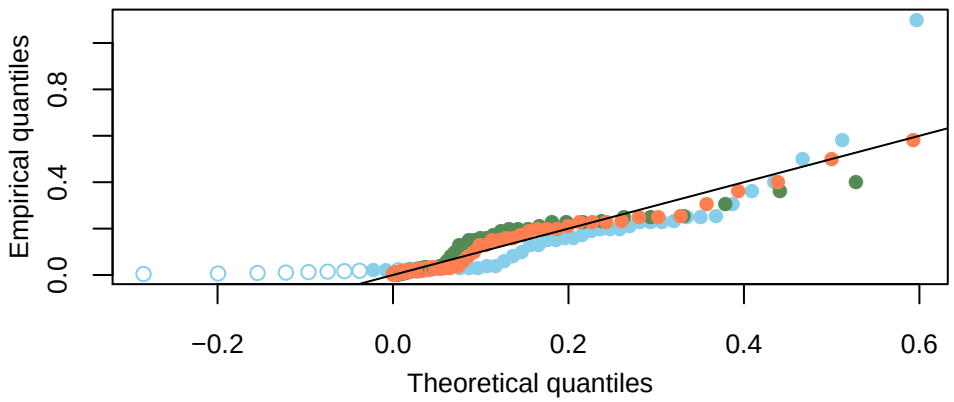
DRAFT

Distribution: White Perch Fillet in MBC−Manganese

Media:
White Perch Fillet
Exposure Unit:
MBC
Chemical (mg/kg):
Mercury (Inorganic)

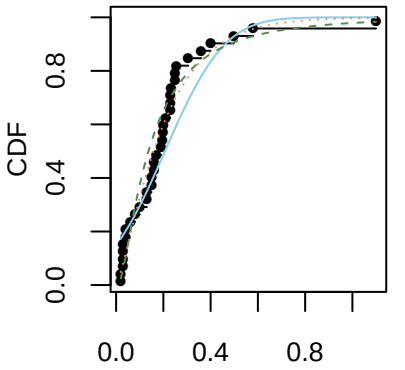
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

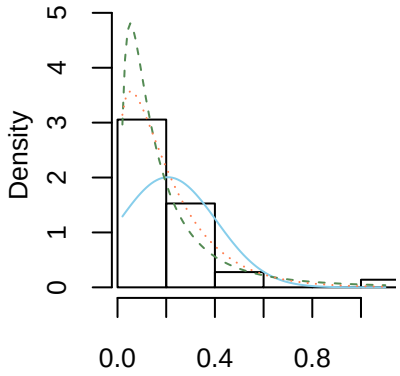


ECDF, Histogram & Q−Q (Detects Only)

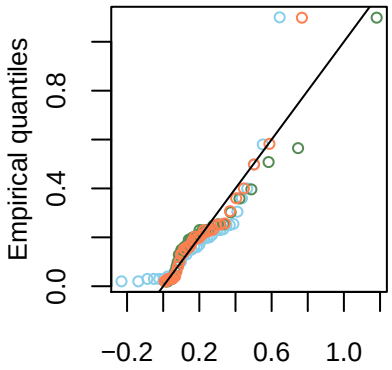
ECDF



Histogram



Q−Q



N = 49	FOD = 73%	Min (detect) = 0.02 J	Kaplan Meier Mean = 0.15
N (detect) = 36	SD (log detect) = 0.99	Max (detect) = 1	Kaplan Meier SD = 0.19

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6e−06	–	–	–	–	−19.6609	−15.8772
Lognormal	0.026	0.0015	–	–	–	–	−82.2576	−78.4739
Gamma	–	–	0.1682	0.139	1.11	0.813	−81.2739	−77.4903

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.7e−05	–	–	–	–	−10.1018	−6.93472
Lognormal	0.025	0.0065	–	–	–	–	−38.5234	−35.3563
Gamma	–	–	0.1287	0.153	0.7215	0.776	−39.3438	−36.1767

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: White Perch Fillet in MBC−Mercury (Inorganic)

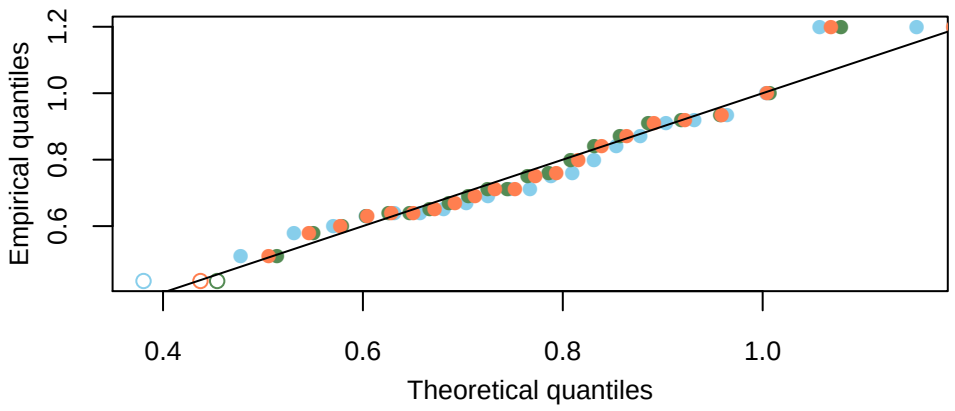
Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **453**

Media:
White Perch Fillet
Exposure Unit:
MBC
Chemical (mg/kg):
Selenium

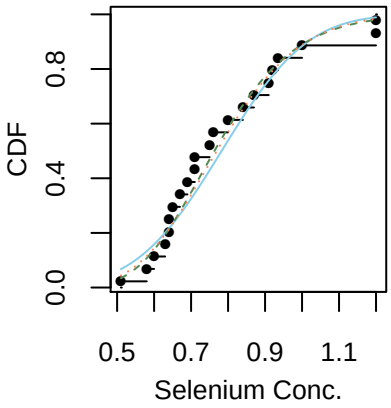
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

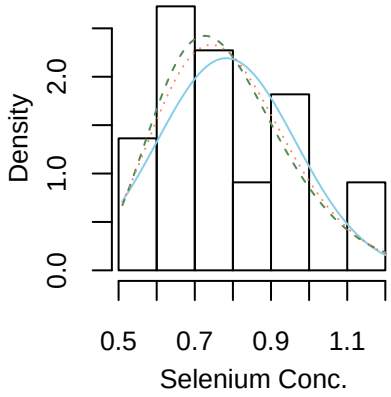


ECDF, Histogram & Q−Q (Detects Only)

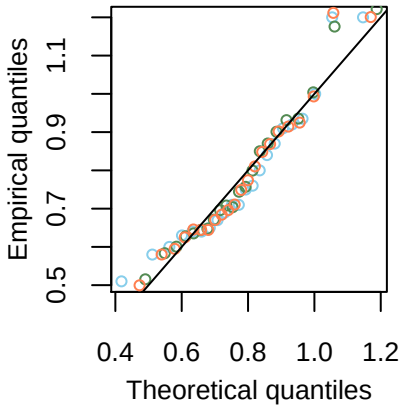
ECDF



Histogram



Q−Q



N = 23	FOD = 96%	Min (detect) = 0.51 J	Kaplan Meier Mean = 0.77
N (detect) = 22	SD (log detect) = 0.23	Max (detect) = 1	Kaplan Meier SD = 0.19

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.23	0.32	–	–	–	–	−6.7324	−4.46141
Lognormal	0.9	0.83	–	–	–	–	−9.02062	−6.74963
Gamma	–	–	0.1135	0.182	0.2675	0.744	−8.67063	−6.39964

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.07	0.21	–	–	–	–	−8.52683	−6.34474
Lognormal	0.56	0.5	–	–	–	–	−11.8486	−9.66652
Gamma	–	–	0.1379	0.185	0.4067	0.74	−11.0215	−8.8394

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in MBC−Selenium

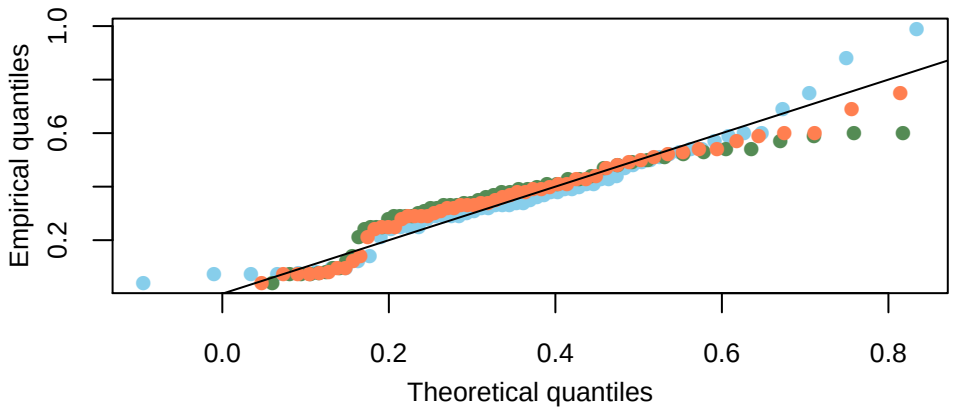
Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **454**

Media:
White Perch Fillet
Exposure Unit:
MBC
Chemical (mg/kg):
Methyl Mercury

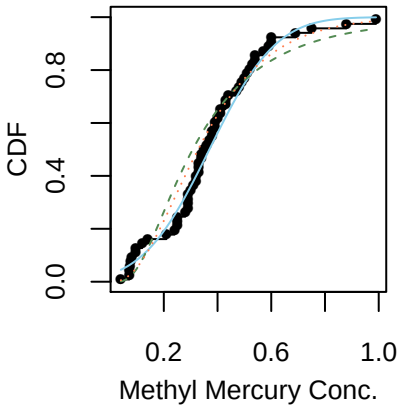
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

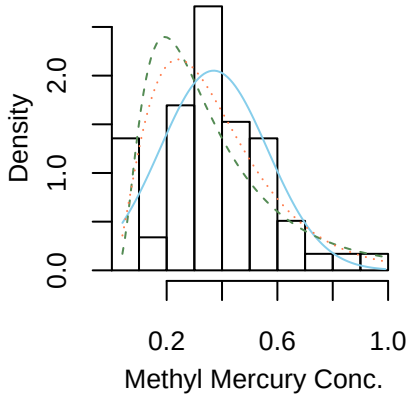


ECDF, Histogram & Q−Q (Detects Only)

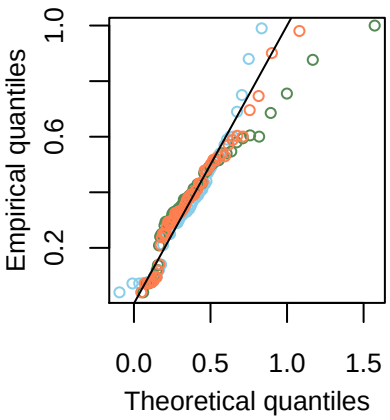
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 0.04	Arithmetic Mean = 0.37
N (detect) = 59	SD (log detect) = 0.69	Max (detect) = 0.99 J	Arithmetic SD = 0.2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.027	0.46	–	–	–	–	−21.7758	−17.6208
Lognormal	5e−05	7.4e−06	–	–	–	–	−12.6222	−8.46713
Gamma	–	–	0.1518	0.127	1.434	0.763	−23.1503	−18.9952

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: White Perch Fillet in MBC−Methyl Mercury

Exhibit 2: EPC Program and Results
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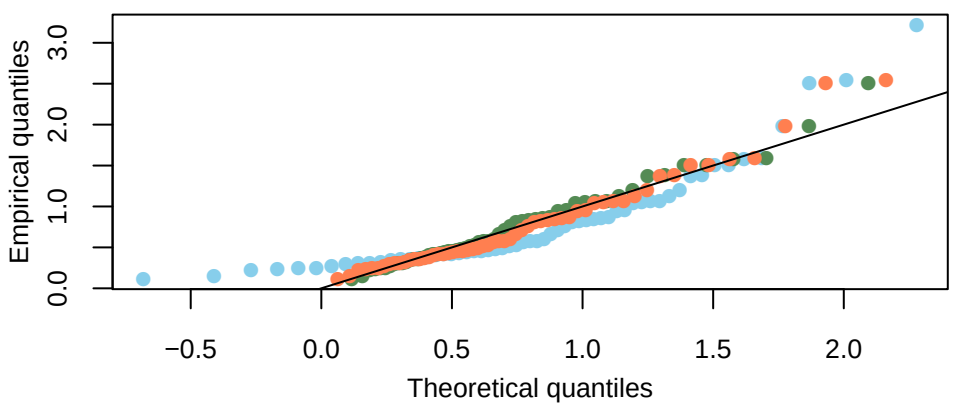
Berry's Creek Study Area Remedial Investigation

Figure
455

Media:
White Perch Fillet
Exposure Unit:
MBC
Chemical (mg/kg):
PCBs (Total Aroclors)

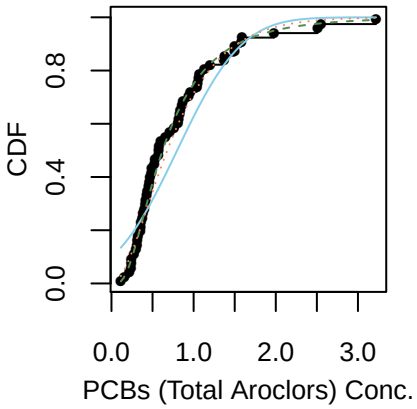
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

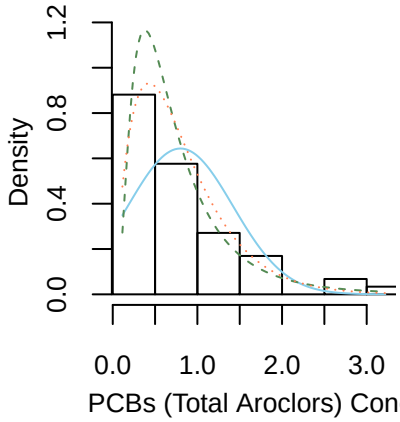


ECDF, Histogram & Q−Q (Detects Only)

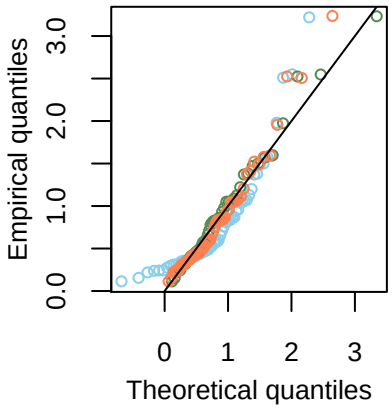
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 0.11	Arithmetic Mean = 0.8
N (detect) = 59	SD (log detect) = 0.71	Max (detect) = 3 J	Arithmetic SD = 0.63

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00026	–	–	–	–	115.008	119.163
Lognormal	0.92	0.62	–	–	–	–	74.0604	78.2154
Gamma	–	–	0.1096	0.127	0.7455	0.763	79.4421	83.5972

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: White Perch Fillet in MBC−PCBs (Total Aroclors)

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **456**

Media:
White Perch Fillet
Exposure Unit:
BCC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 67%	Min (detect) = 0.43 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.47 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: White Perch Fillet in BCC−Antimony

Media:
White Perch Fillet
Exposure Unit:
BCC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.91 J	Arithmetic Mean = 1
N (detect) = 3	SD (log detect) = 0	Max (detect) = 1 J	Arithmetic SD = 0.15

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: White Perch Fillet in BCC−Copper

Media:
White Perch Fillet
Exposure Unit:
BCC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 7 J	Arithmetic Mean = 10
N (detect) = 3	SD (log detect) = 0	Max (detect) = 13	Arithmetic SD = 2

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in BCC−Iron

Media:
White Perch Fillet
Exposure Unit:
BCC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.18 J	Arithmetic Mean = 0.42
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.69 J	Arithmetic SD = 0.26

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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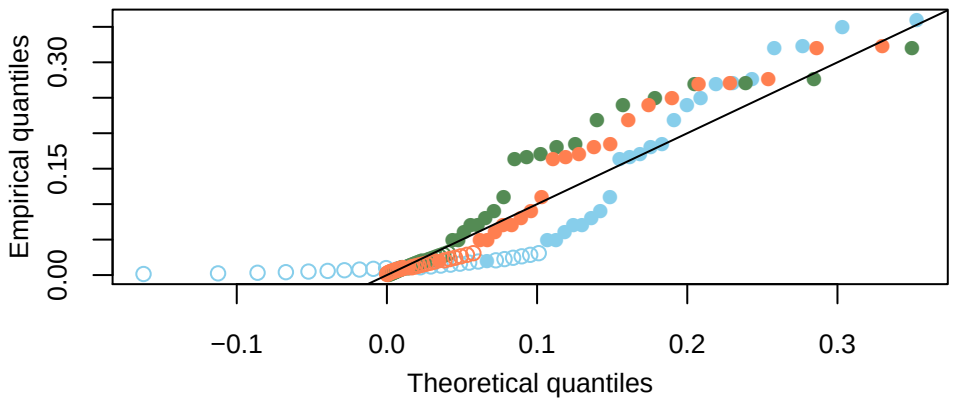
Distribution: White Perch Fillet in BCC−Manganese

Media:
White Perch Fillet
Exposure Unit:
BCC
Chemical (mg/kg):
Mercury (Inorganic)

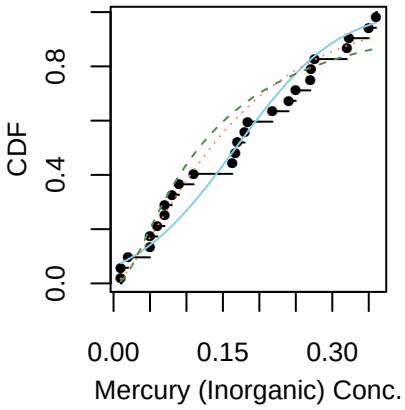
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

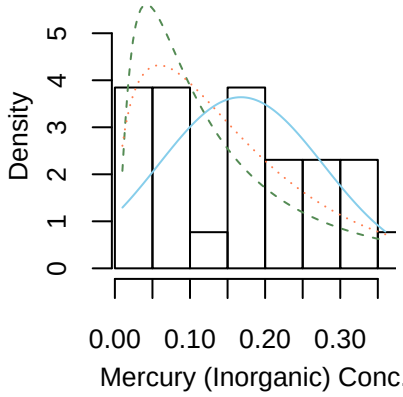


ECDF, Histogram & Q−Q (Detects Only)

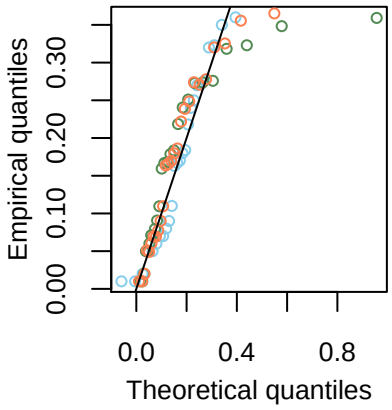
ECDF



Histogram



Q−Q



N = 49	FOD = 53%	Min (detect) = 0.01	Kaplan Meier Mean = 0.089
N (detect) = 26	SD (log detect) = 1	Max (detect) = 0.36	Kaplan Meier SD = 0.12

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.4e−08	–	–	–	–	−72.3372	−68.5536
Lognormal	0.025	0.024	–	–	–	–	−137.314	−133.53
Gamma	–	–	0.1603	0.139	1.438	0.813	−135.169	−131.385

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.1	0.2	–	–	–	–	−37.1781	−34.6619
Lognormal	0.0033	0.0077	–	–	–	–	−32.9746	−30.4584
Gamma	–	–	0.1705	0.18	0.659	0.773	−39.4095	−36.8933

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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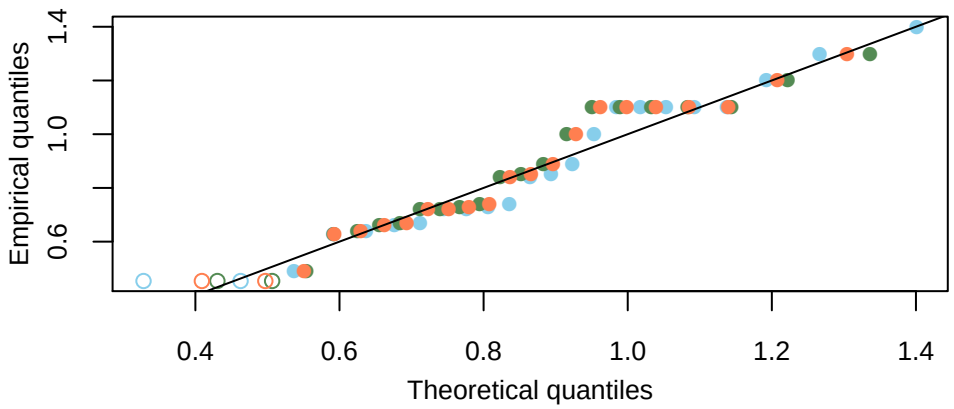
Distribution: White Perch Fillet in BCC−Mercury (Inorganic)

Media:
White Perch Fillet
Exposure Unit:
BCC
Chemical (mg/kg):
Selenium

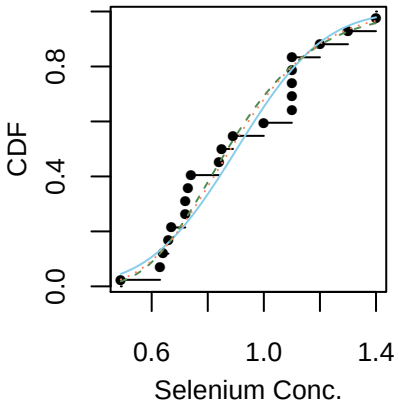
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

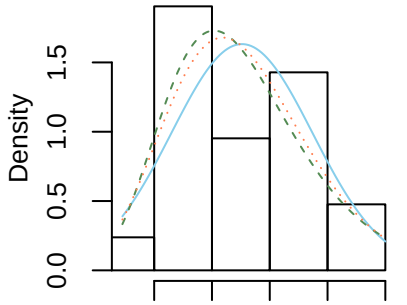


ECDF, Histogram & Q−Q (Detects Only)

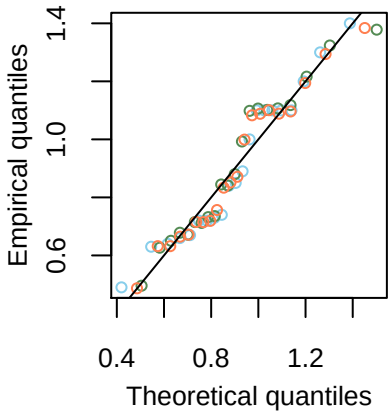
ECDF



Histogram



Q−Q



N = 23	FOD = 91%	Min (detect) = 0.49 J	Kaplan Meier Mean = 0.86
N (detect) = 21	SD (log detect) = 0.28	Max (detect) = 1	Kaplan Meier SD = 0.28

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.27	0.16	–	–	–	–	8.31469	10.5857
Lognormal	0.26	0.13	–	–	–	–	7.98688	10.2579
Gamma	–	–	0.1649	0.182	0.4507	0.744	7.5695	9.84048

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.24	0.11	–	–	–	–	4.4185	6.50754
Lognormal	0.37	0.083	–	–	–	–	3.57333	5.66238
Gamma	–	–	0.1798	0.189	0.541	0.743	3.5079	5.59694

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: White Perch Fillet in BCC−Selenium

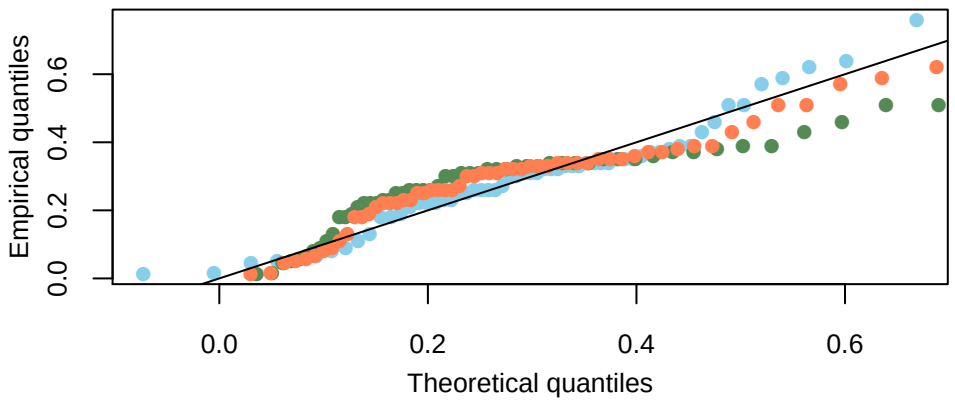
Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **462**

Media:
White Perch Fillet
Exposure Unit:
BCC
Chemical (mg/kg):
Methyl Mercury

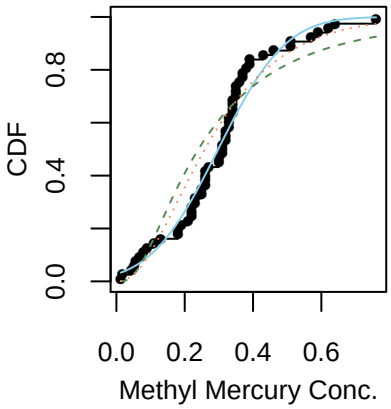
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

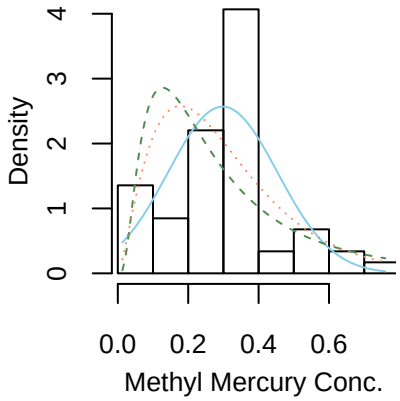


ECDF, Histogram & Q−Q (Detects Only)

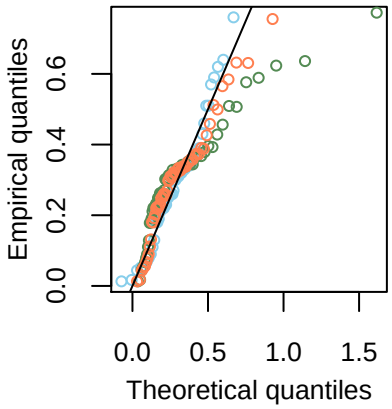
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 0.013	Arithmetic Mean = 0.3
N (detect) = 59	SD (log detect) = 0.81	Max (detect) = 0.76	Arithmetic SD = 0.16

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.038	0.02	–	–	–	–	−48.337	−44.1819
Lognormal	0	1.7e−07	–	–	–	–	−23.412	−19.257
Gamma	–	–	0.1693	0.127	2.135	0.763	−42.3814	−38.2263

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

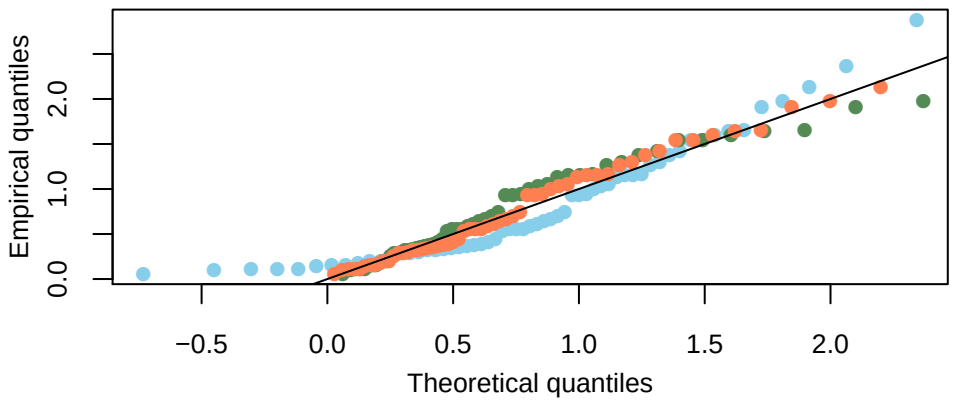
DRAFT

Distribution: White Perch Fillet in BCC−Methyl Mercury

Media:
White Perch Fillet
Exposure Unit:
BCC
Chemical (mg/kg):
PCBs (Total Aroclors)

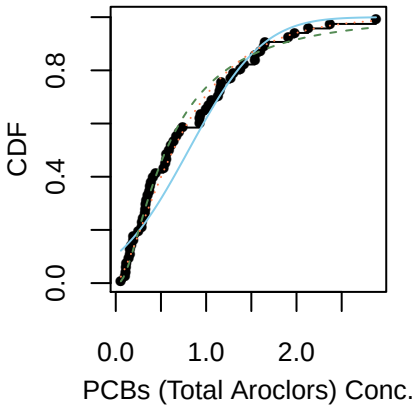
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

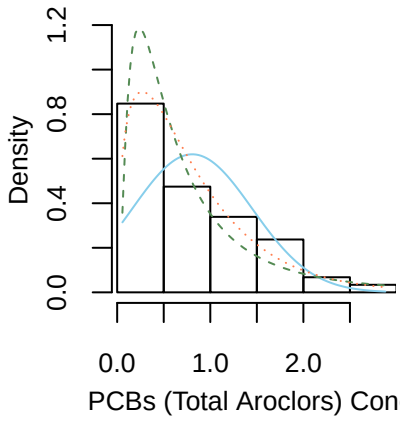


ECDF, Histogram & Q−Q (Detects Only)

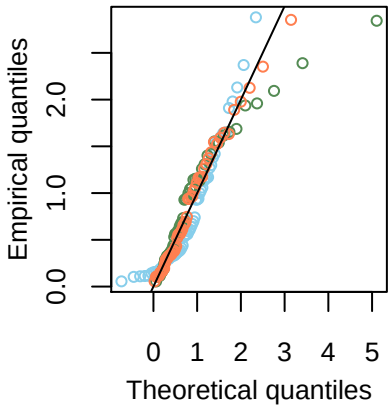
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 0.056 J	Arithmetic Mean = 0.81
N (detect) = 59	SD (log detect) = 0.94	Max (detect) = 2	Arithmetic SD = 0.65

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	9e−05	0.0038	–	–	–	–	119.451	123.606
Lognormal	0.13	0.051	–	–	–	–	93.5678	97.7229
Gamma	–	–	0.08328	0.129	0.4493	0.78	91.3563	95.5114

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in BCC−PCBs (Total Aroclors)

Exhibit 2: EPC Program and Results
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Berry's Creek Study Area Remedial Investigation

Figure **464**

Media:
White Perch Fillet
Exposure Unit:
LBC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in LBC−Antimony

Media:
White Perch Fillet
Exposure Unit:
LBC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.93 J	Arithmetic Mean = 1
N (detect) = 3	SD (log detect) = 0	Max (detect) = 1 J	Arithmetic SD = 0.085

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in LBC−Copper

Media:
White Perch Fillet
Exposure Unit:
LBC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 5 J	Arithmetic Mean = 6
N (detect) = 3	SD (log detect) = 0	Max (detect) = 9 J	Arithmetic SD = 2

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in LBC−Iron

Media:
White Perch Fillet
Exposure Unit:
LBC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.18 J	Arithmetic Mean = 0.33
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.59 J	Arithmetic SD = 0.23

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

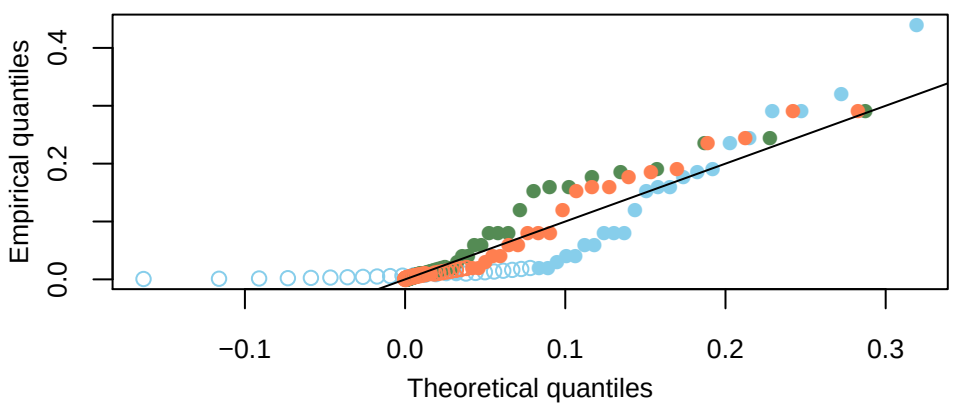
DRAFT

Distribution: White Perch Fillet in LBC−Manganese

Media:
White Perch Fillet
Exposure Unit:
LBC
Chemical (mg/kg):
Mercury (Inorganic)

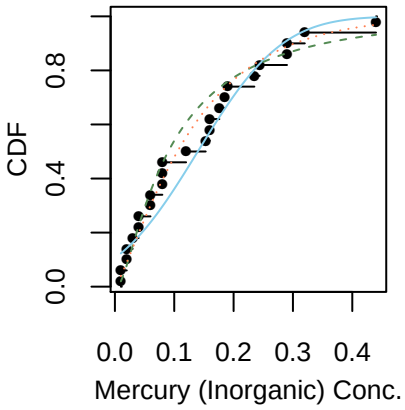
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

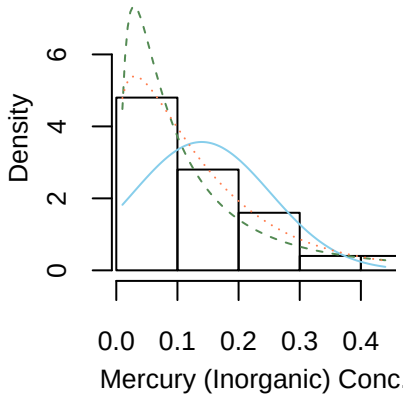


ECDF, Histogram & Q−Q (Detects Only)

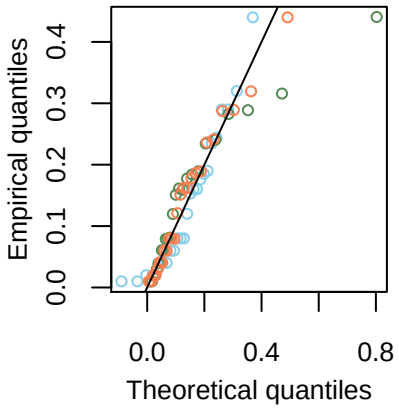
ECDF



Histogram



Q−Q



N = 47	FOD = 53%	Min (detect) = 0.01	Kaplan Meier Mean = 0.074
N (detect) = 25	SD (log detect) = 1.1	Max (detect) = 0.44 J	Kaplan Meier SD = 0.11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.1e−08	–	–	–	–	−74.651	−70.9507
Lognormal	0.12	0.16	–	–	–	–	−160.219	−156.519
Gamma	–	–	0.1877	0.139	1.284	0.813	−156.344	−152.643

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.032	0.037	–	–	–	–	−34.5854	−32.1477
Lognormal	0.11	0.069	–	–	–	–	−42.3097	−39.872
Gamma	–	–	0.1357	0.18	0.3291	0.773	−45.2603	−42.8226

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in LBC−Mercury (Inorganic)

Exhibit 2: EPC Program and Results
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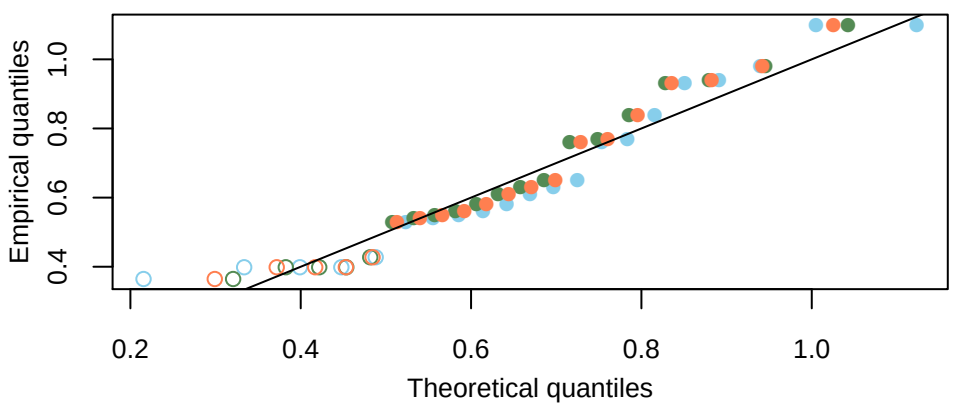
Berry's Creek Study Area Remedial Investigation

Figure **469**

Media:
White Perch Fillet
Exposure Unit:
LBC
Chemical (mg/kg):
Selenium

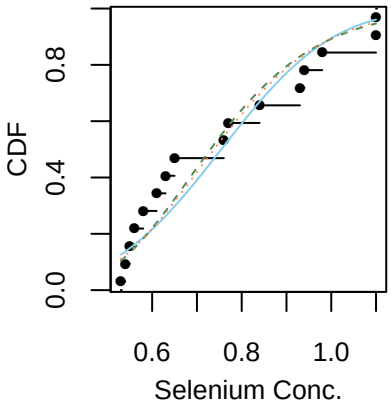
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

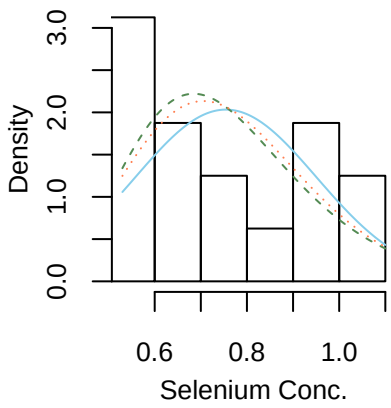


ECDF, Histogram & Q−Q (Detects Only)

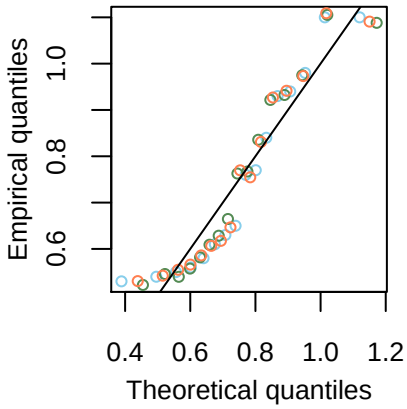
ECDF



Histogram



Q−Q



N = 21	FOD = 76%	Min (detect) = 0.53 J	Kaplan Meier Mean = 0.67
N (detect) = 16	SD (log detect) = 0.26	Max (detect) = 1	Kaplan Meier SD = 0.23

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.086	0.23	–	–	–	–	1.72249	3.81153
Lognormal	0.24	0.79	–	–	–	–	−0.746666	1.34238
Gamma	–	–	0.1105	0.19	0.434	0.745	−0.425934	1.66311

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.048	0.099	–	–	–	–	−2.70249	−1.15731
Lognormal	0.082	0.24	–	–	–	–	−4.49197	−2.94679
Gamma	–	–	0.1859	0.215	0.6359	0.739	−4.07346	−2.52828

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in LBC−Selenium

Exhibit 2: EPC Program and Results
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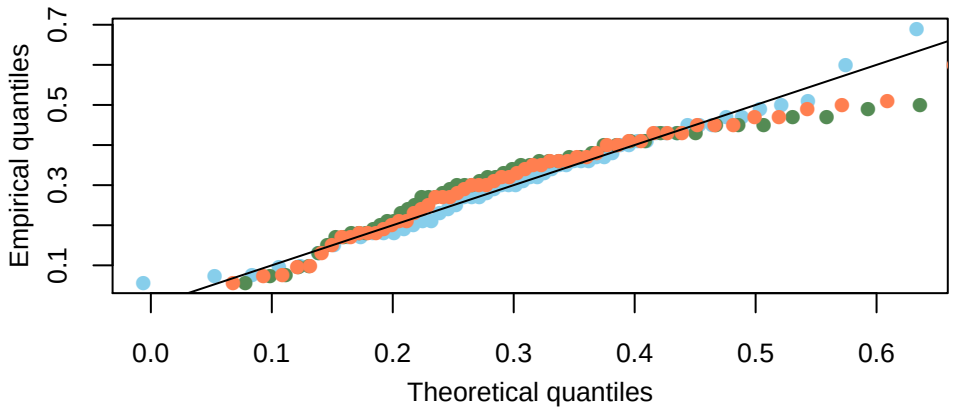
Figure **470**

Media:
White Perch Fillet
Exposure Unit:
LBC
Chemical (mg/kg):
Methyl Mercury

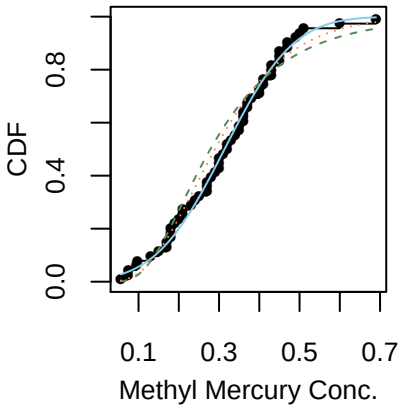
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

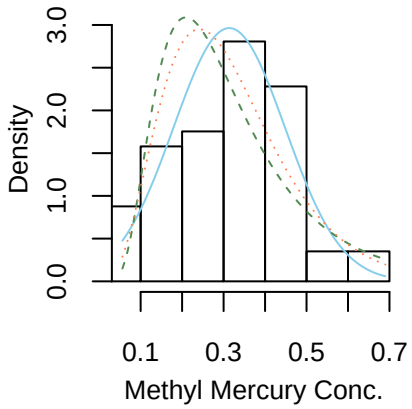


ECDF, Histogram & Q−Q (Detects Only)

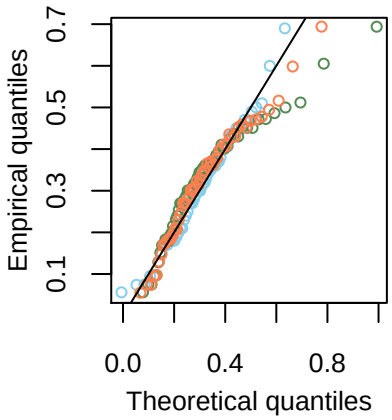
ECDF



Histogram



Q−Q



N = 57	FOD = 100%	Min (detect) = 0.056	Arithmetic Mean = 0.31
N (detect) = 57	SD (log detect) = 0.54	Max (detect) = 0.69	Arithmetic SD = 0.14

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.68	0.9	–	–	–	–	−62.862	−58.7759
Lognormal	0.00071	0.0049	–	–	–	–	−51.2571	−47.171
Gamma	–	–	0.11	0.127	0.8359	0.763	−59.5291	−55.443

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in LBC−Methyl Mercury

Exhibit 2: EPC Program and Results
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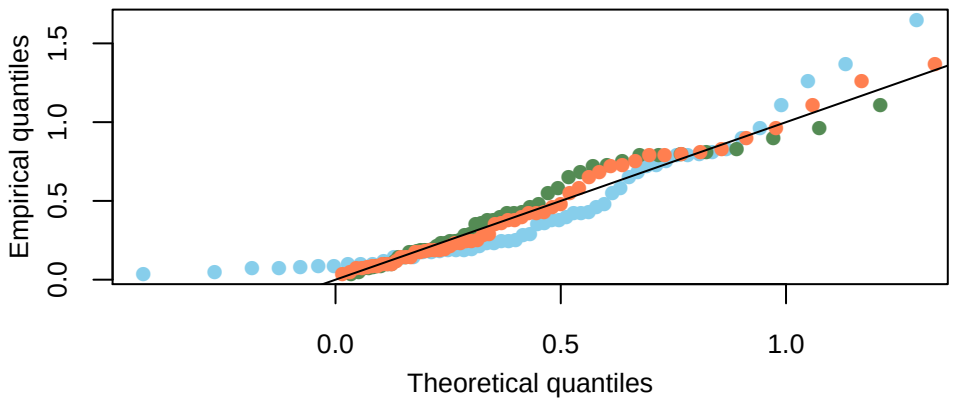
Figure **471**

Media:
White Perch Fillet
Exposure Unit:
LBC
Chemical (mg/kg):
PCBs (Total Aroclors)

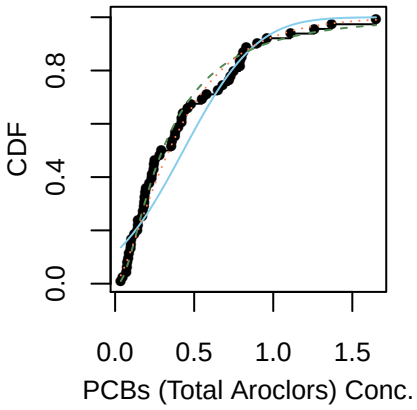
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

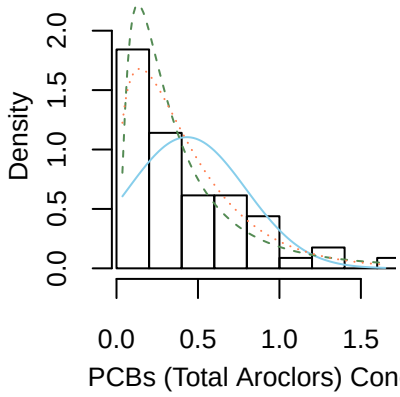


ECDF, Histogram & Q−Q (Detects Only)

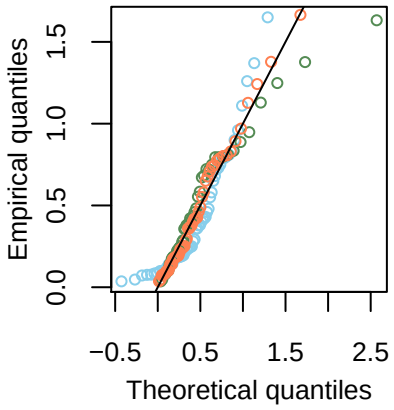
ECDF



Histogram



Q−Q



N = 57	FOD = 100%	Min (detect) = 0.036	Arithmetic Mean = 0.43
N (detect) = 57	SD (log detect) = 0.91	Max (detect) = 1 J	Arithmetic SD = 0.36

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.00053	–	–	–	–	49.7238	53.8099
Lognormal	0.39	0.42	–	–	–	–	16.7856	20.8717
Gamma	–	–	0.1026	0.129	0.5126	0.78	17.2844	21.3705

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

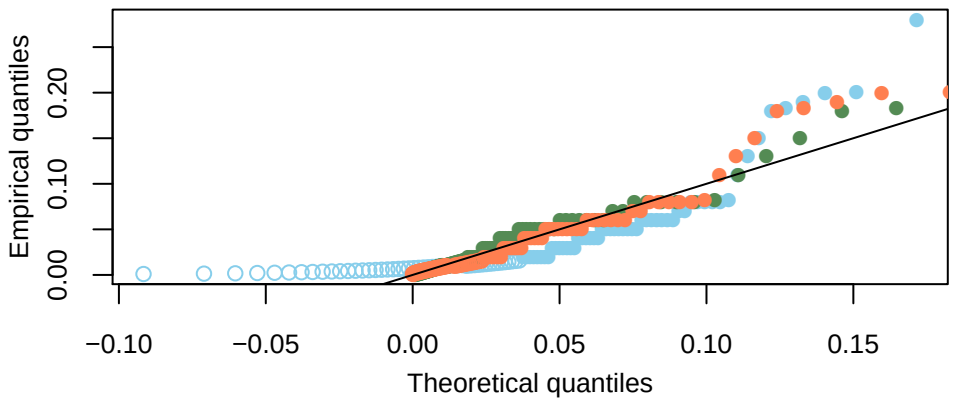
DRAFT

Distribution: White Perch Fillet in LBC−PCBs (Total Aroclors)

Media:
White Perch Fillet
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Mercury (Inorganic)

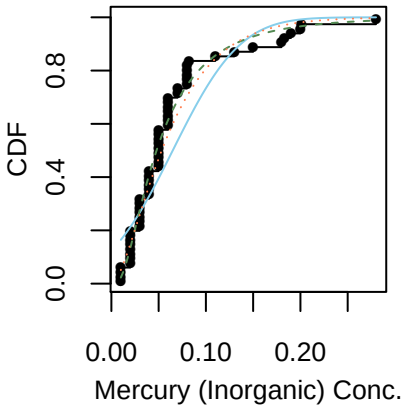
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

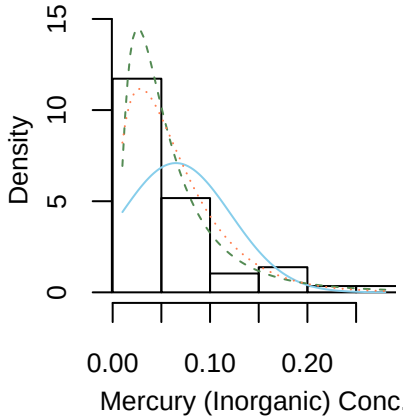


ECDF, Histogram & Q−Q (Detects Only)

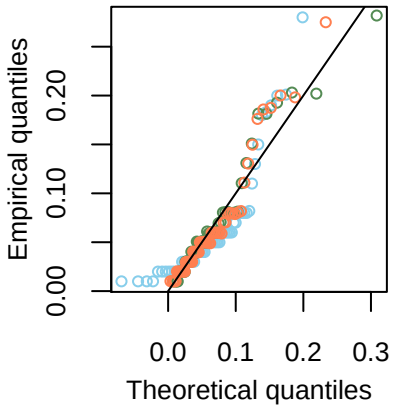
ECDF



Histogram



Q−Q



N = 103	FOD = 56%	Min (detect) = 0.01	Kaplan Meier Mean = 0.037
N (detect) = 58	SD (log detect) = 0.79	Max (detect) = 0.28 J	Kaplan Meier SD = 0.053

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	9e−14	–	–	–	–	−317.165	−311.896
Lognormal	0.29	0.037	–	–	–	–	−466.332	−461.063
Gamma	–	–	0.1297	0.095	1.617	0.818	−454.983	−449.714

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.6e−09	–	–	–	–	−165.255	−161.134
Lognormal	0.11	0.24	–	–	–	–	−212.539	−208.418
Gamma	–	–	0.1473	0.129	1.251	0.78	−206.913	−202.792

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

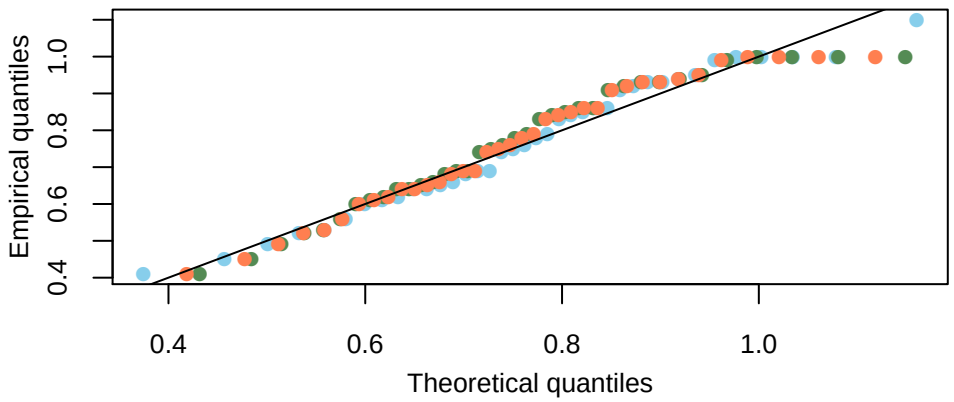
DRAFT

Distribution: White Perch Fillet in Reference Sites−Mercury (Inorganic)

Media:
White Perch Fillet
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Selenium

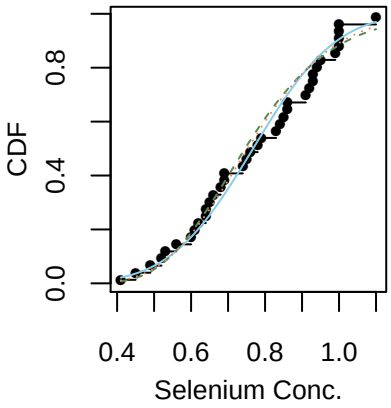
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

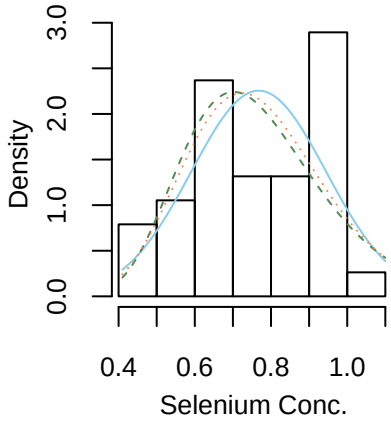


ECDF, Histogram & Q−Q (Detects Only)

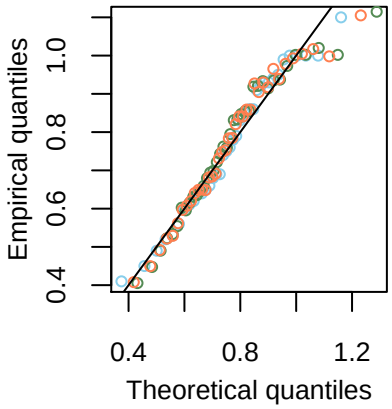
ECDF



Histogram



Q−Q



N = 38	FOD = 100%	Min (detect) = 0.41 J	Arithmetic Mean = 0.77
N (detect) = 38	SD (log detect) = 0.25	Max (detect) = 1	Arithmetic SD = 0.18

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.32	0.4	–	–	–	–	−19.8079	−16.5327
Lognormal	0.099	0.25	–	–	–	–	−17.0411	−13.7659
Gamma	–	–	0.1072	0.149	0.5084	0.748	−18.4932	−15.218

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in Reference Sites−Selenium

Exhibit 2: EPC Program and Results
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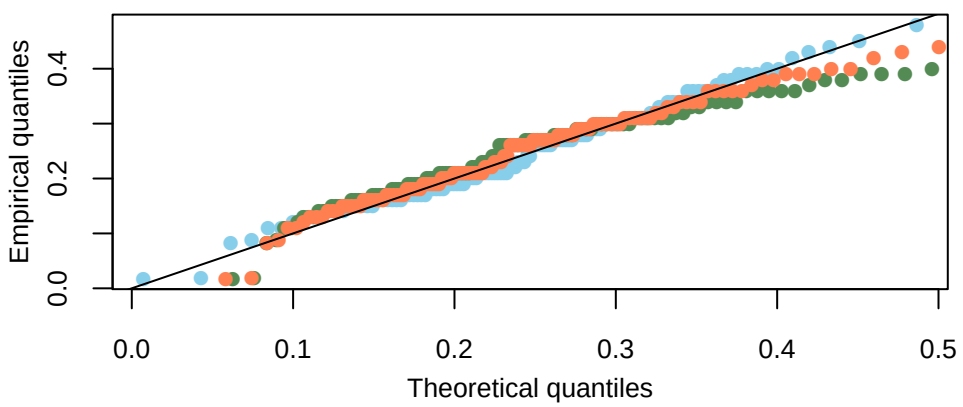
Berry's Creek Study Area Remedial Investigation

Figure **474**

Media:
White Perch Fillet
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Methyl Mercury

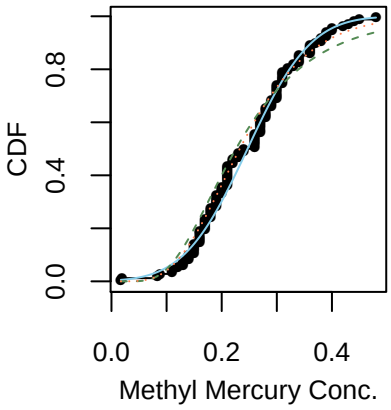
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

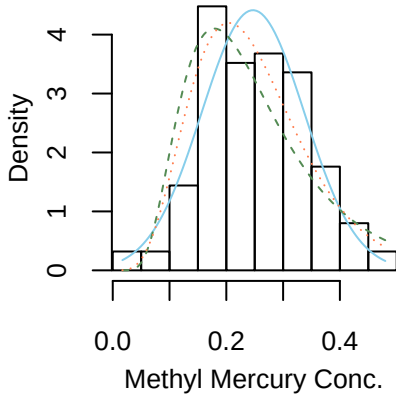


ECDF, Histogram & Q−Q (Detects Only)

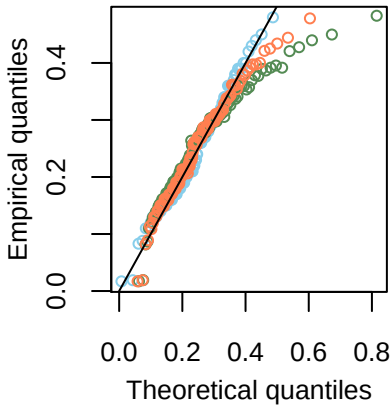
ECDF



Histogram



Q−Q



N = 125	FOD = 100%	Min (detect) = 0.017	Arithmetic Mean = 0.25
N (detect) = 125	SD (log detect) = 0.49	Max (detect) = 0.48	Arithmetic SD = 0.091

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.28	0.005	–	–	–	–	−242.242	−236.586
Lognormal	0	0.00082	–	–	–	–	−194.692	−189.036
Gamma	–	–	0.09999	0.09	1.094	0.754	−225.301	−219.645

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in Reference Sites−Methyl Mercury

Exhibit 2: EPC Program and Results
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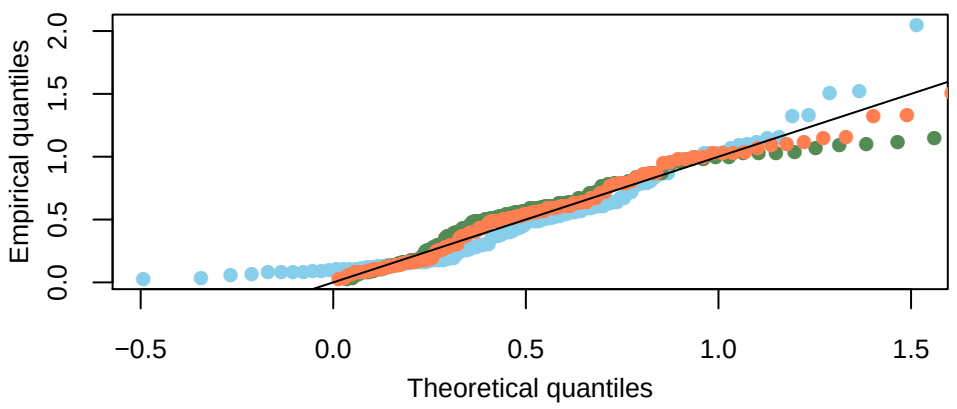
Berry's Creek Study Area Remedial Investigation

Figure
475

Media:
White Perch Fillet
Exposure Unit:
Reference Sites
Chemical (mg/kg):
PCBs (Total Aroclors)

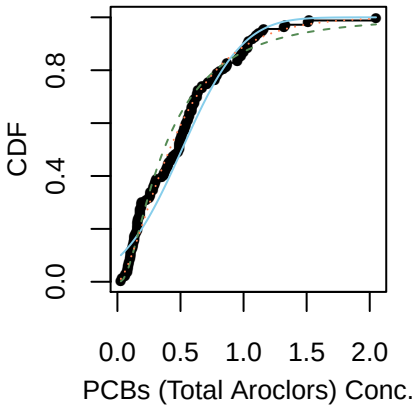
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

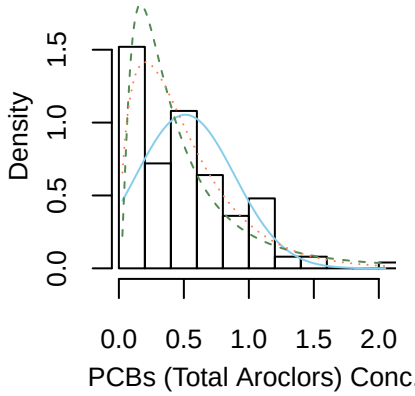


ECDF, Histogram & Q−Q (Detects Only)

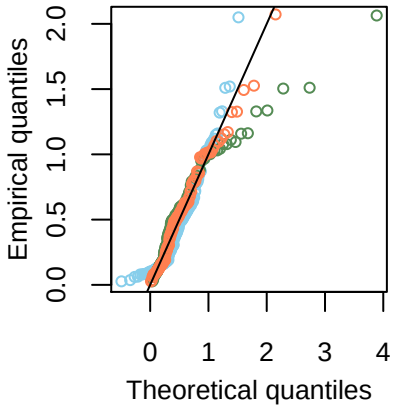
ECDF



Histogram



Q−Q



N = 125	FOD = 100%	Min (detect) = 0.027 J	Arithmetic Mean = 0.51
N (detect) = 125	SD (log detect) = 0.89	Max (detect) = 2	Arithmetic SD = 0.38

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.002	–	–	–	–	115.849	121.505
Lognormal	0.00068	2.1e−05	–	–	–	–	79.2547	84.9114
Gamma	–	–	0.0967	0.092	1.036	0.783	69.424	75.0807

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in Reference Sites−PCBs (Total Aroclors)

Media:
Blue Crab Muscle
Exposure Unit:
UBC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in UBC−Antimony

Media:
Blue Crab Muscle
Exposure Unit:
UBC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 9	Arithmetic Mean = 12
N (detect) = 3	SD (log detect) = 0	Max (detect) = 14	Arithmetic SD = 2

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in UBC−Copper

Media:
Blue Crab Muscle
Exposure Unit:
UBC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 33%	Min (detect) = 11 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 11 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in UBC−Iron

Media:
Blue Crab Muscle
Exposure Unit:
UBC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 6 J	Arithmetic Mean = 19
N (detect) = 3	SD (log detect) = 0	Max (detect) = 35 J	Arithmetic SD = 15

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in UBC−Manganese

Media:
Blue Crab Muscle
Exposure Unit:
UBC
Chemical (mg/kg):
Mercury (Inorganic)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 9	FOD = 11%	Min (detect) = 0.01	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.01	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in UBC−Mercury (Inorganic)

Media:
Blue Crab Muscle
Exposure Unit:
UBC
Chemical (mg/kg):
Selenium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.72	Arithmetic Mean = 0.85
N (detect) = 3	SD (log detect) = 0	Max (detect) = 1	Arithmetic SD = 0.14

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

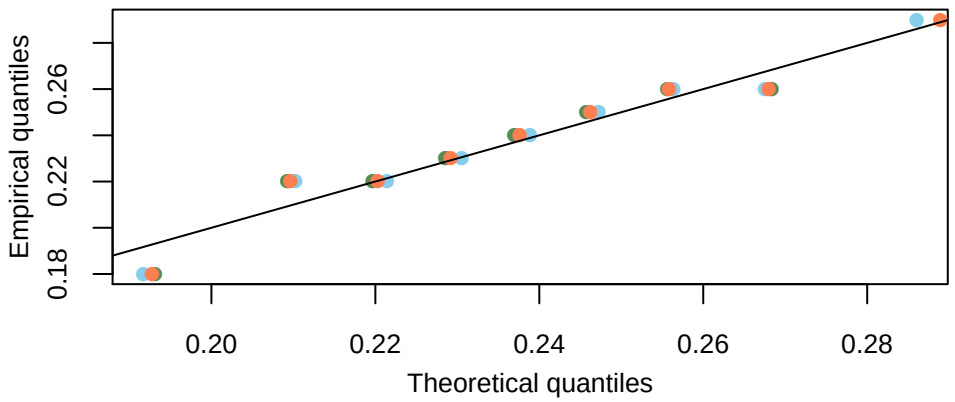
DRAFT

Distribution: Blue Crab Muscle in UBC−Selenium

Media:
Blue Crab Muscle
Exposure Unit:
UBC
Chemical (mg/kg):
Methyl Mercury

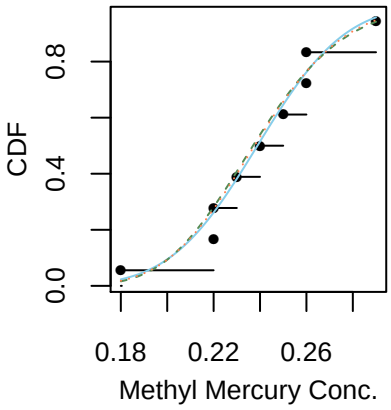
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

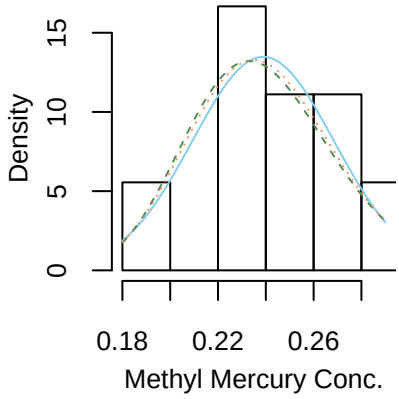


ECDF, Histogram & Q−Q (Detects Only)

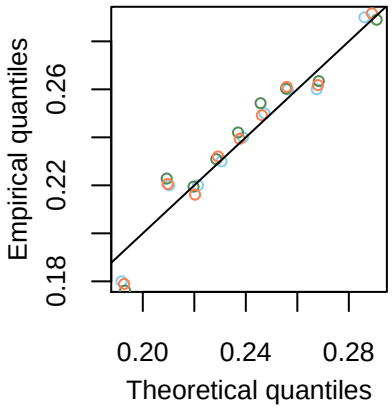
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 0.18	Arithmetic Mean = 0.24
N (detect) = 9	SD (log detect) = 0.14	Max (detect) = 0.29 J	Arithmetic SD = 0.031

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.91	0.7	–	–	–	–	−33.8148	−33.4204
Lognormal	0.71	0.53	–	–	–	–	−33.3113	−32.9169
Gamma	–	–	0.1635	0.279	0.2502	0.721	−33.524	−33.1295

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in UBC−Methyl Mercury

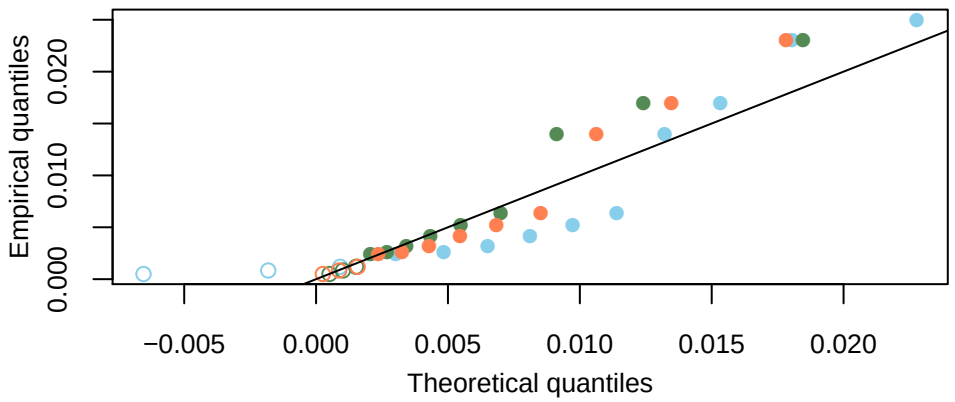
Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **483**

Media:
Blue Crab Muscle
Exposure Unit:
UBC
Chemical (mg/kg):
PCBs (Total Aroclors)

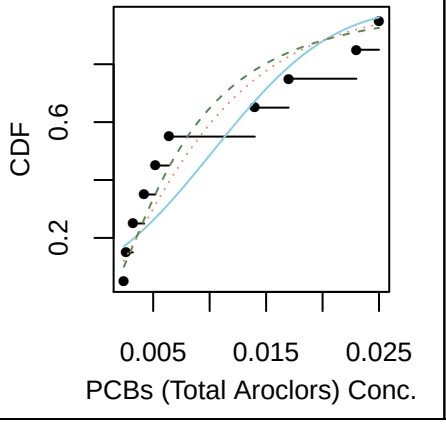
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

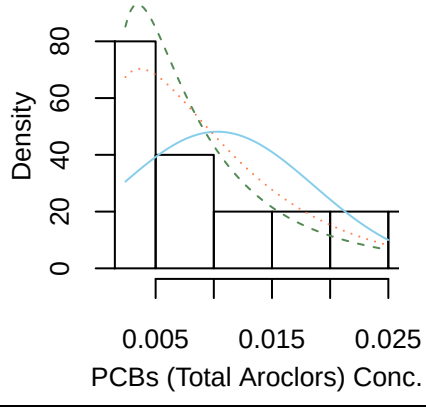


ECDF, Histogram & Q−Q (Detects Only)

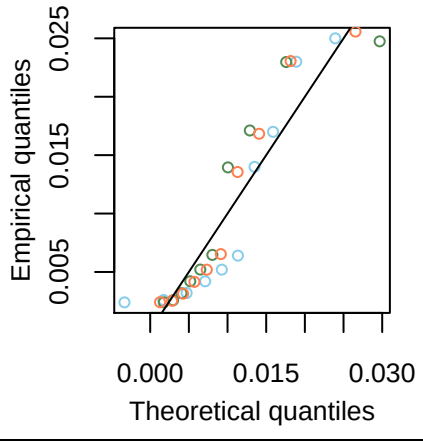
ECDF



Histogram



Q−Q



N = 13	FOD = 77%	Min (detect) = 0.0024 J	Kaplan Meier Mean = 0.0083
N (detect) = 10	SD (log detect) = 0.91	Max (detect) = 0.025	Kaplan Meier SD = 0.0081

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0078	0.0097	–	–	–	–	−83.7235	−82.5936
Lognormal	0.7	0.78	–	–	–	–	−95.628	−94.4981
Gamma	–	–	0.1385	0.281	0.362	0.777	−95.2024	−94.0725

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.035	0.034	–	–	–	–	−63.4861	−62.881
Lognormal	0.21	0.59	–	–	–	–	−69.2779	−68.6728
Gamma	–	–	0.2063	0.274	0.5448	0.748	−68.5376	−67.9324

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in UBC−PCBs (Total Aroclors)

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **484**

Media:
Blue Crab Muscle
Exposure Unit:
MBC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in MBC−Antimony

Media:
Blue Crab Muscle
Exposure Unit:
MBC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 9	Arithmetic Mean = 12
N (detect) = 3	SD (log detect) = 0	Max (detect) = 16	Arithmetic SD = 3

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in MBC−Copper

Media:
Blue Crab Muscle
Exposure Unit:
MBC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 10 J	Arithmetic Mean = 20
N (detect) = 3	SD (log detect) = 0	Max (detect) = 34 J	Arithmetic SD = 13

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in MBC−Iron

Media:
Blue Crab Muscle
Exposure Unit:
MBC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 6 J	Arithmetic Mean = 26
N (detect) = 3	SD (log detect) = 0	Max (detect) = 62 J	Arithmetic SD = 31

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in MBC−Manganese

Media:
Blue Crab Muscle
Exposure Unit:
MBC
Chemical (mg/kg):
Mercury (Inorganic)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 9	FOD = 11%	Min (detect) = 0.14 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.14 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Blue Crab Muscle in MBC−Mercury (Inorganic)

Media:
Blue Crab Muscle
Exposure Unit:
MBC
Chemical (mg/kg):
Selenium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.68	Arithmetic Mean = 1
N (detect) = 3	SD (log detect) = 0	Max (detect) = 1	Arithmetic SD = 0.41

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

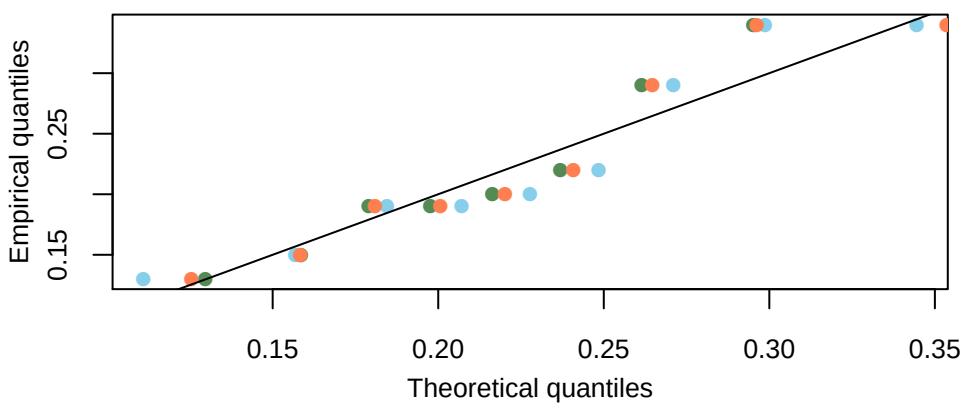
DRAFT

Distribution: Blue Crab Muscle in MBC−Selenium

Media:
Blue Crab Muscle
Exposure Unit:
MBC
Chemical (mg/kg):
Methyl Mercury

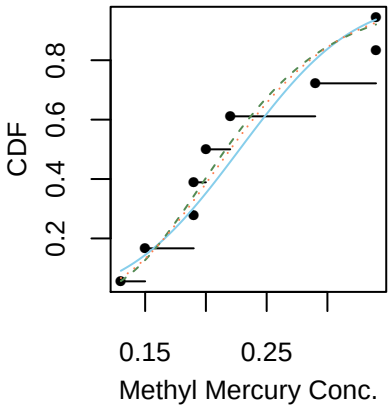
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

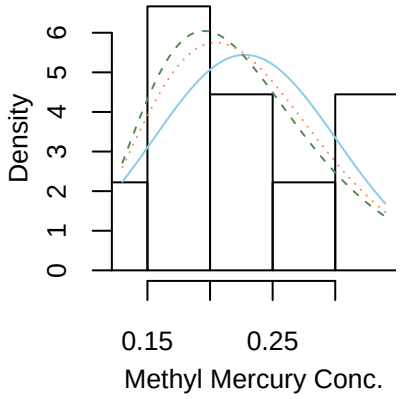


ECDF, Histogram & Q−Q (Detects Only)

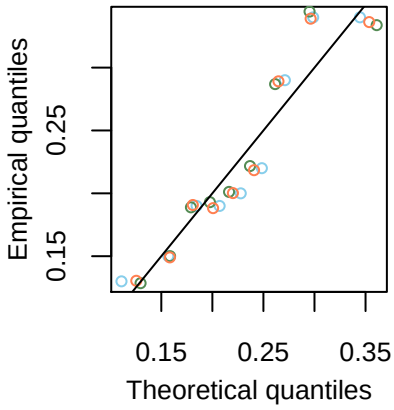
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 0.13	Arithmetic Mean = 0.23
N (detect) = 9	SD (log detect) = 0.34	Max (detect) = 0.34	Arithmetic SD = 0.078

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.22	0.33	–	–	–	–	−17.4967	−17.1022
Lognormal	0.48	0.83	–	–	–	–	−18.4592	−18.0648
Gamma	–	–	0.1706	0.28	0.3806	0.723	−18.3209	−17.9265

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Blue Crab Muscle in MBC−Methyl Mercury

Exhibit 2: EPC Program and Results
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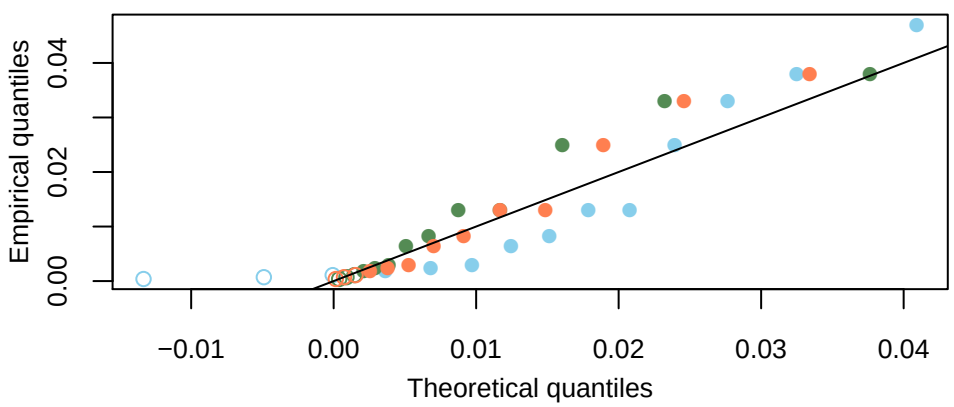
Figure **491**

Media:
Blue Crab Muscle
Exposure Unit:
MBC
Chemical (mg/kg):
PCBs (Total Aroclors)

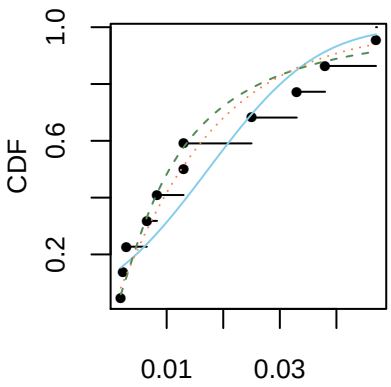
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

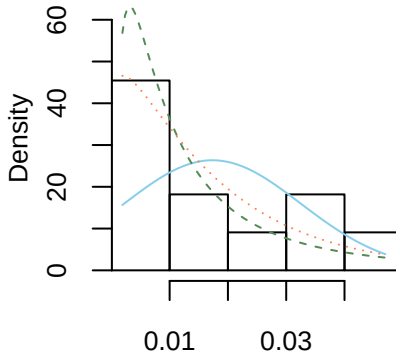


ECDF, Histogram & Q−Q (Detects Only)

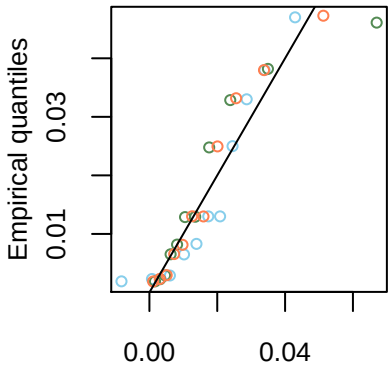
ECDF



Histogram



Q−Q



N = 14	FOD = 79%	Min (detect) = 0.0019 J	Kaplan Meier Mean = 0.014
N (detect) = 11	SD (log detect) = 1.1	Max (detect) = 0.047	Kaplan Meier SD = 0.015

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0086	0.036	–	–	–	–	−73.7642	−72.4861
Lognormal	0.53	0.8	–	–	–	–	−88.9568	−87.6787
Gamma	–	–	0.1575	0.281	0.3167	0.777	−89.292	−88.0139

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.082	0.065	–	–	–	–	−56.9766	−56.1808
Lognormal	0.38	0.78	–	–	–	–	−63.0067	−62.2109
Gamma	–	–	0.1433	0.274	0.3186	0.748	−63.2887	−62.493

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in MBC−PCBs (Total Aroclors)

Exhibit 2: EPC Program and Results
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Berry's Creek Study Area Remedial Investigation

Figure **492**

Media:
Blue Crab Muscle
Exposure Unit:
BCC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Blue Crab Muscle in BCC−Antimony

Media:
Blue Crab Muscle
Exposure Unit:
BCC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 9	Arithmetic Mean = 11
N (detect) = 3	SD (log detect) = 0	Max (detect) = 14	Arithmetic SD = 2

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in BCC−Copper

Media:
Blue Crab Muscle
Exposure Unit:
BCC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 67%	Min (detect) = 10 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 18 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in BCC−Iron

Media:
Blue Crab Muscle
Exposure Unit:
BCC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 5 J	Arithmetic Mean = 10
N (detect) = 3	SD (log detect) = 0	Max (detect) = 13 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

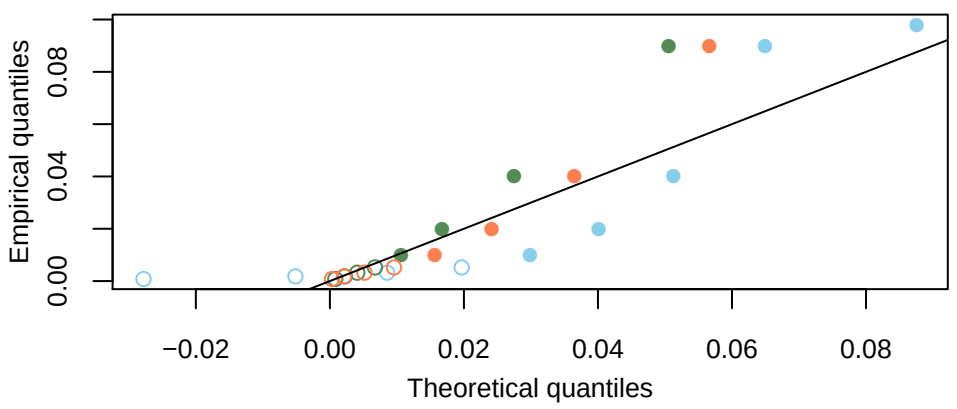
DRAFT

Distribution: Blue Crab Muscle in BCC−Manganese

Media:
Blue Crab Muscle
Exposure Unit:
BCC
Chemical (mg/kg):
Mercury (Inorganic)

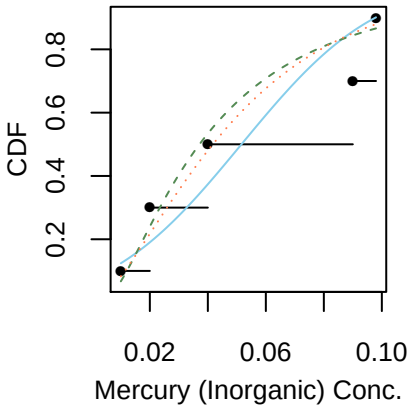
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

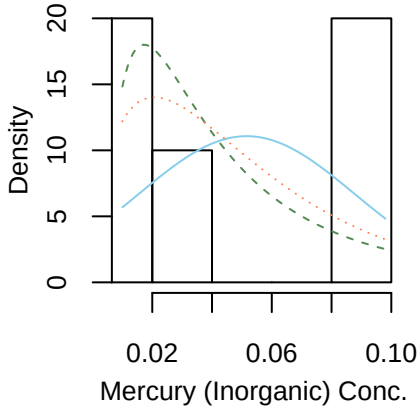


ECDF, Histogram & Q−Q (Detects Only)

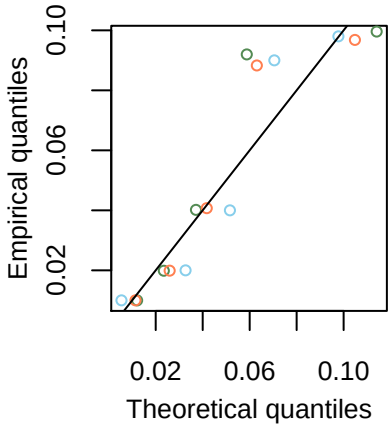
ECDF



Histogram



Q−Q



N = 9	FOD = 56%	Min (detect) = 0.01	Kaplan Meier Mean = 0.029
N (detect) = 5	SD (log detect) = 0.98	Max (detect) = 0.098	Kaplan Meier SD = 0.037

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0065	0.061	–	–	–	–	−30.1881	−29.7936
Lognormal	0.73	0.98	–	–	–	–	−43.6723	−43.2779
Gamma	–	–	0.1647	0.294	0.3322	0.771	−43.1634	−42.7689

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.29	N<5	–	–	–	–	−15.0443	−15.8255
Lognormal	0.54	N<5	–	–	–	–	−16.0704	−16.8515
Gamma	–	–	NA	NA	NA	NA	−16.3184	−17.0995

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in BCC−Mercury (Inorganic)

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **497**

Media:
Blue Crab Muscle
Exposure Unit:
BCC
Chemical (mg/kg):
Selenium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.74	Arithmetic Mean = 0.82
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.91	Arithmetic SD = 0.085

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

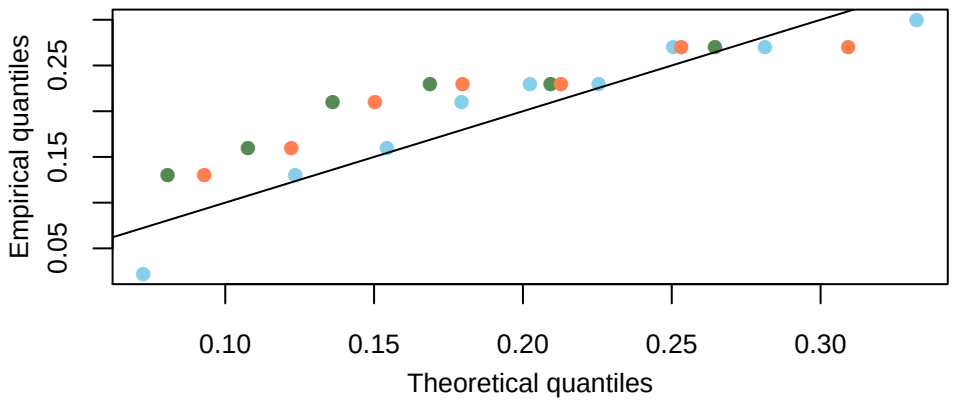
DRAFT

Distribution: Blue Crab Muscle in BCC−Selenium

Media:
Blue Crab Muscle
Exposure Unit:
BCC
Chemical (mg/kg):
Methyl Mercury

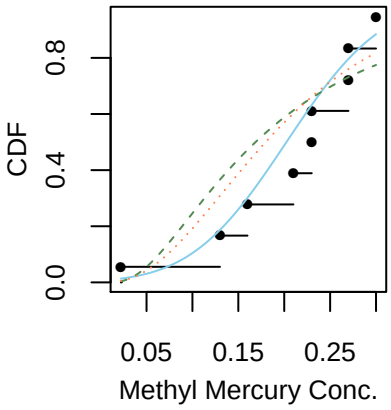
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

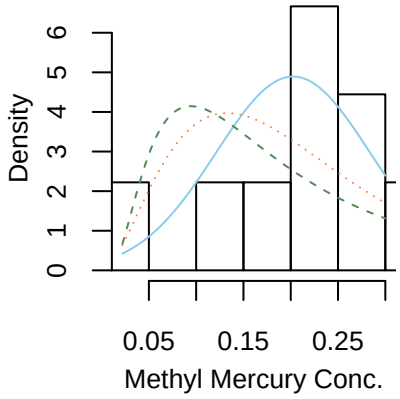


ECDF, Histogram & Q−Q (Detects Only)

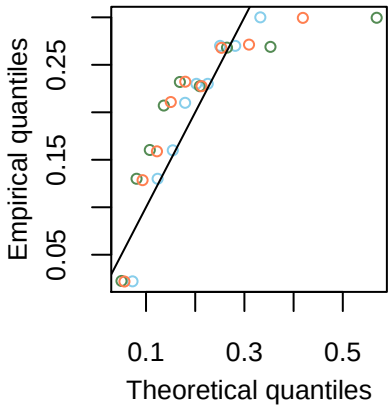
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 0.022	Arithmetic Mean = 0.2
N (detect) = 9	SD (log detect) = 0.81	Max (detect) = 0.3	Arithmetic SD = 0.086

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.29	0.36	–	–	–	–	−15.5803	−15.1859
Lognormal	0.00084	0.052	–	–	–	–	−7.36142	−6.96697
Gamma	–	–	0.2689	0.282	0.9337	0.73	−11.0586	−10.6642

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Blue Crab Muscle in BCC−Methyl Mercury

Exhibit 2: EPC Program and Results
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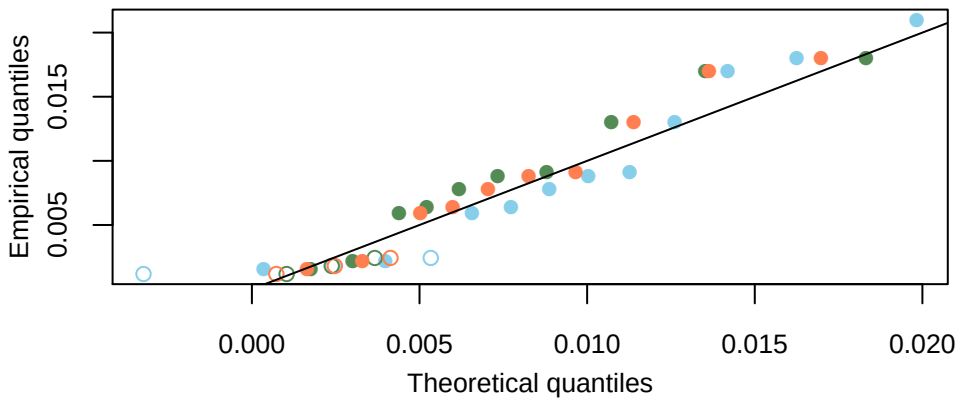
Berry's Creek Study Area Remedial Investigation

Figure **499**

Media:
Blue Crab Muscle
Exposure Unit:
BCC
Chemical (mg/kg):
PCBs (Total Aroclors)

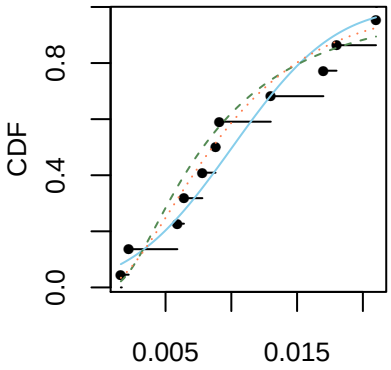
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

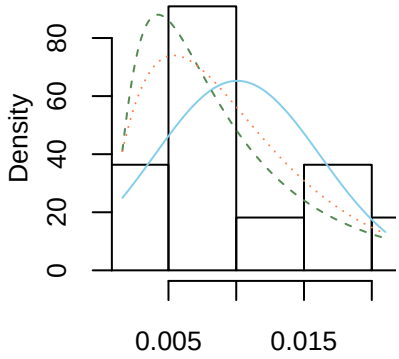


ECDF, Histogram & Q−Q (Detects Only)

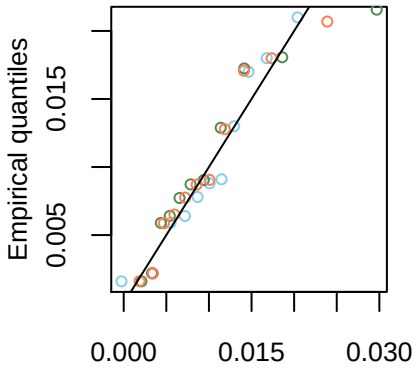
ECDF



Histogram



Q−Q



N = 14	FOD = 79%	Min (detect) = 0.0016 J	Kaplan Meier Mean = 0.0083
N (detect) = 11	SD (log detect) = 0.83	Max (detect) = 0.021	Kaplan Meier SD = 0.0064

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.085	0.34	–	–	–	–	−97.7205	−96.4424
Lognormal	0.21	0.39	–	–	–	–	−102.704	−101.425
Gamma	–	–	0.1823	0.274	0.4059	0.748	−103.252	−101.973

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.51	0.27	–	–	–	–	−76.9209	−76.1251
Lognormal	0.24	0.38	–	–	–	–	−76.7014	−75.9056
Gamma	–	–	0.1328	0.27	0.286	0.736	−78.19	−77.3942

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Blue Crab Muscle in BCC−PCBs (Total Aroclors)

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **500**

Media:
Blue Crab Muscle
Exposure Unit:
LBC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Blue Crab Muscle in LBC−Antimony

Media:
Blue Crab Muscle
Exposure Unit:
LBC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 14 J	Arithmetic Mean = 16
N (detect) = 3	SD (log detect) = 0	Max (detect) = 20	Arithmetic SD = 2

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Blue Crab Muscle in LBC−Copper

Media:
Blue Crab Muscle
Exposure Unit:
LBC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 67%	Min (detect) = 10 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 260 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Blue Crab Muscle in LBC−Iron

Media:
Blue Crab Muscle
Exposure Unit:
LBC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 5 J	Arithmetic Mean = 5
N (detect) = 3	SD (log detect) = 0	Max (detect) = 6 J	Arithmetic SD = 0.58

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Blue Crab Muscle in LBC−Manganese

Media:
Blue Crab Muscle
Exposure Unit:
LBC
Chemical (mg/kg):
Mercury (Inorganic)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 9	FOD = 22%	Min (detect) = 0.02 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.079	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Blue Crab Muscle in LBC−Mercury (Inorganic)

Media:
Blue Crab Muscle
Exposure Unit:
LBC
Chemical (mg/kg):
Selenium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.95	Arithmetic Mean = 1
N (detect) = 3	SD (log detect) = 0	Max (detect) = 1	Arithmetic SD = 0.3

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

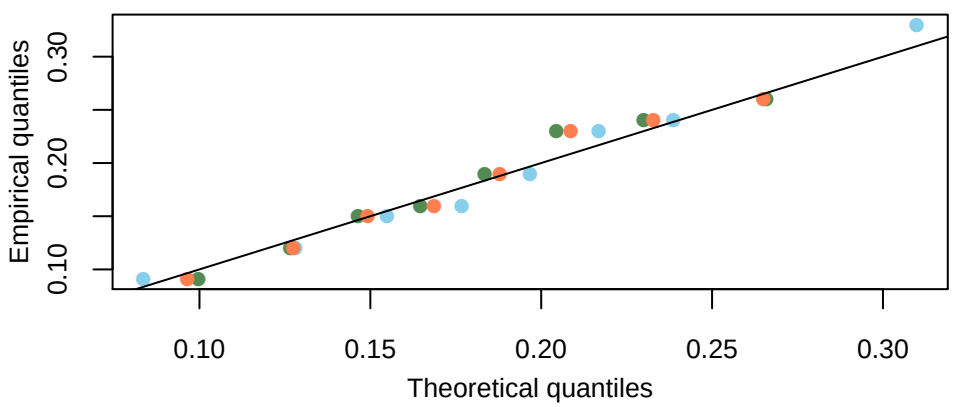
DRAFT

Distribution: Blue Crab Muscle in LBC−Selenium

Media:
Blue Crab Muscle
Exposure Unit:
LBC
Chemical (mg/kg):
Methyl Mercury

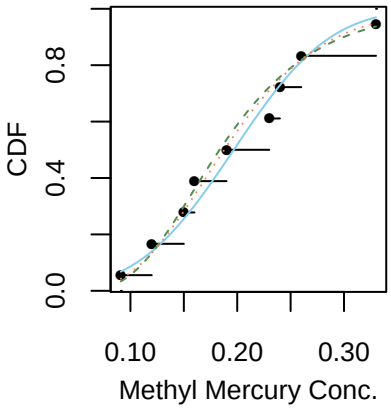
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

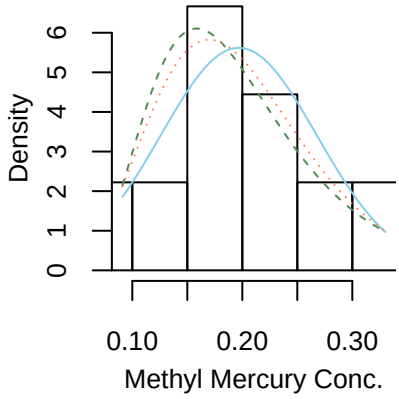


ECDF, Histogram & Q−Q (Detects Only)

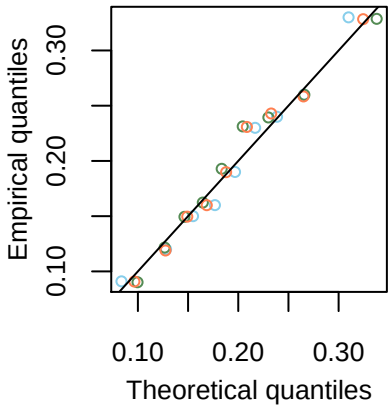
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 0.091	Arithmetic Mean = 0.2
N (detect) = 9	SD (log detect) = 0.41	Max (detect) = 0.33	Arithmetic SD = 0.075

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.95	0.92	–	–	–	–	−18.0668	−17.6723
Lognormal	0.95	0.77	–	–	–	–	−18.2432	−17.8487
Gamma	–	–	0.155	0.28	0.1589	0.723	−18.4815	−18.0871

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Blue Crab Muscle in LBC−Methyl Mercury

Exhibit 2: EPC Program and Results
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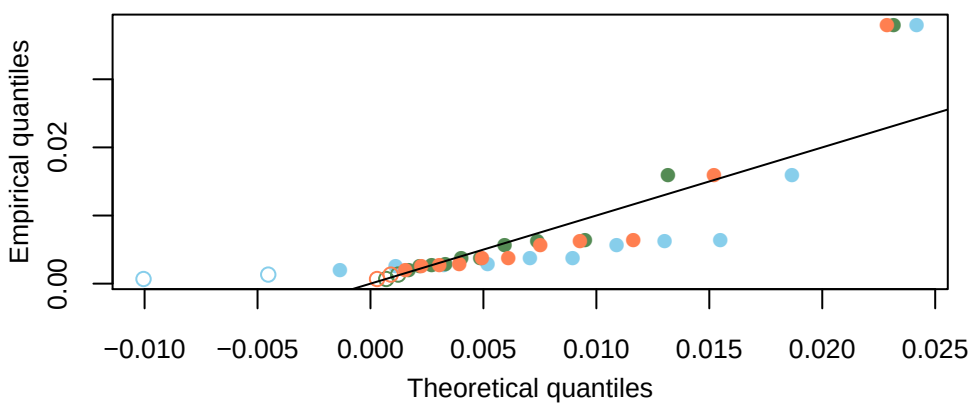
Berry's Creek Study Area Remedial Investigation

Figure **507**

Media:
Blue Crab Muscle
Exposure Unit:
LBC
Chemical (mg/kg):
PCBs (Total Aroclors)

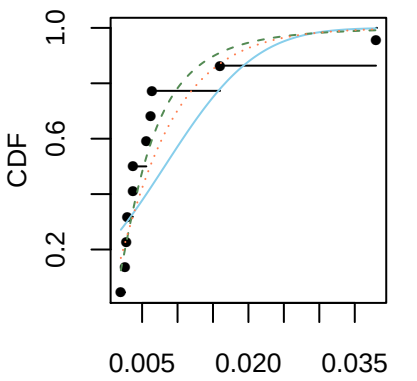
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

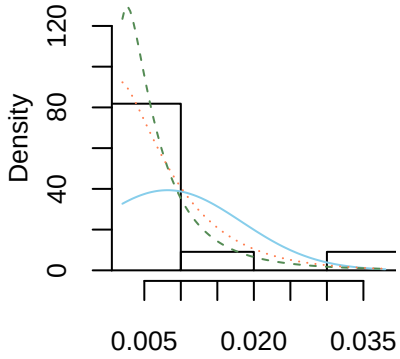


ECDF, Histogram & Q−Q (Detects Only)

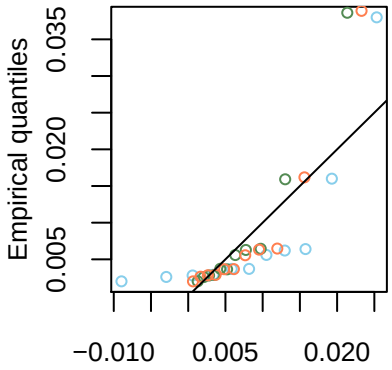
ECDF



Histogram



Q−Q



N = 13	FOD = 85%	Min (detect) = 0.002 J	Kaplan Meier Mean = 0.0072
N (detect) = 11	SD (log detect) = 0.87	Max (detect) = 0.038	Kaplan Meier SD = 0.0096

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	6e−05	2.4e−05	–	–	–	–	−79.6947	−78.5648
Lognormal	0.74	0.37	–	–	–	–	−102.799	−101.669
Gamma	–	–	0.2522	0.274	0.7955	0.748	−98.7497	−97.6198

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−05	6.3e−05	–	–	–	–	−65.797	−65.0012
Lognormal	0.072	0.12	–	–	–	–	−84.4054	−83.6096
Gamma	–	–	0.301	0.274	1.054	0.748	−80.0838	−79.288

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Blue Crab Muscle in LBC−PCBs (Total Aroclors)

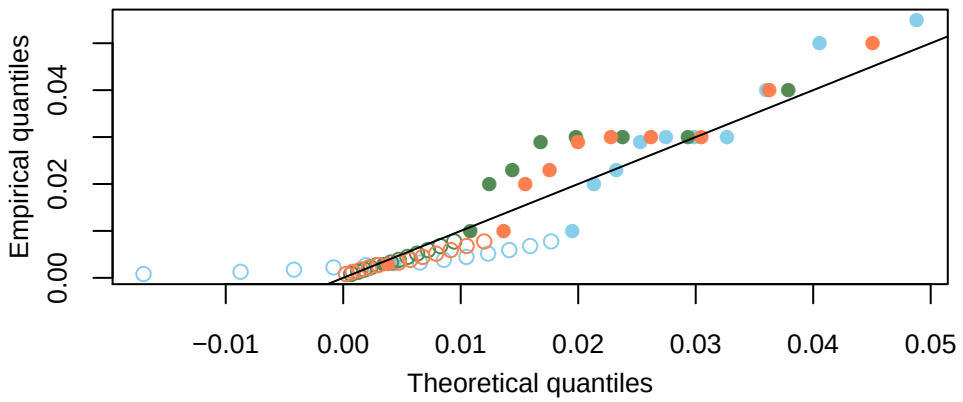
Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **508**

Media:
Blue Crab Muscle
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Mercury (Inorganic)

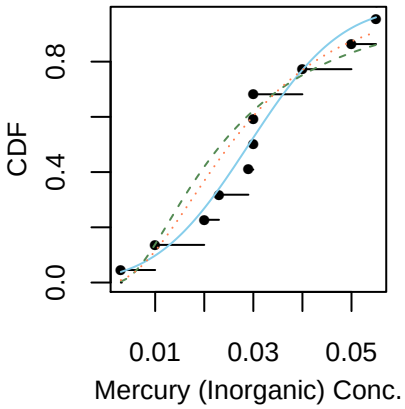
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

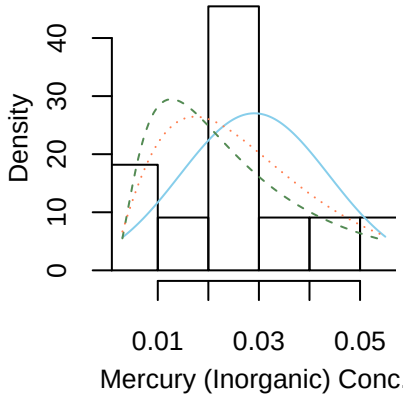


ECDF, Histogram & Q−Q (Detects Only)

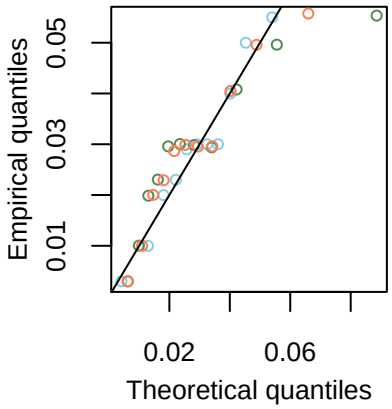
ECDF



Histogram



Q−Q



N = 23	FOD = 48%	Min (detect) = 0.003 J	Kaplan Meier Mean = 0.014
N (detect) = 11	SD (log detect) = 0.82	Max (detect) = 0.055 J	Kaplan Meier SD = 0.018

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00075	0.00052	–	–	–	–	−120.093	−117.822
Lognormal	0.2	0.2	–	–	–	–	−141.67	−139.399
Gamma	–	–	0.1576	0.192	0.7634	0.805	−140.674	−138.403

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.78	0.23	–	–	–	–	−57.5387	−56.7429
Lognormal	0.017	0.073	–	–	–	–	−52.6336	−51.8378
Gamma	–	–	0.2189	0.27	0.5377	0.736	−55.8652	−55.0694

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Blue Crab Muscle in Reference Sites−Mercury (Inorganic)

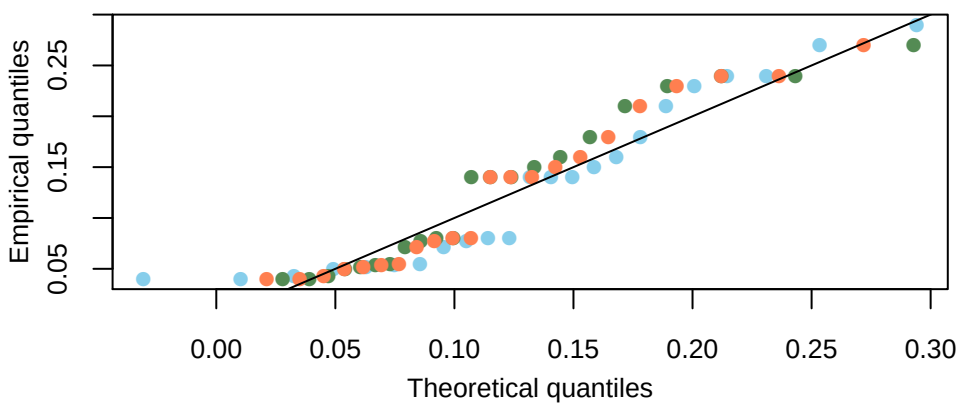
Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **509**

Media:
Blue Crab Muscle
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Methyl Mercury

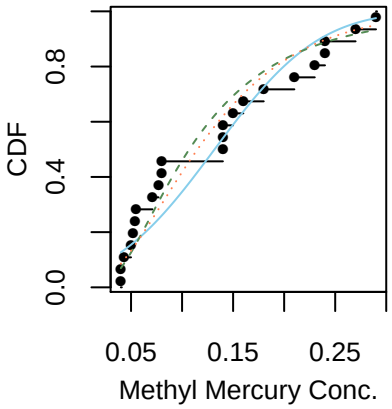
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

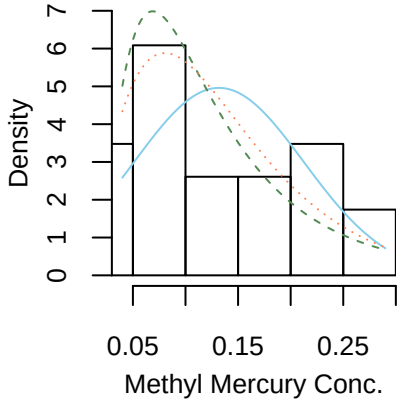


ECDF, Histogram & Q−Q (Detects Only)

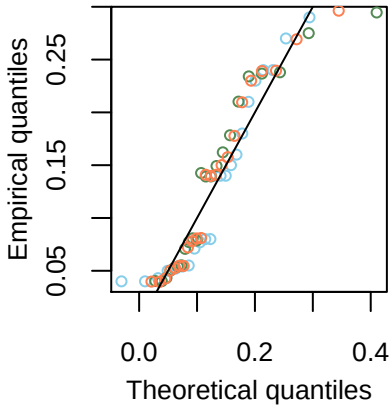
ECDF



Histogram



Q−Q



N = 23	FOD = 100%	Min (detect) = 0.04 J	Arithmetic Mean = 0.13
N (detect) = 23	SD (log detect) = 0.68	Max (detect) = 0.29 J	Arithmetic SD = 0.082

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.016	0.0077	–	–	–	–	−46.6687	−44.3978
Lognormal	0.04	0.066	–	–	–	–	−52.2513	−49.9803
Gamma	–	–	0.1769	0.184	0.764	0.755	−52.1333	−49.8623

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

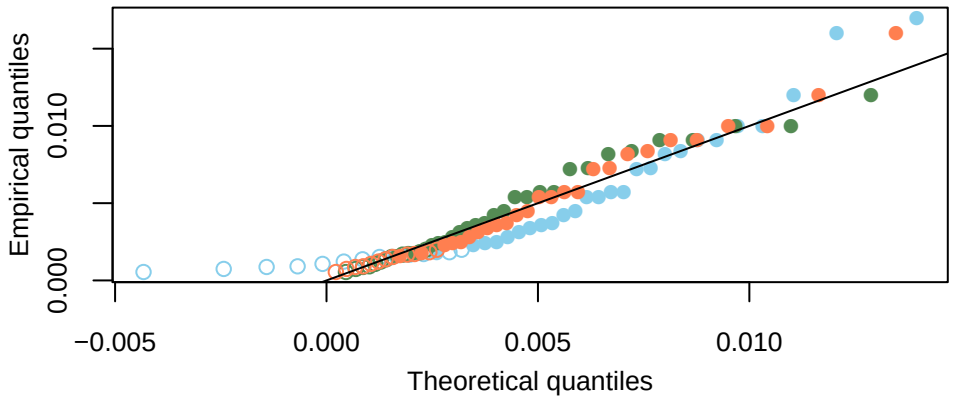
DRAFT

Distribution: Blue Crab Muscle in Reference Sites−Methyl Mercury

Media:
Blue Crab Muscle
Exposure Unit:
Reference Sites
Chemical (mg/kg):
PCBs (Total Aroclors)

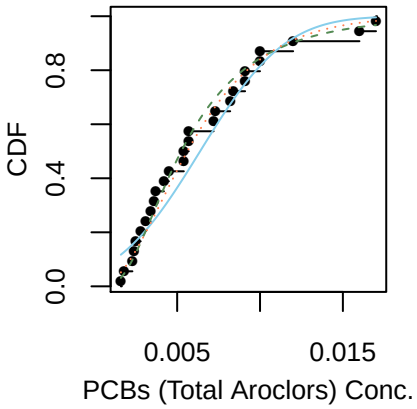
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

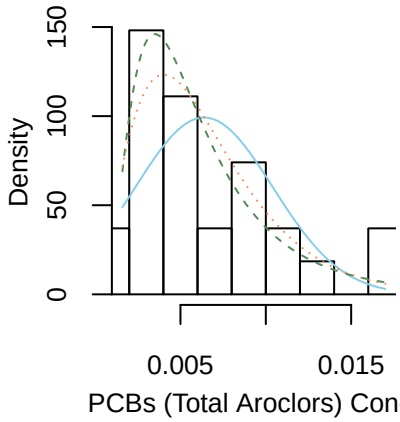


ECDF, Histogram & Q−Q (Detects Only)

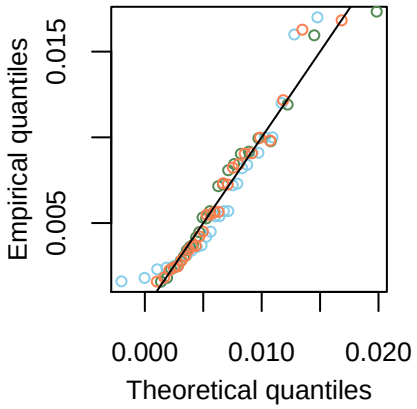
ECDF



Histogram



Q−Q



N = 39	FOD = 69%	Min (detect) = 0.0016 J	Kaplan Meier Mean = 0.0048
N (detect) = 27	SD (log detect) = 0.65	Max (detect) = 0.017 J	Kaplan Meier SD = 0.0041

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00011	0.006	–	–	–	–	−314.114	−310.787
Lognormal	0.54	0.62	–	–	–	–	−339.414	−336.087
Gamma	–	–	0.1057	0.153	0.4944	0.776	−337.703	−334.376

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.01	0.078	–	–	–	–	−217.244	−214.653
Lognormal	0.74	0.78	–	–	–	–	−227.162	−224.57
Gamma	–	–	0.09941	0.177	0.2799	0.756	−226.415	−223.824

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in Reference Sites−PCBs (Total Aroclors)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
UBC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in UBC−Antimony

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
UBC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 9	Arithmetic Mean = 12
N (detect) = 3	SD (log detect) = 0	Max (detect) = 14	Arithmetic SD = 2

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in UBC−Copper

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
UBC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 33%	Min (detect) = 11 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 11 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in UBC−Iron

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
UBC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 6 J	Arithmetic Mean = 19
N (detect) = 3	SD (log detect) = 0	Max (detect) = 35 J	Arithmetic SD = 15

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

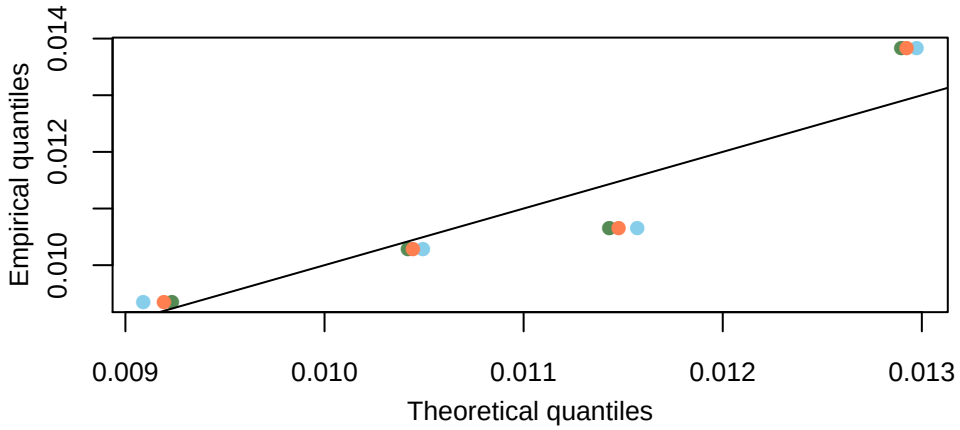
DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in UBC−Manganese

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
UBC
Chemical (mg/kg):
Mercury (Inorganic)

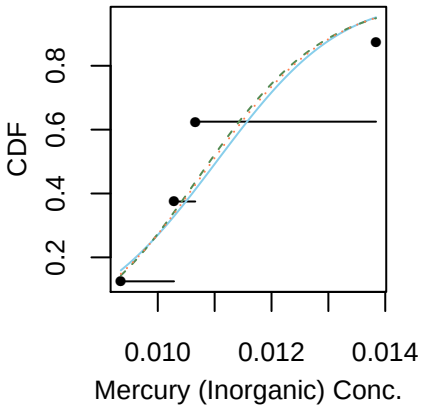
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

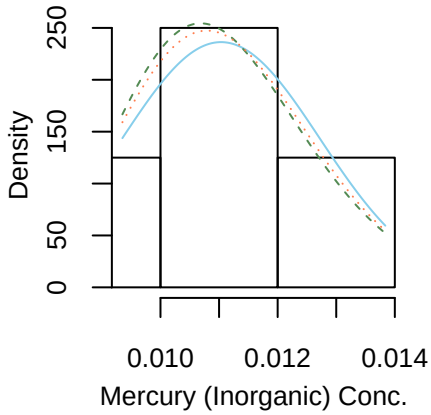


ECDF, Histogram & Q−Q (Detects Only)

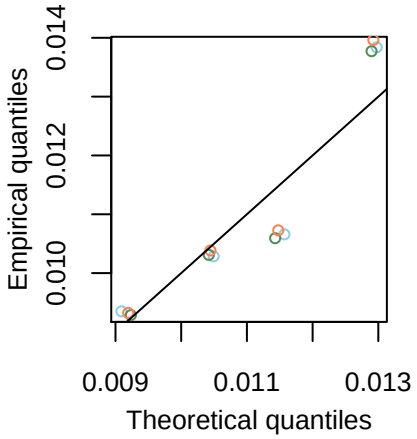
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 0.0093 J	Arithmetic Mean = 0.011
N (detect) = 4	SD (log detect) = 0.17	Max (detect) = 0.014 J	Arithmetic SD = 0.0019

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.29	N<5	–	–	–	–	−35.7213	−36.9487
Lognormal	0.43	N<5	–	–	–	–	−36.227	−37.4544
Gamma	–	–	NA	NA	NA	NA	−36.0725	−37.2999

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in UBC−Mercury (Inorganic)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
UBC
Chemical (mg/kg):
Selenium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.72	Arithmetic Mean = 0.85
N (detect) = 3	SD (log detect) = 0	Max (detect) = 1	Arithmetic SD = 0.14

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

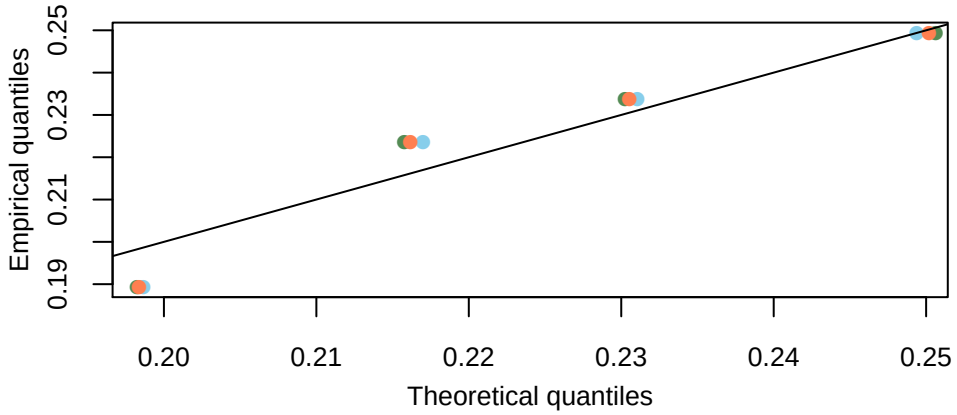
DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in UBC−Selenium

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
UBC
Chemical (mg/kg):
Methyl Mercury

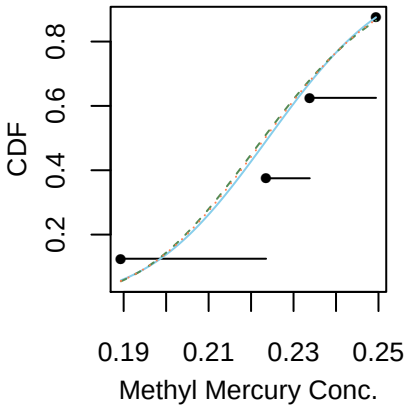
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

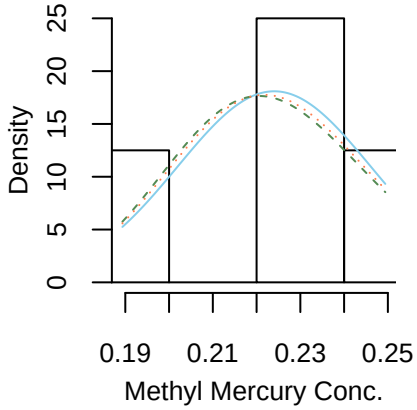


ECDF, Histogram & Q−Q (Detects Only)

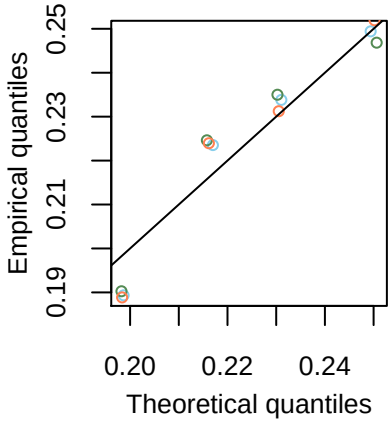
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 0.19 J	Arithmetic Mean = 0.22
N (detect) = 4	SD (log detect) = 0.12	Max (detect) = 0.25 J	Arithmetic SD = 0.025

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.72	N<5	–	–	–	–	−15.1642	−16.3916
Lognormal	0.61	N<5	–	–	–	–	−14.9232	−16.1506
Gamma	–	–	NA	NA	NA	NA	−15.0109	−16.2383

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in UBC−Methyl Mercury

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **518**

Media:
Blue Crab Muscle & Hepatopancreas

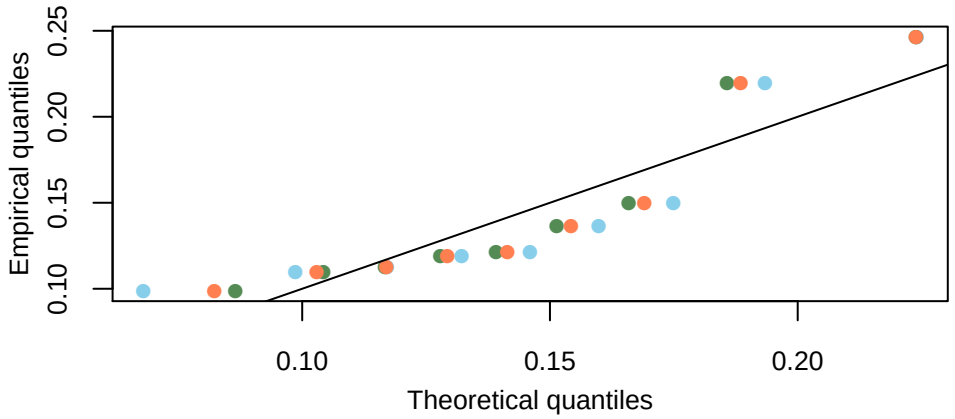
Exposure Unit:
UBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

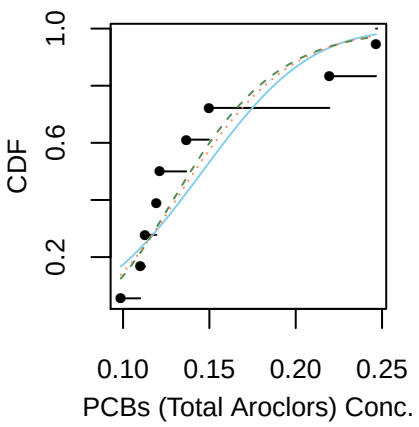
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

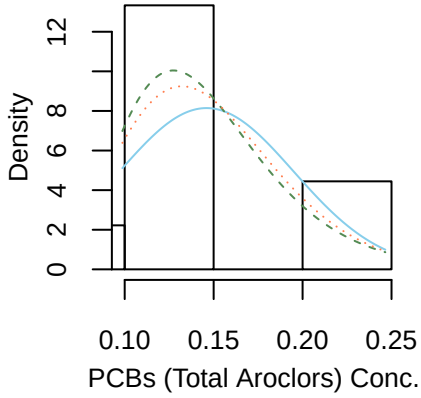


ECDF, Histogram & Q−Q (Detects Only)

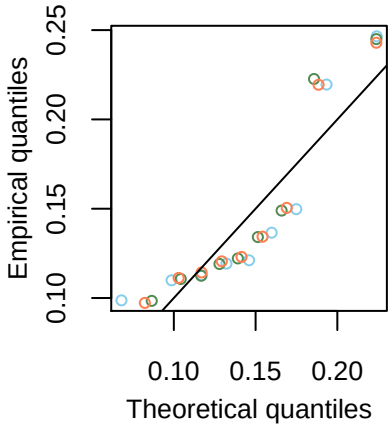
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 0.099	Arithmetic Mean = 0.15
N (detect) = 9	SD (log detect) = 0.32	Max (detect) = 0.25 J	Arithmetic SD = 0.052

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.021	0.11	–	–	–	–	−24.7532	−24.3587
Lognormal	0.11	0.21	–	–	–	–	−27.7243	−27.3298
Gamma	–	–	0.2413	0.279	0.7103	0.722	−26.8761	−26.4817

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in UBC−PCBs (Total Aroclo

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **519**

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
MBC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in MBC−Antimony

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
MBC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 9	Arithmetic Mean = 12
N (detect) = 3	SD (log detect) = 0	Max (detect) = 16	Arithmetic SD = 3

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in MBC−Copper

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
MBC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 10 J	Arithmetic Mean = 20
N (detect) = 3	SD (log detect) = 0	Max (detect) = 34 J	Arithmetic SD = 13

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in MBC−Iron

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
MBC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 6 J	Arithmetic Mean = 26
N (detect) = 3	SD (log detect) = 0	Max (detect) = 62 J	Arithmetic SD = 31

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in MBC−Manganese

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
MBC
Chemical (mg/kg):
Mercury (Inorganic)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 4	FOD = 75%	Min (detect) = 0.013 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.12 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in MBC−Mercury (Inorganic

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
MBC
Chemical (mg/kg):
Selenium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.68	Arithmetic Mean = 1
N (detect) = 3	SD (log detect) = 0	Max (detect) = 1	Arithmetic SD = 0.41

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in MBC−Selenium

Media:
Blue Crab Muscle & Hepatopancreas

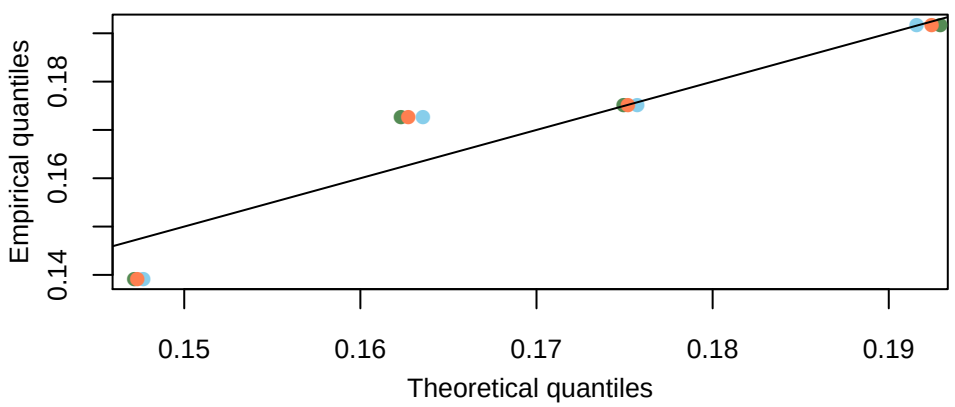
Exposure Unit:
MBC

Chemical (mg/kg):
Methyl Mercury

Legend

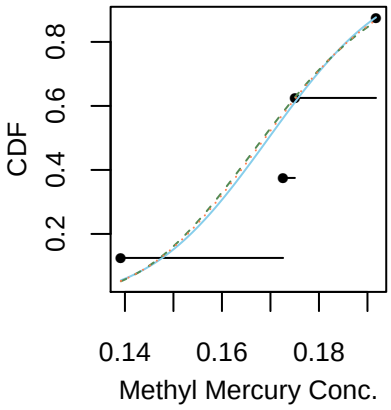
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

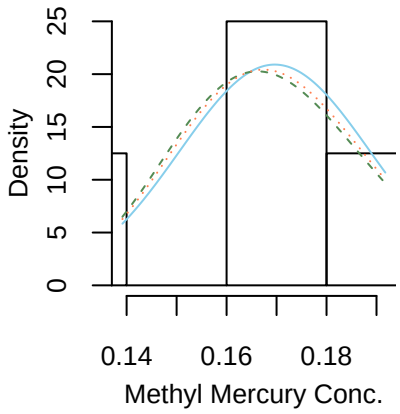


ECDF, Histogram & Q−Q (Detects Only)

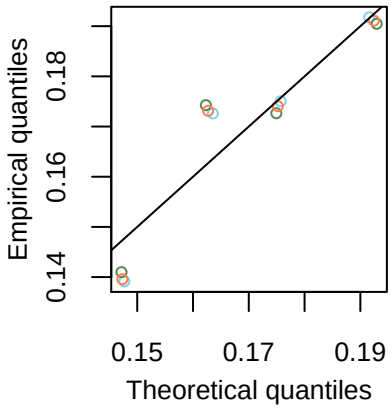
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 0.14 J	Arithmetic Mean = 0.17
N (detect) = 4	SD (log detect) = 0.14	Max (detect) = 0.19 J	Arithmetic SD = 0.022

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.52	N<5	–	–	–	–	−16.3197	−17.5471
Lognormal	0.41	N<5	–	–	–	–	−16.0147	−17.2421
Gamma	–	–	NA	NA	NA	NA	−16.1262	−17.3536

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in MBC−Methyl Mercury

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **526**

Media:
Blue Crab Muscle & Hepatopancreas

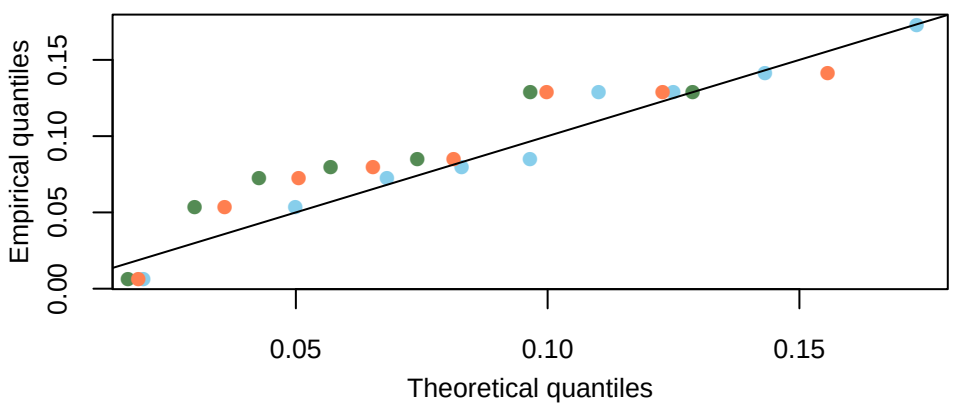
Exposure Unit:
MBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

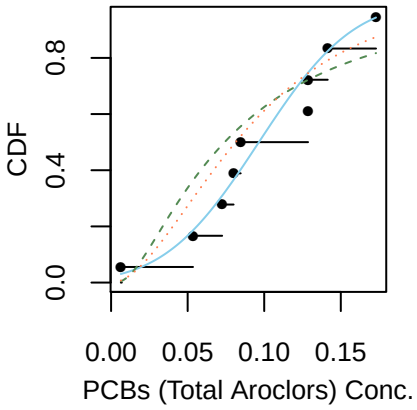
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

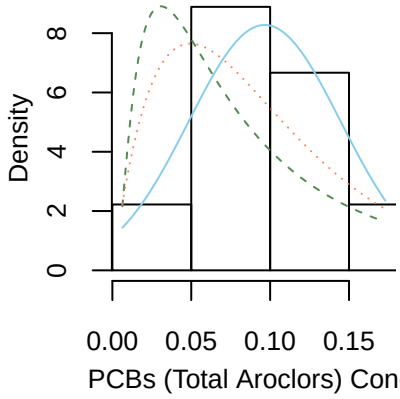


ECDF, Histogram & Q−Q (Detects Only)

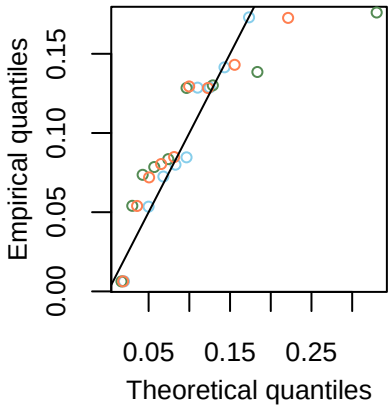
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 0.0064 J	Arithmetic Mean = 0.097
N (detect) = 9	SD (log detect) = 0.99	Max (detect) = 0.17	Arithmetic SD = 0.051

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.89	0.55	–	–	–	–	−25.0427	−24.6482
Lognormal	0.0042	0.06	–	–	–	–	−18.457	−18.0626
Gamma	–	–	0.218	0.282	0.6221	0.73	−22.2853	−21.8909

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in MBC−PCBs (Total Aroclo

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
BCC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in BCC−Antimony

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
BCC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 9	Arithmetic Mean = 11
N (detect) = 3	SD (log detect) = 0	Max (detect) = 14	Arithmetic SD = 2

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in BCC−Copper

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
BCC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 67%	Min (detect) = 10 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 18 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in BCC−Iron

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
BCC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 5 J	Arithmetic Mean = 10
N (detect) = 3	SD (log detect) = 0	Max (detect) = 13 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in BCC−Manganese

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
BCC
Chemical (mg/kg):
Mercury (Inorganic)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.0024 J	Arithmetic Mean = 0.038
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.093 J	Arithmetic SD = 0.049

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in BCC−Mercury (Inorganic)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
BCC
Chemical (mg/kg):
Selenium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.74	Arithmetic Mean = 0.82
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.91	Arithmetic SD = 0.085

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in BCC−Selenium

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
BCC
Chemical (mg/kg):
Methyl Mercury

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.18 J	Arithmetic Mean = 0.21
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.23 J	Arithmetic SD = 0.028

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

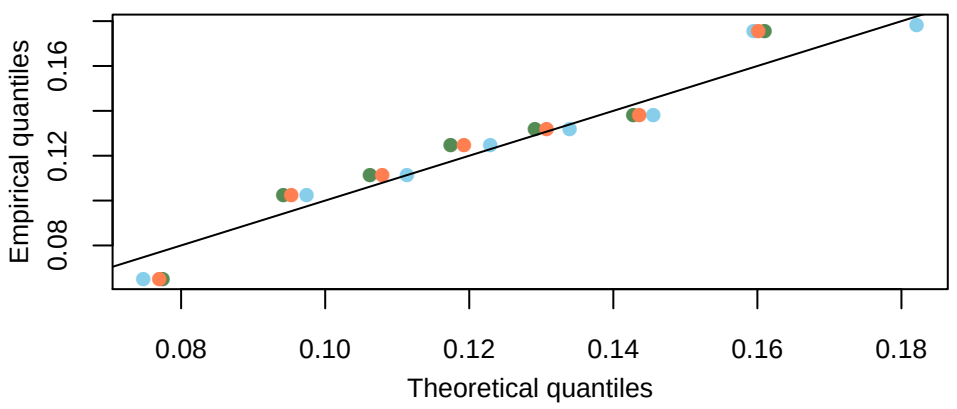
Distribution: Blue Crab Muscle & Hepatopancreas in BCC−Methyl Mercury

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
BCC
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

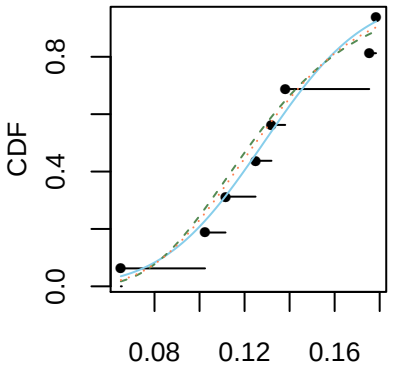
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

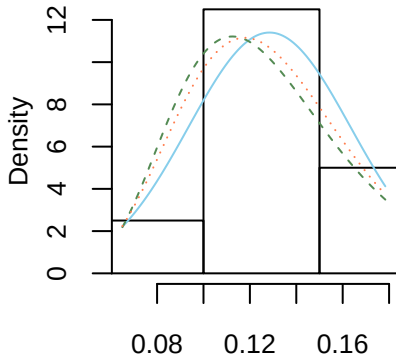


ECDF, Histogram & Q−Q (Detects Only)

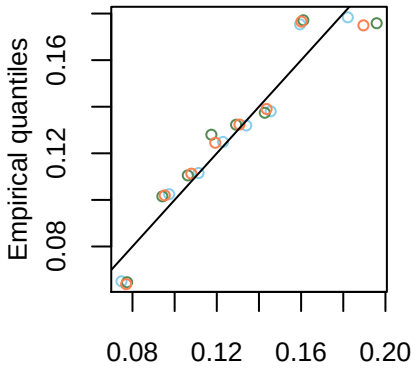
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 0.065	Arithmetic Mean = 0.13
N (detect) = 8	SD (log detect) = 0.32	Max (detect) = 0.18 J	Arithmetic SD = 0.037

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.76	0.87	–	–	–	–	−26.9399	−26.781
Lognormal	0.44	0.79	–	–	–	–	−25.9441	−25.7853
Gamma	–	–	0.1409	0.294	0.2725	0.715	−26.4675	−26.3086

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in BCC−PCBs (Total Aroclo

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
LBC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in LBC−Antimony

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
LBC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 14 J	Arithmetic Mean = 16
N (detect) = 3	SD (log detect) = 0	Max (detect) = 20	Arithmetic SD = 2

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in LBC−Copper

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
LBC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 67%	Min (detect) = 10 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 260 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in LBC−Iron

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
LBC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 5 J	Arithmetic Mean = 5
N (detect) = 3	SD (log detect) = 0	Max (detect) = 6 J	Arithmetic SD = 0.58

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in LBC−Manganese

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
LBC
Chemical (mg/kg):
Mercury (Inorganic)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 4	FOD = 75%	Min (detect) = 0.0092 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.022 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in LBC−Mercury (Inorganic)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
LBC
Chemical (mg/kg):
Selenium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.95	Arithmetic Mean = 1
N (detect) = 3	SD (log detect) = 0	Max (detect) = 1	Arithmetic SD = 0.3

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in LBC−Selenium

Media:
Blue Crab Muscle & Hepatopancreas

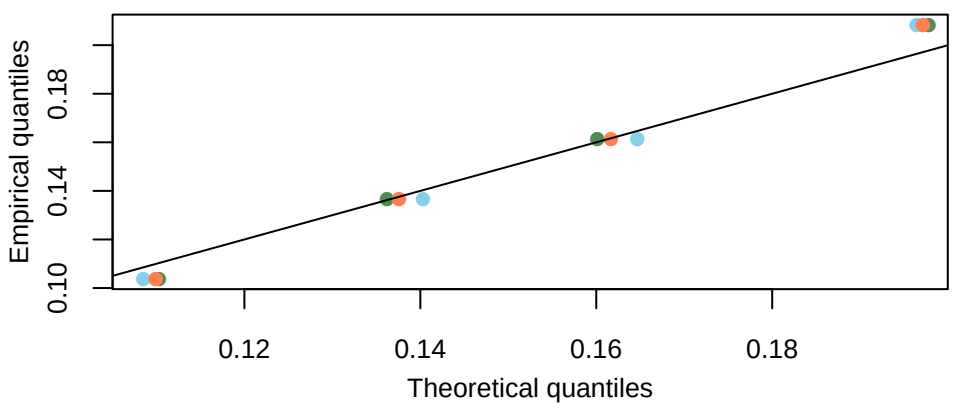
Exposure Unit:
LBC

Chemical (mg/kg):
Methyl Mercury

Legend

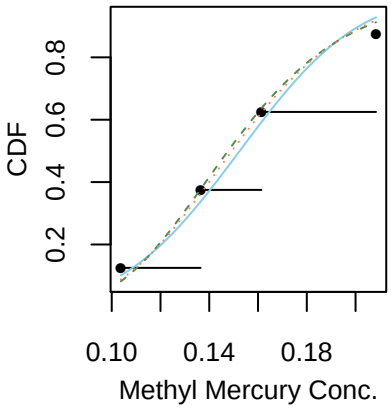
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

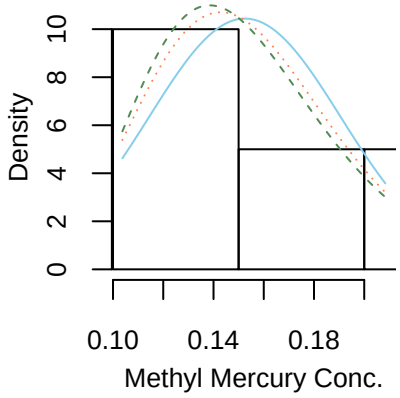


ECDF, Histogram & Q−Q (Detects Only)

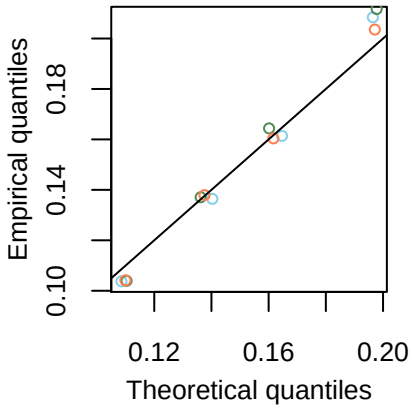
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 0.1 J	Arithmetic Mean = 0.15
N (detect) = 4	SD (log detect) = 0.29	Max (detect) = 0.21 J	Arithmetic SD = 0.044

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.96	N<5	–	–	–	–	−10.7658	−11.9933
Lognormal	1	N<5	–	–	–	–	−10.9201	−12.1475
Gamma	–	–	NA	NA	NA	NA	−10.9198	−12.1472

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

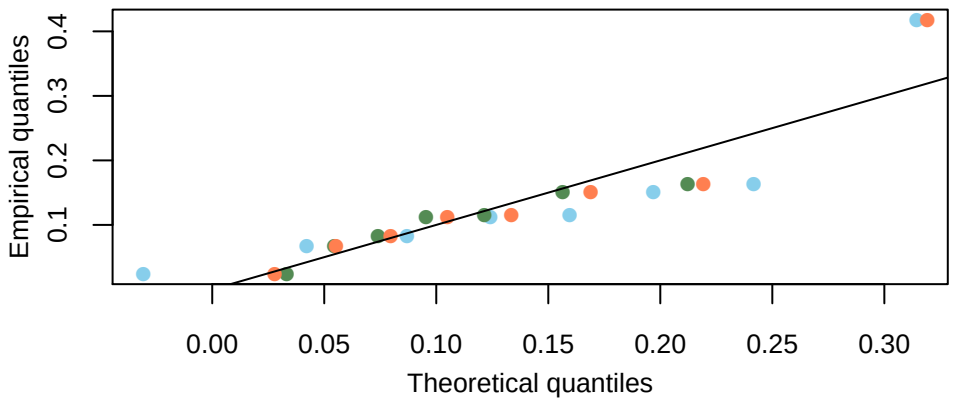
Distribution: Blue Crab Muscle & Hepatopancreas in LBC−Methyl Mercury

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
LBC
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

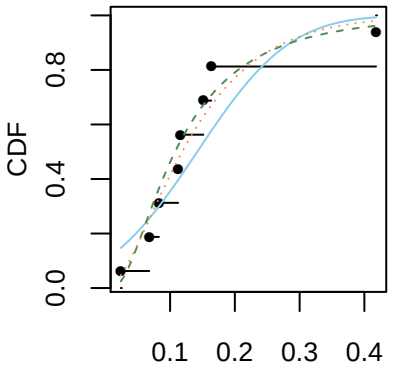
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

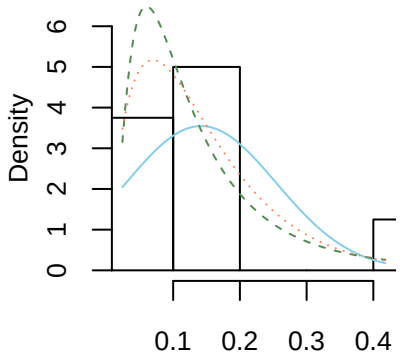


ECDF, Histogram & Q−Q (Detects Only)

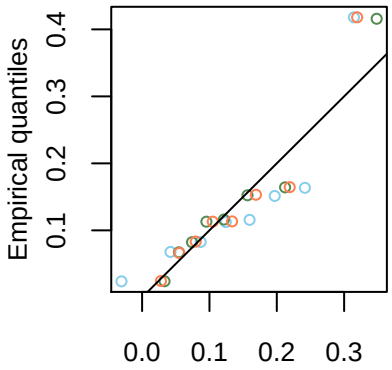
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 0.024 J	Arithmetic Mean = 0.14
N (detect) = 8	SD (log detect) = 0.82	Max (detect) = 0.42 J	Arithmetic SD = 0.12

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.017	0.029	–	–	–	–	−8.25362	−8.09473
Lognormal	0.78	0.63	–	–	–	–	−13.2372	−13.0783
Gamma	–	–	0.2048	0.301	0.3236	0.736	−12.9995	−12.8406

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

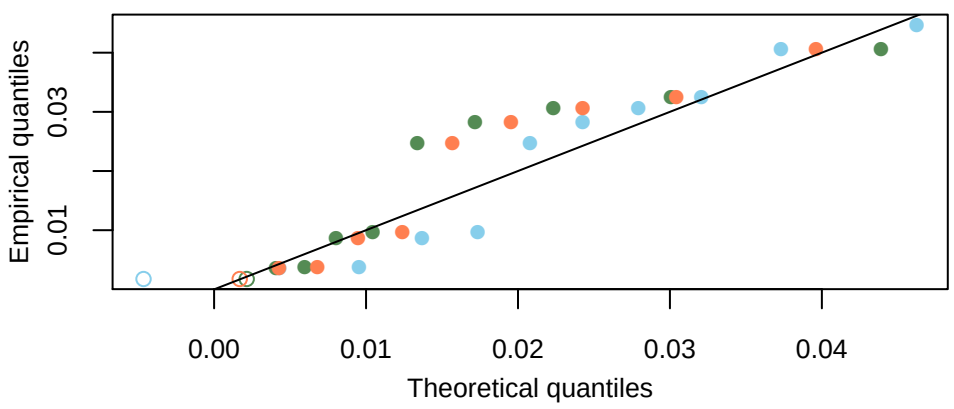
Distribution: Blue Crab Muscle & Hepatopancreas in LBC−PCBs (Total Aroclo

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Mercury (Inorganic)

Legend

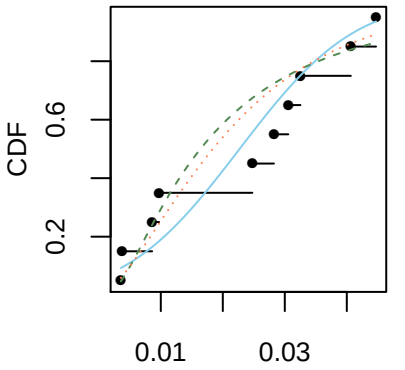
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

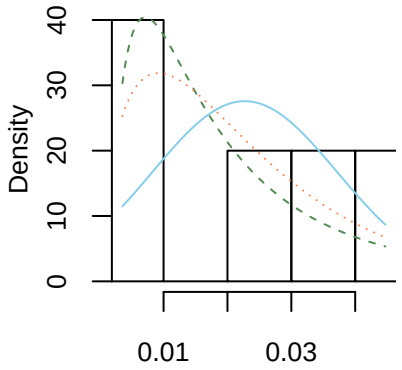


ECDF, Histogram & Q−Q (Detects Only)

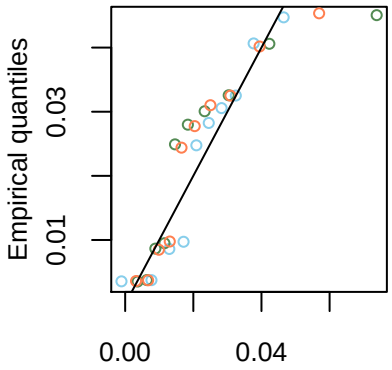
ECDF



Histogram



Q−Q



N = 11	FOD = 91%	Min (detect) = 0.0036 J	Kaplan Meier Mean = 0.021
N (detect) = 10	SD (log detect) = 0.96	Max (detect) = 0.045 J	Kaplan Meier SD = 0.015

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.17	0.18	–	–	–	–	−57.0997	−56.3039
Lognormal	0.098	0.05	–	–	–	–	−57.9321	−57.1363
Gamma	–	–	0.2359	0.274	0.5674	0.748	−59.5732	−58.7774

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.26	0.29	–	–	–	–	−52.3368	−51.7316
Lognormal	0.06	0.044	–	–	–	–	−51.6189	−51.0138
Gamma	–	–	0.2451	0.274	0.5969	0.748	−53.1	−52.4948

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

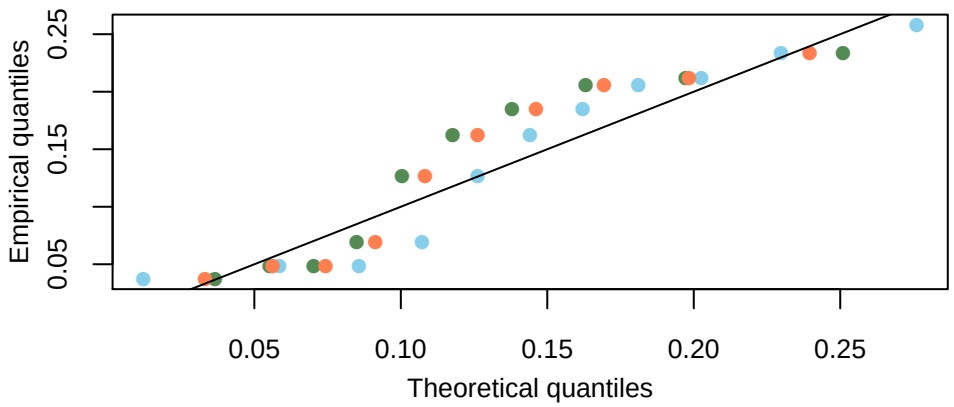
DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in Reference Sites−Mercury (Inorganic)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Methyl Mercury

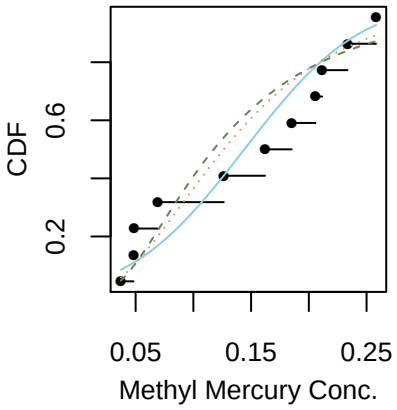
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

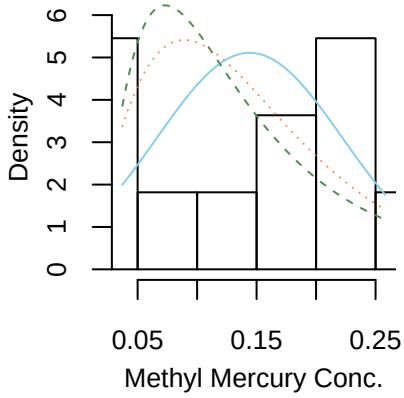


ECDF, Histogram & Q−Q (Detects Only)

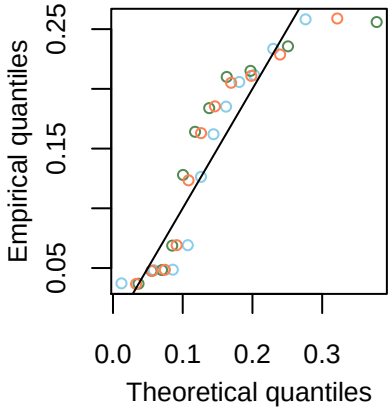
ECDF



Histogram



Q−Q



N = 11	FOD = 100%	Min (detect) = 0.037 J	Arithmetic Mean = 0.14
N (detect) = 11	SD (log detect) = 0.72	Max (detect) = 0.26 J	Arithmetic SD = 0.082

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.19	0.38	–	–	–	–	−20.8854	−20.0896
Lognormal	0.058	0.16	–	–	–	–	−20.0077	−19.2119
Gamma	–	–	0.2004	0.27	0.6507	0.736	−21.0606	−20.2648

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

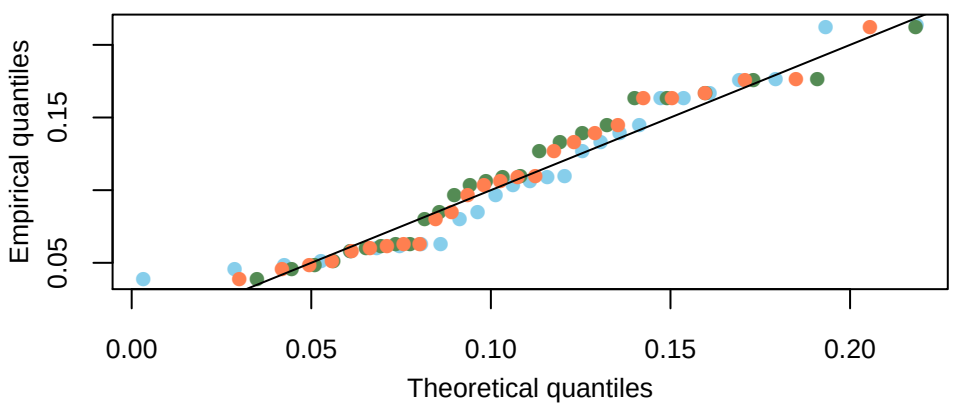
Distribution: Blue Crab Muscle & Hepatopancreas in Reference Sites−Methyl Mercury

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
Reference Sites
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

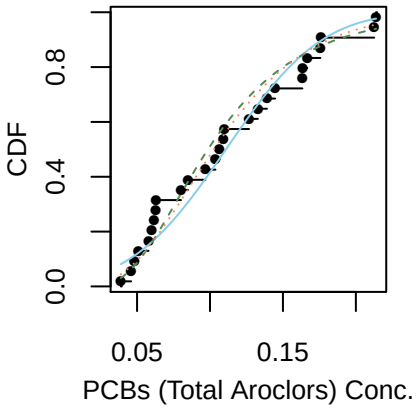
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

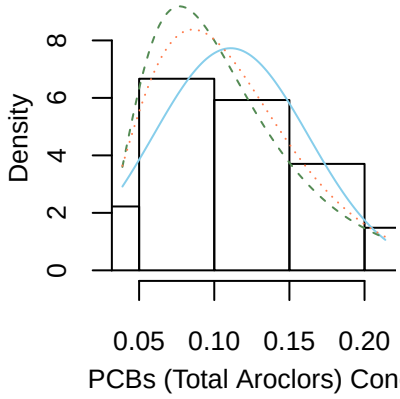


ECDF, Histogram & Q−Q (Detects Only)

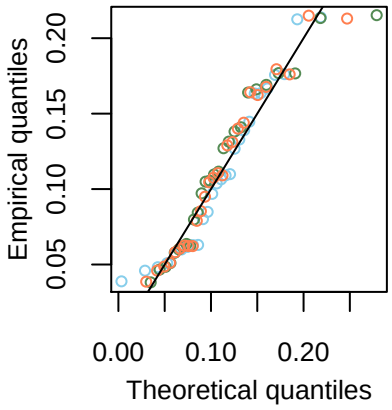
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 0.039 J	Arithmetic Mean = 0.11
N (detect) = 27	SD (log detect) = 0.51	Max (detect) = 0.21	Arithmetic SD = 0.053

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.089	0.11	–	–	–	–	−79.4252	−76.8336
Lognormal	0.17	0.16	–	–	–	–	−82.0444	−79.4528
Gamma	–	–	0.1544	0.177	0.4831	0.756	−82.4757	−79.884

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

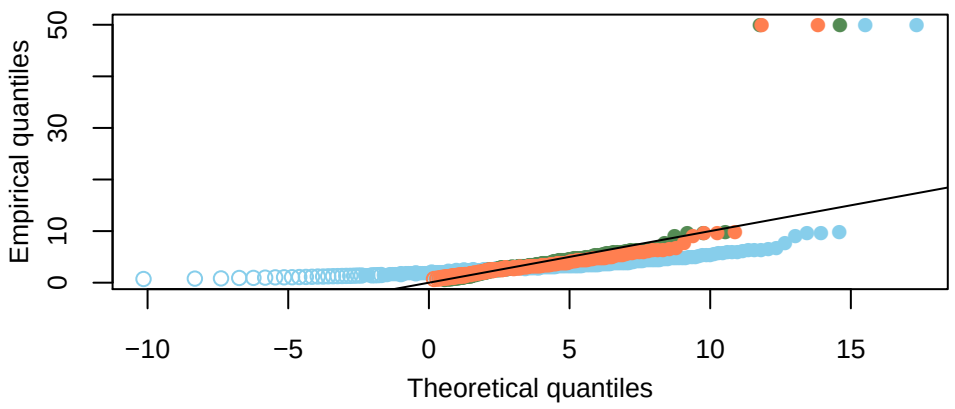
DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in Reference Sites−PCBs (Total Aroclors)

Media:
Surface Water Total
Exposure Unit:
UBC
Chemical (ug/l):
Arsenic

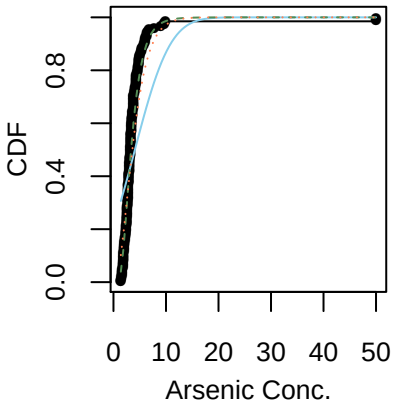
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

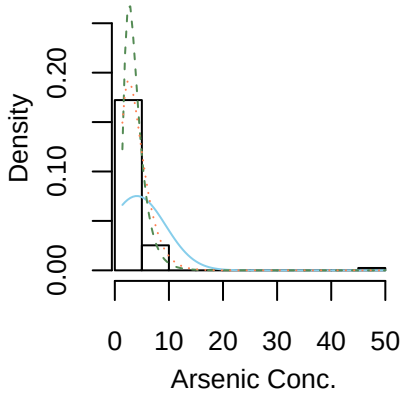


ECDF, Histogram & Q−Q (Detects Only)

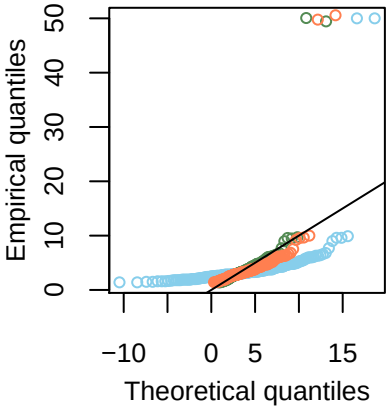
ECDF



Histogram



Q−Q



N = 205	FOD = 81%	Min (detect) = 1 J	Kaplan Meier Mean = 3
N (detect) = 166	SD (log detect) = 0.5	Max (detect) = 50 J	Kaplan Meier SD = 5

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.7e−44	–	–	–	–	1235.91	1242.56
Lognormal	0	0.005	–	–	–	–	792.51	799.156
Gamma	–	–	0.1468	0.064	6.85	0.766	874.273	880.92

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.1e−44	–	–	–	–	1029	1035.23
Lognormal	0	3.4e−05	–	–	–	–	644.022	650.246
Gamma	–	–	0.175	0.091	9.837	0.765	733.1	739.324

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Water Total in UBC−Arsenic

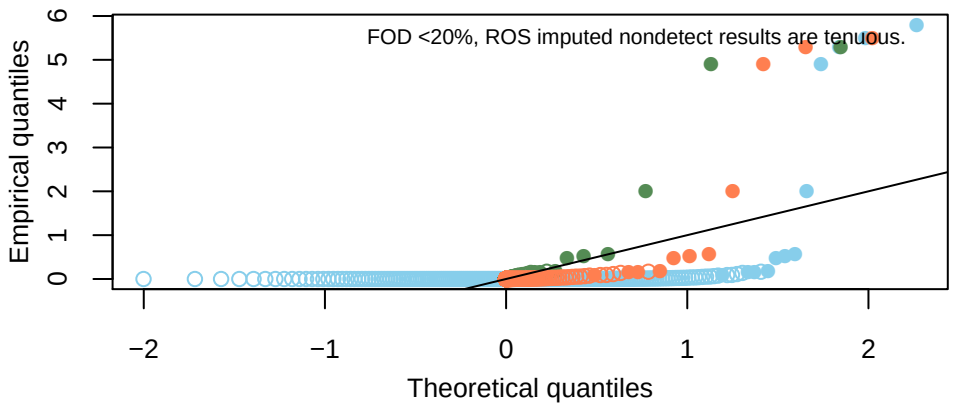
Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **547**

Media:
Surface Water Total
Exposure Unit:
UBC
Chemical (ug/l):
Thallium

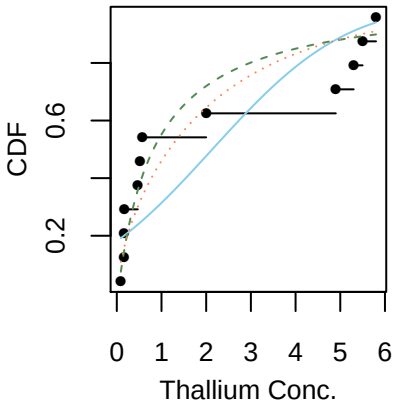
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

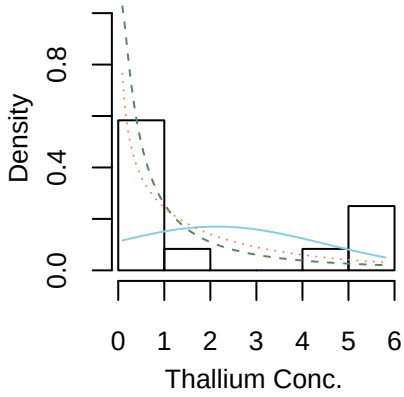


ECDF, Histogram & Q−Q (Detects Only)

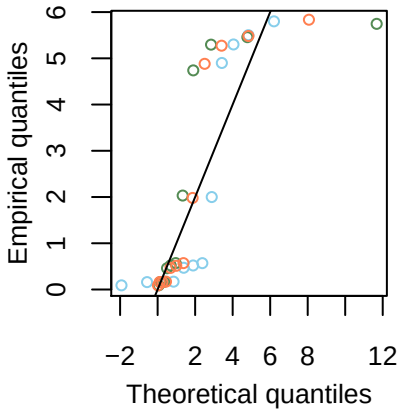
ECDF



Histogram



Q−Q



N = 205	FOD = 6%	Min (detect) = 0.09 J	Kaplan Meier Mean = 0.2
N (detect) = 12	SD (log detect) = 1.6	Max (detect) = 5 J	Kaplan Meier SD = 0.75

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5e−121	–	–	–	–	470.195	476.831
Lognormal	0.88	1	–	–	–	–	−2028.23	−2021.59
Gamma	–	–	0.234	0.07299	21.34	1.019	−1871.2	−1864.56

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0022	0.0012	–	–	–	–	58.5315	59.5013
Lognormal	0.058	0.2	–	–	–	–	43.5306	44.5005
Gamma	–	–	0.2464	0.281	0.8748	0.777	44.2925	45.2623

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Water Total in UBC−Thallium

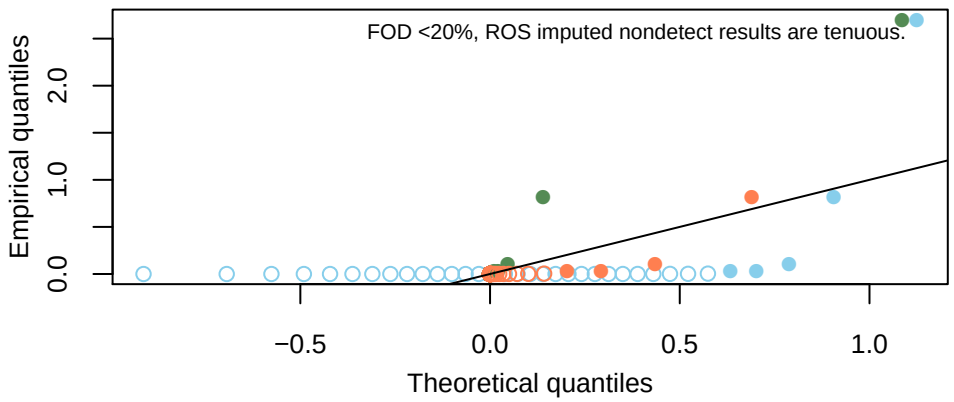
Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **548**

Media:
Surface Water Total
Exposure Unit:
UBC
Chemical (ug/l):
Benzo[a]pyrene

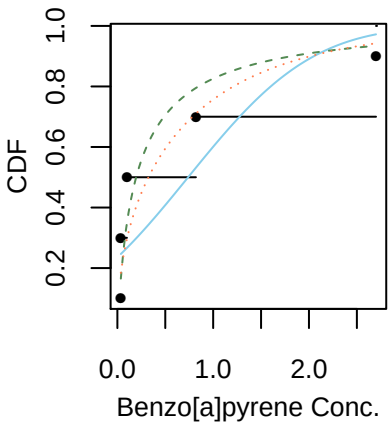
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

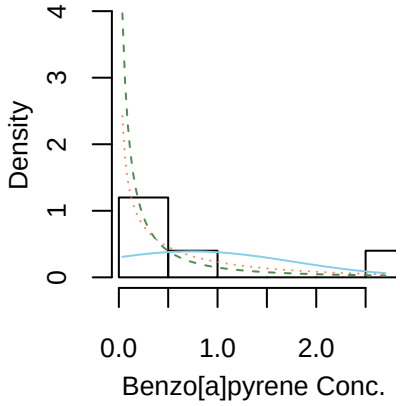


ECDF, Histogram & Q−Q (Detects Only)

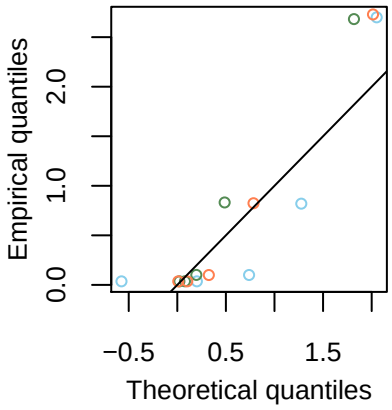
ECDF



Histogram



Q−Q



N = 35	FOD = 14%	Min (detect) = 0.036 J	Kaplan Meier Mean = 0.12
N (detect) = 5	SD (log detect) = 1.9	Max (detect) = 2	Kaplan Meier SD = 0.46

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.2e−22	–	–	–	–	49.7962	52.9069
Lognormal	0.67	0.89	–	–	–	–	−455.606	−452.496
Gamma	–	–	0.2957	0.1702	4.192	1.001	−427.019	−423.909

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.02	N<5	–	–	–	–	18.4322	17.6511
Lognormal	0.26	N<5	–	–	–	–	7.4111	6.62998
Gamma	–	–	NA	NA	NA	NA	8.51128	7.73016

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Water Total in UBC−Benzo[a]pyrene

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **549**

Media:
Surface Water Total
Exposure Unit:
UBC
Chemical (ug/l):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 35	FOD = 9%	Min (detect) = 0.013 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 3	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

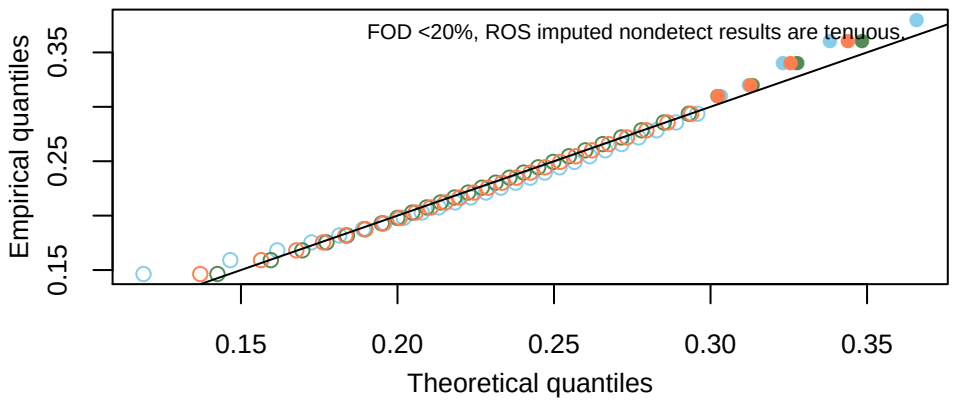
DRAFT

Distribution: Surface Water Total in UBC−Dibenz[a,h]anthracene

Media:
Surface Water Total
Exposure Unit:
UBC
Chemical (ug/l):
Vinyl Chloride

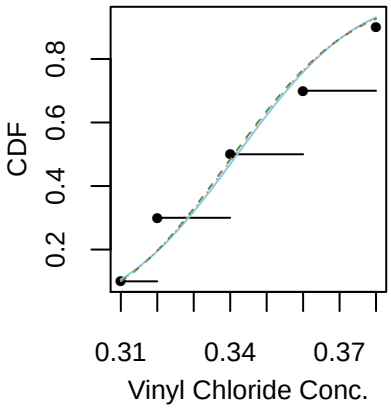
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

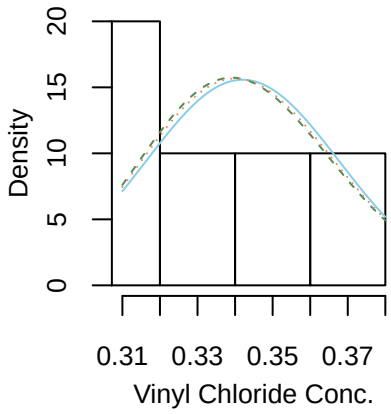


ECDF, Histogram & Q−Q (Detects Only)

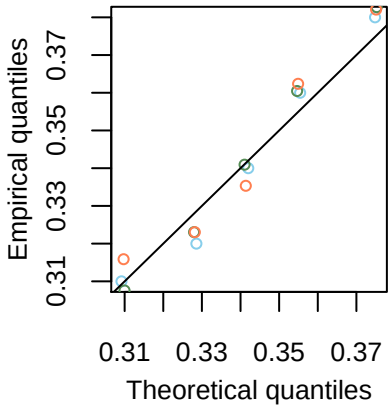
ECDF



Histogram



Q−Q



N = 35	FOD = 14%	Min (detect) = 0.31 J	Kaplan Meier Mean = 0.25
N (detect) = 5	SD (log detect) = 0.083	Max (detect) = 0.38 J	Kaplan Meier SD = 0.042

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.51	0.98	–	–	–	–	−84.8971	−82.0291
Lognormal	1	1	–	–	–	–	−87.35	−84.482
Gamma	–	–	0.04263	0.16	0.098	0.745	−86.9878	−84.1199

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.82	N<5	–	–	–	–	−18.4574	−19.2385
Lognormal	0.84	N<5	–	–	–	–	−18.5289	−19.31
Gamma	–	–	NA	NA	NA	NA	−18.5099	−19.291

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Water Total in UBC−Vinyl Chloride

Exhibit 2: EPC Program and Results
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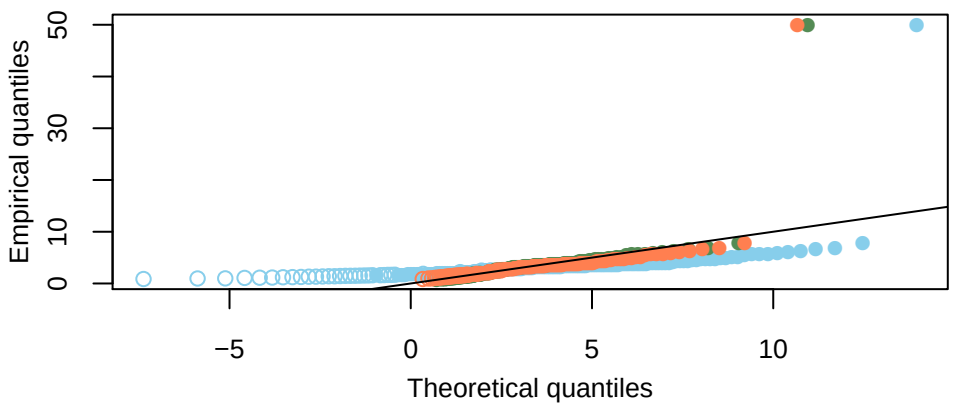
Berry's Creek Study Area Remedial Investigation

Figure **551**

Media:
Surface Water Total
Exposure Unit:
MBC
Chemical (ug/l):
Arsenic

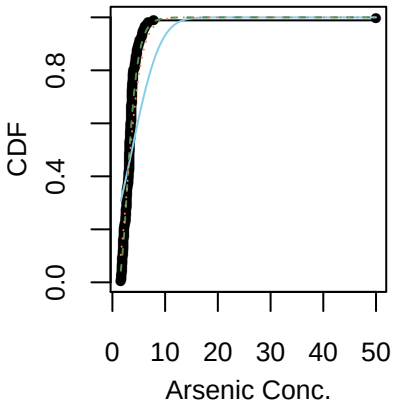
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

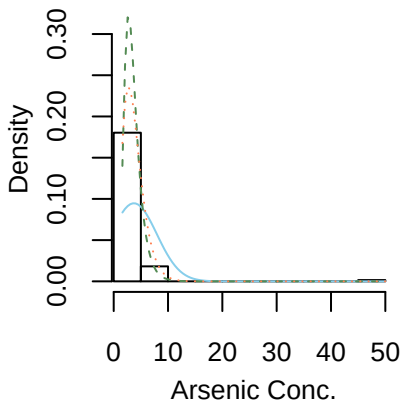


ECDF, Histogram & Q−Q (Detects Only)

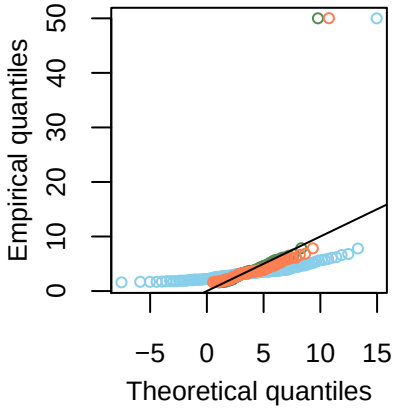
ECDF



Histogram



Q−Q



N = 163	FOD = 81%	Min (detect) = 1 J	Kaplan Meier Mean = 3
N (detect) = 132	SD (log detect) = 0.42	Max (detect) = 50 J	Kaplan Meier SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.6e−33	–	–	–	–	909.619	915.807
Lognormal	0	0.016	–	–	–	–	574.255	580.442
Gamma	–	–	0.1388	0.091	Inf	0.765	632.554	638.742

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.9e−35	–	–	–	–	758.14	763.906
Lognormal	0	0.00015	–	–	–	–	456.165	461.931
Gamma	–	–	0.1835	0.091	Inf	0.765	523.965	529.73

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

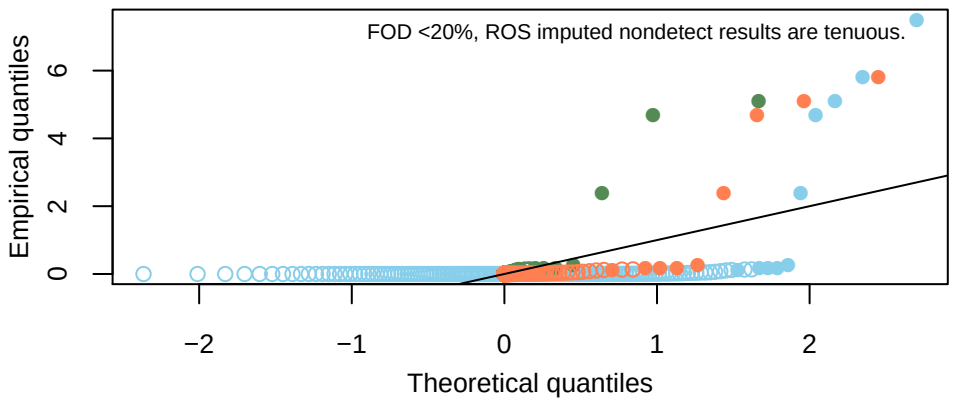
DRAFT

Distribution: Surface Water Total in MBC−Arsenic

Media:
Surface Water Total
Exposure Unit:
MBC
Chemical (ug/l):
Thallium

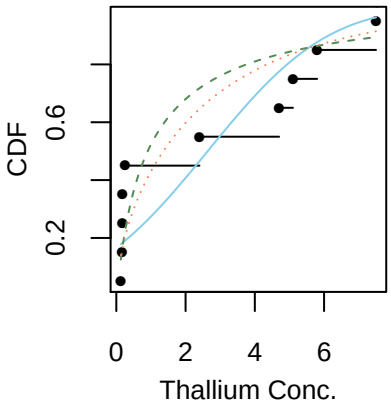
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

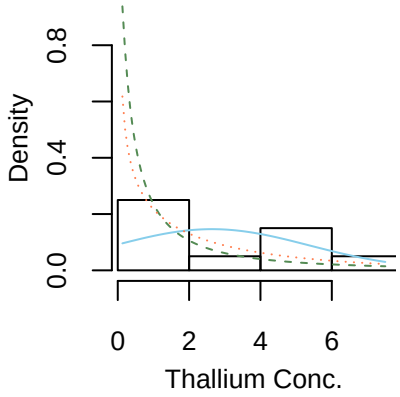


ECDF, Histogram & Q−Q (Detects Only)

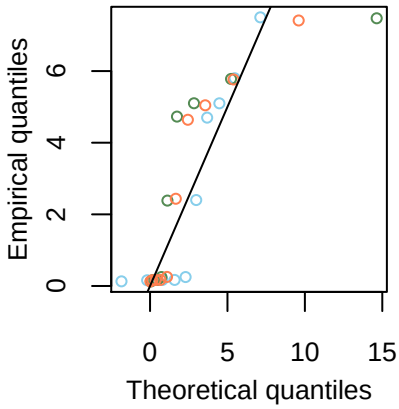
ECDF



Histogram



Q−Q



N = 163	FOD = 6%	Min (detect) = 0.13 J	Kaplan Meier Mean = 0.24
N (detect) = 10	SD (log detect) = 1.8	Max (detect) = 7 J	Kaplan Meier SD = 0.91

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.4e−101	–	–	–	–	441.009	447.196
Lognormal	0.83	1	–	–	–	–	−1681.59	−1675.4
Gamma	–	–	0.2415	0.1027	17.7	1.015	−1553.74	−1547.55

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.022	0.013	–	–	–	–	52.437	53.0422
Lognormal	0.0093	0.045	–	–	–	–	40.9284	41.5335
Gamma	–	–	0.2962	0.281	0.9923	0.777	40.9453	41.5505

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Water Total in MBC−Thallium

Exhibit 2: EPC Program and Results
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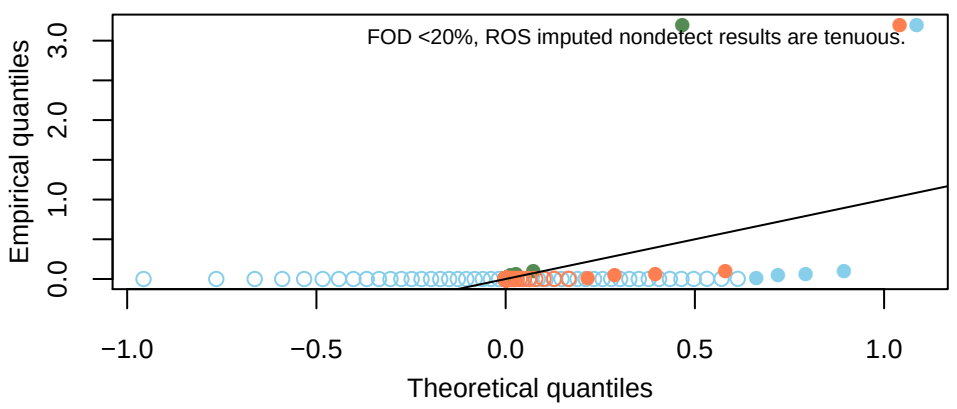
Figure **553**

Media:
Surface Water Total
Exposure Unit:
MBC
Chemical (ug/l):
Benzo[a]pyrene

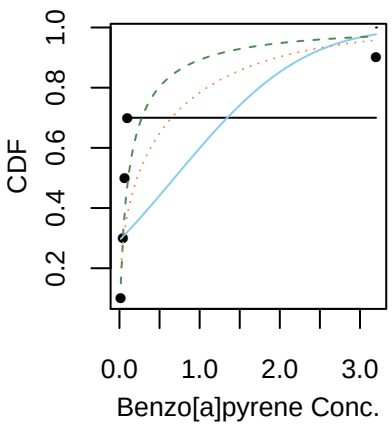
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

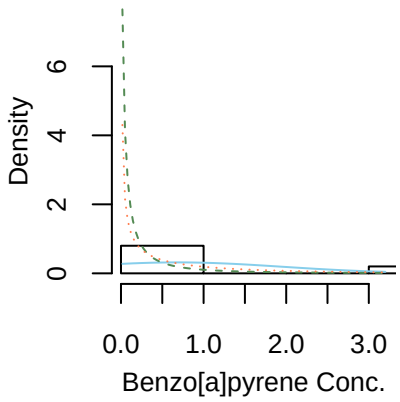


ECDF, Histogram & Q−Q (Detects Only)

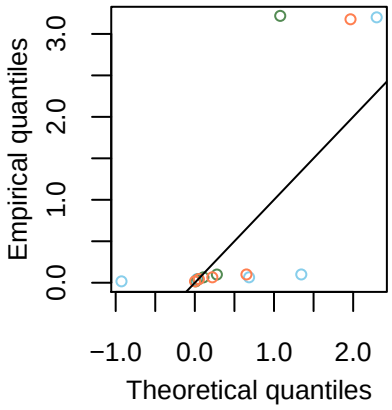
ECDF



Histogram



Q−Q



N = 53	FOD = 9%	Min (detect) = 0.017 J	Kaplan Meier Mean = 0.075
N (detect) = 5	SD (log detect) = 2	Max (detect) = 3	Kaplan Meier SD = 0.43

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.4e−33	–	–	–	–	66.1959	70.1365
Lognormal	0.57	0.86	–	–	–	–	−815.899	−811.958
Gamma	–	–	0.3183	0.1437	7.642	1.008	−761.053	−757.112

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00027	N<5	–	–	–	–	20.4826	19.7015
Lognormal	0.19	N<5	–	–	–	–	1.83456	1.05344
Gamma	–	–	NA	NA	NA	NA	4.77898	3.99785

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Water Total in MBC−Benzo[a]pyrene

Exhibit 2: EPC Program and Results
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Berry's Creek Study Area Remedial Investigation

Figure **554**

Media:
Surface Water Total
Exposure Unit:
MBC
Chemical (ug/l):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 53	FOD = 6%	Min (detect) = 0.15 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 4	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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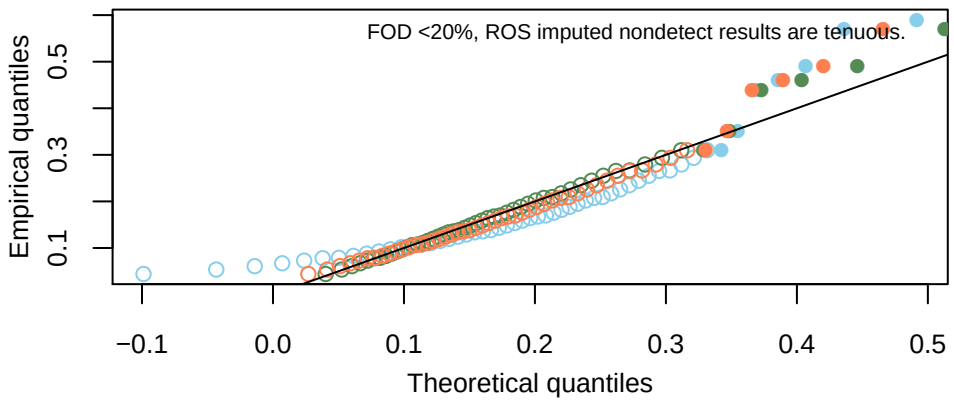
Distribution: Surface Water Total in MBC−Dibenz[a,h]anthracene

Media:
Surface Water Total
Exposure Unit:
MBC
Chemical (ug/l):
Vinyl Chloride

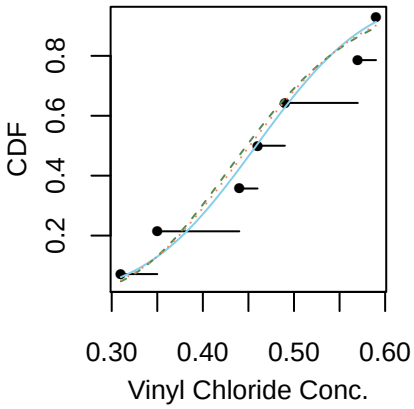
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

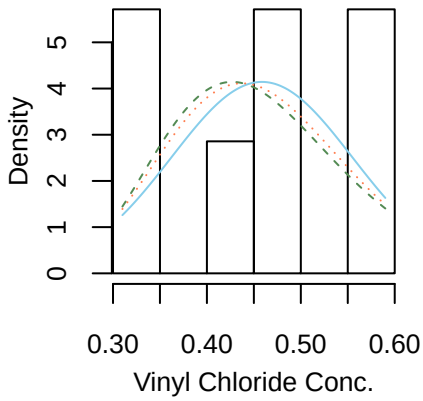


ECDF, Histogram & Q−Q (Detects Only)

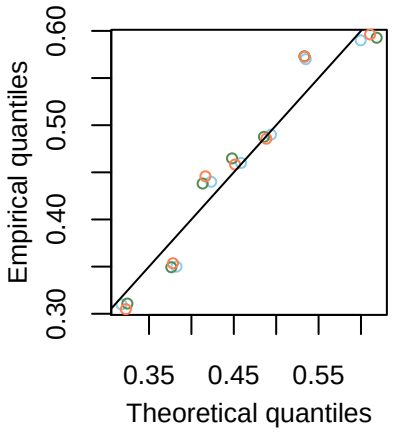
ECDF



Histogram



Q−Q



N = 53	FOD = 13%	Min (detect) = 0.31 J	Kaplan Meier Mean = 0.26
N (detect) = 7	SD (log detect) = 0.24	Max (detect) = 0.59 J	Kaplan Meier SD = 0.085

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.013	–	–	–	–	−65.4024	−61.4618
Lognormal	0.97	1	–	–	–	–	−91.7058	−87.7652
Gamma	–	–	0.06441	0.127	0.4218	0.763	−88.2124	−84.2719

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.72	0.93	–	–	–	–	−8.90213	−9.01031
Lognormal	0.61	0.67	–	–	–	–	−8.56366	−8.67184
Gamma	–	–	NA	NA	NA	NA	−8.74212	−8.8503

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Water Total in MBC−Vinyl Chloride

Exhibit 2: EPC Program and Results
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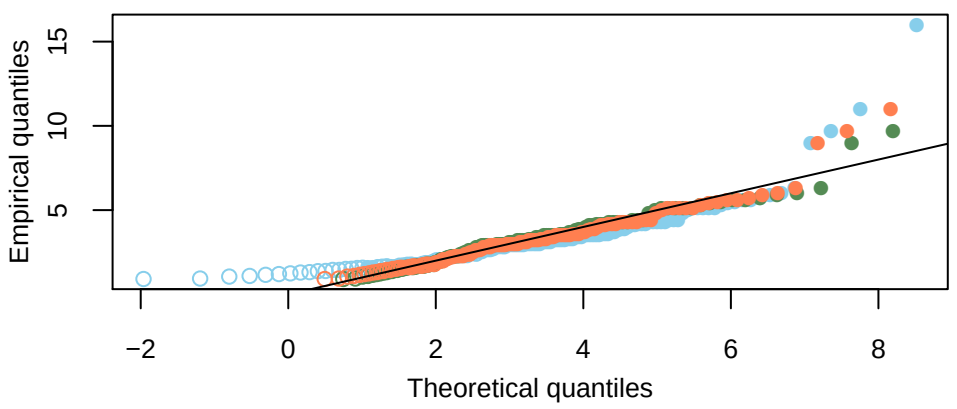
Berry's Creek Study Area Remedial Investigation

Figure **556**

Media:
Surface Water Total
Exposure Unit:
BCC
Chemical (ug/l):
Arsenic

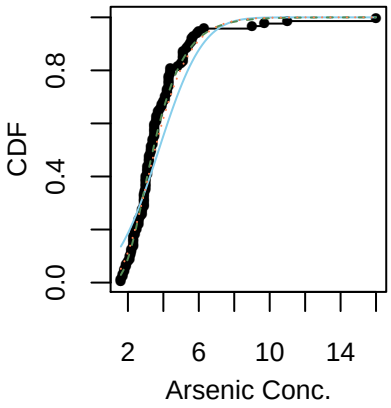
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

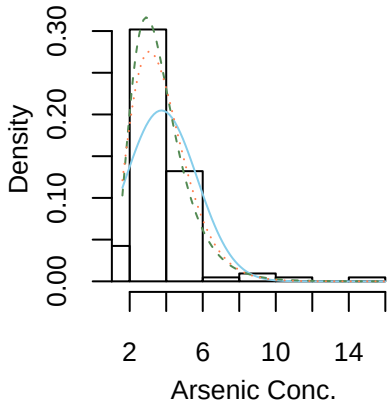


ECDF, Histogram & Q−Q (Detects Only)

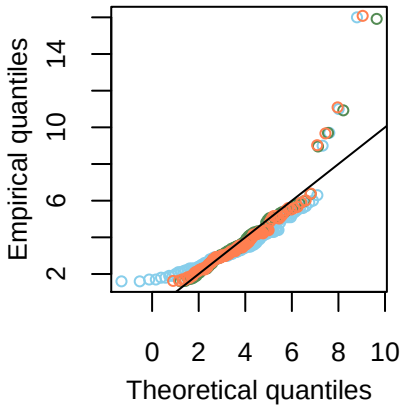
ECDF



Histogram



Q−Q



N = 134	FOD = 79%	Min (detect) = 1 J	Kaplan Meier Mean = 3
N (detect) = 106	SD (log detect) = 0.4	Max (detect) = 16	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.3e−07	–	–	–	–	564.502	570.298
Lognormal	0.12	0.05	–	–	–	–	483.263	489.059
Gamma	–	–	0.07011	0.091	0.9065	0.765	495.088	500.884

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6e−09	–	–	–	–	446.135	451.462
Lognormal	0.002	0.088	–	–	–	–	370.845	376.172
Gamma	–	–	0.1122	0.09	1.85	0.754	387.095	392.422

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

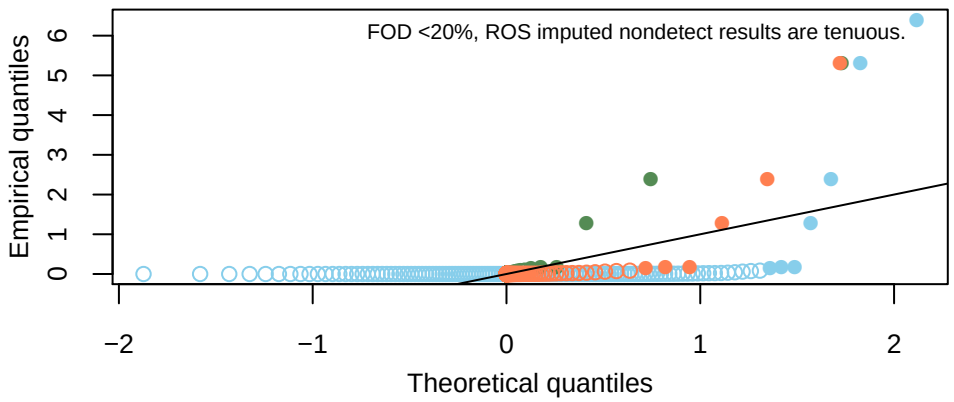
DRAFT

Distribution: Surface Water Total in BCC−Arsenic

Media:
Surface Water Total
Exposure Unit:
BCC
Chemical (ug/l):
Thallium

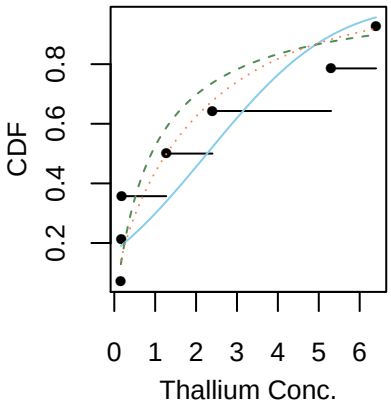
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

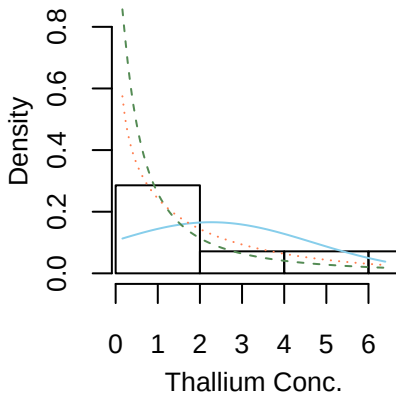


ECDF, Histogram & Q−Q (Detects Only)

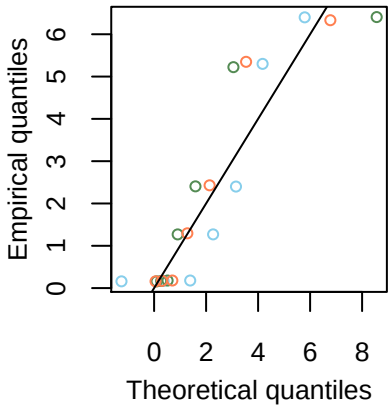
ECDF



Histogram



Q−Q



N = 134	FOD = 5%	Min (detect) = 0.16 J	Kaplan Meier Mean = 0.19
N (detect) = 7	SD (log detect) = 1.7	Max (detect) = 6 J	Kaplan Meier SD = 0.74

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	8e−85	–	–	–	–	305.657	311.453
Lognormal	0.98	1	–	–	–	–	−1647.56	−1641.77
Gamma	–	–	0.2518	0.1027	15.45	1.015	−1536.45	−1530.65

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.062	0.38	–	–	–	–	36.1503	36.0421
Lognormal	0.092	0.15	–	–	–	–	28.4729	28.3647
Gamma	–	–	NA	NA	NA	NA	28.5532	28.445

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Water Total in BCC−Thallium

Exhibit 2: EPC Program and Results
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Berry's Creek Study Area Remedial Investigation

Figure **558**

Media:
Surface Water Total
Exposure Unit:
BCC
Chemical (ug/l):
Benzo[a]pyrene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 23	FOD = 13%	Min (detect) = 0.012 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.086 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Water Total in BCC−Benzo[a]pyrene

Media:
Surface Water Total
Exposure Unit:
BCC
Chemical (ug/l):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 23	FOD = 4%	Min (detect) = 0.22 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.22 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Water Total in BCC−Dibenz[a,h]anthracene

Media:
Surface Water Total
Exposure Unit:
BCC
Chemical (ug/l):
Vinyl Chloride

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 23	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

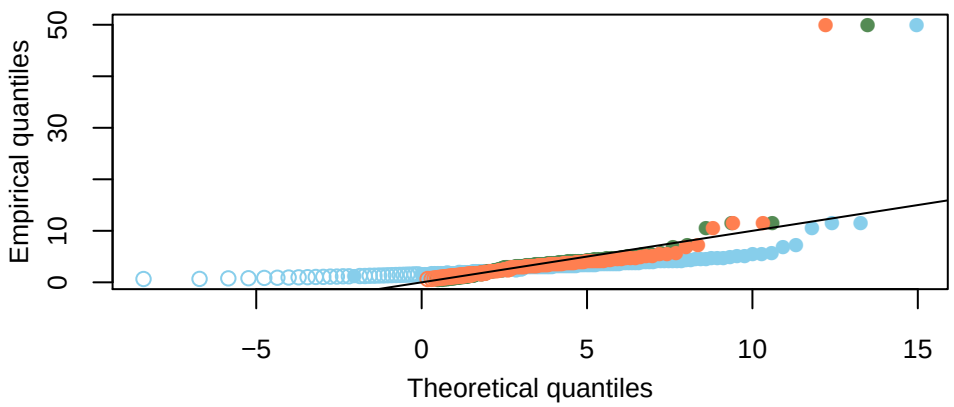
DRAFT

Distribution: Surface Water Total in BCC−Vinyl Chloride

Media:
Surface Water Total
Exposure Unit:
LBC
Chemical (ug/l):
Arsenic

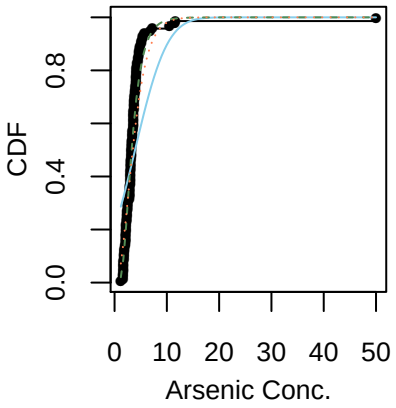
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

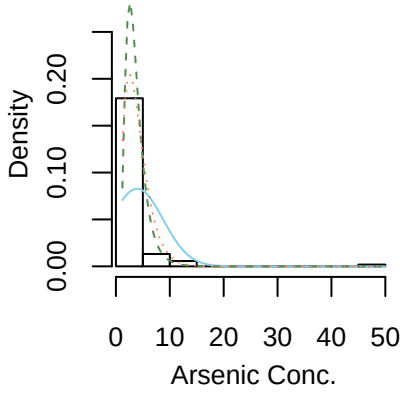


ECDF, Histogram & Q−Q (Detects Only)

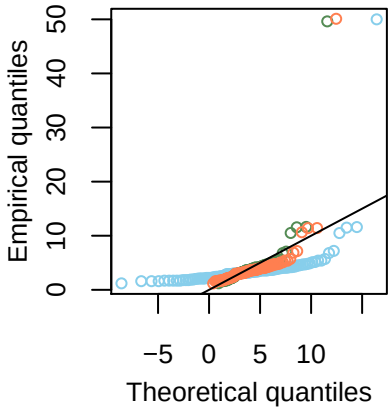
ECDF



Histogram



Q−Q



N = 140	FOD = 76%	Min (detect) = 1 J	Kaplan Meier Mean = 3
N (detect) = 106	SD (log detect) = 0.49	Max (detect) = 50 J	Kaplan Meier SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2e−30	–	–	–	–	812.658	818.542
Lognormal	7e−05	0.0063	–	–	–	–	530.139	536.022
Gamma	–	–	0.132	0.091	3.424	0.765	576.037	581.92

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.6e−29	–	–	–	–	638.114	643.441
Lognormal	0	0.0012	–	–	–	–	403.391	408.718
Gamma	–	–	0.1911	0.091	6.144	0.765	455.883	461.21

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Water Total in LBC−Arsenic

Exhibit 2: EPC Program and Results
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Figure **562**

Media:
Surface Water Total
Exposure Unit:
LBC
Chemical (ug/l):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 140	FOD = 1%	Min (detect) = 5 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 5 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

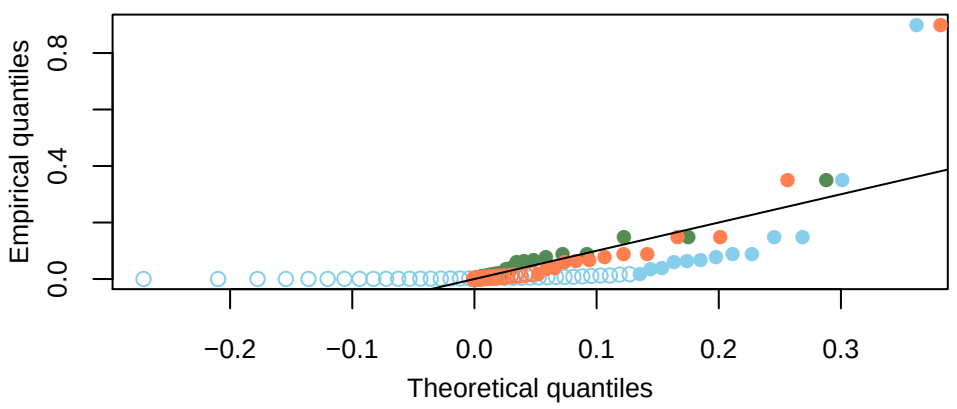
DRAFT

Distribution: Surface Water Total in LBC−Thallium

Media:
Surface Water Total
Exposure Unit:
LBC
Chemical (ug/l):
Benzo[a]pyrene

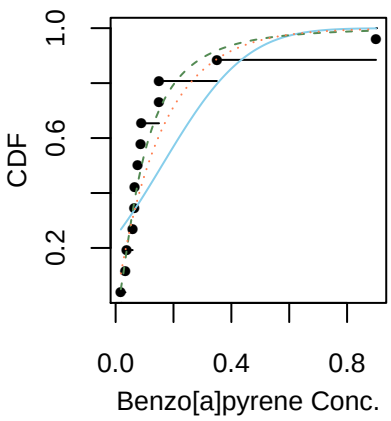
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

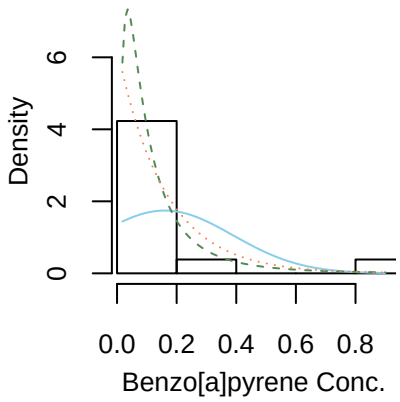


ECDF, Histogram & Q−Q (Detects Only)

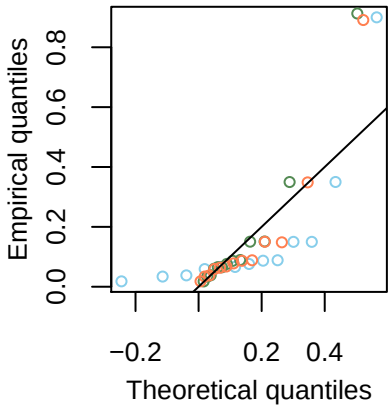
ECDF



Histogram



Q−Q



N = 49	FOD = 27%	Min (detect) = 0.018 J	Kaplan Meier Mean = 0.051
N (detect) = 13	SD (log detect) = 1	Max (detect) = 0.9	Kaplan Meier SD = 0.13

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.8e−19	–	–	–	–	−52.1041	−48.3204
Lognormal	0.8	0.8	–	–	–	–	−291.643	−287.859
Gamma	–	–	0.199	0.1466	2.517	0.9114	−270.053	−266.269

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	4e−05	4.6e−05	–	–	–	–	2.54177	3.67167
Lognormal	0.47	0.18	–	–	–	–	−22.4513	−21.3214
Gamma	–	–	0.2671	0.281	0.9451	0.777	−17.6285	−16.4986

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Water Total in LBC−Benzo[a]pyrene

Exhibit 2: EPC Program and Results
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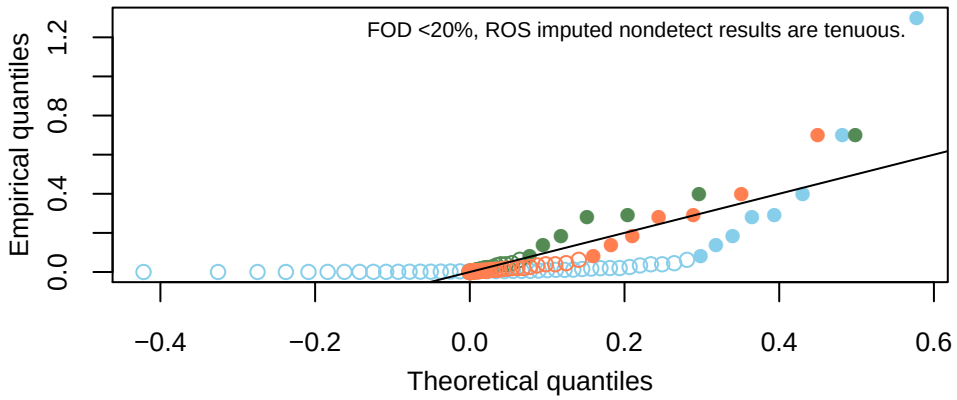
Figure
564

Media:
Surface Water Total
Exposure Unit:
LBC
Chemical (ug/l):
Dibenz[a,h]anthracene

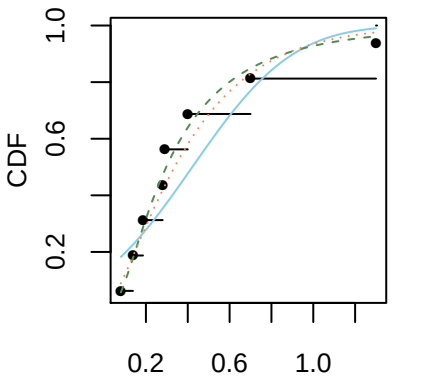
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

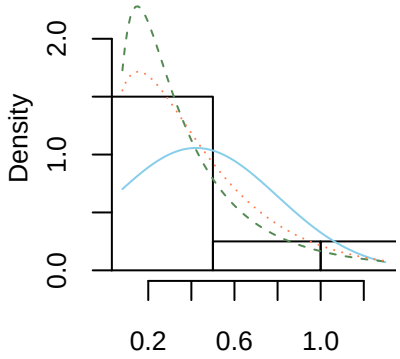


ECDF, Histogram & Q−Q (Detects Only)

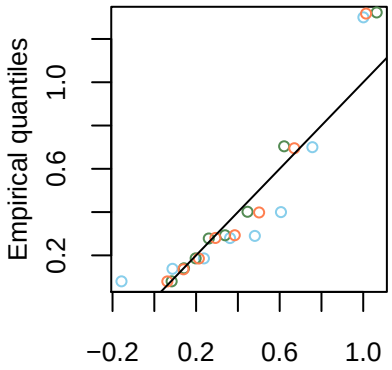
ECDF



Histogram



Q−Q



N = 49	FOD = 16%	Min (detect) = 0.08 J	Kaplan Meier Mean = 0.079
N (detect) = 8	SD (log detect) = 0.89	Max (detect) = 1	Kaplan Meier SD = 0.21

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.7e−19	–	–	–	–	−7.31601	−3.53237
Lognormal	0.85	0.94	–	–	–	–	−250.63	−246.846
Gamma	–	–	0.2082	0.1466	2.866	0.9114	−228.269	−224.485

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.028	0.085	–	–	–	–	11.1126	11.2715
Lognormal	0.99	0.93	–	–	–	–	4.33617	4.49505
Gamma	–	–	0.1912	0.301	0.273	0.736	5.31509	5.47398

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Water Total in LBC−Dibenz[a,h]anthracene

Exhibit 2: EPC Program and Results
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Figure **565**

Media:
Surface Water Total
Exposure Unit:
LBC
Chemical (ug/l):
Vinyl Chloride

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 49	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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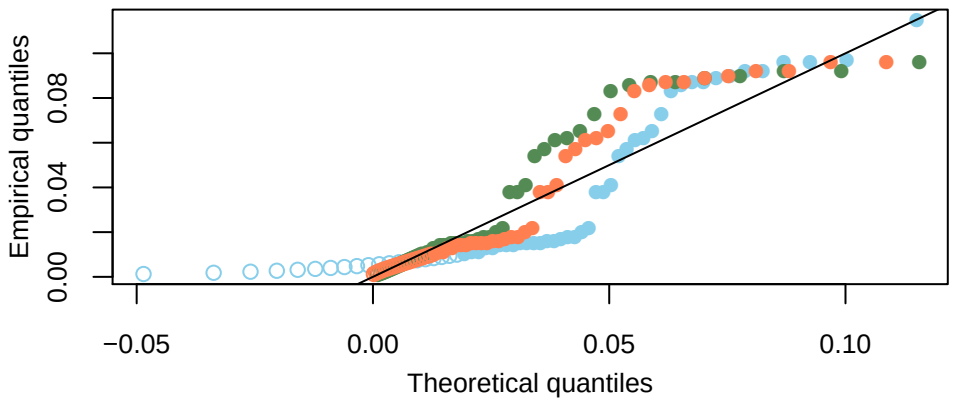
Distribution: Surface Water Total in LBC−Vinyl Chloride

Media:
Ambient Air
Exposure Unit:
UBC
Chemical (ug/m3):
Mercury Average

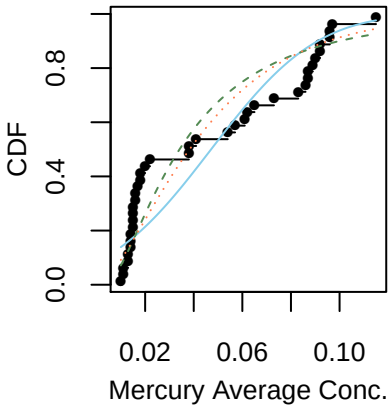
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

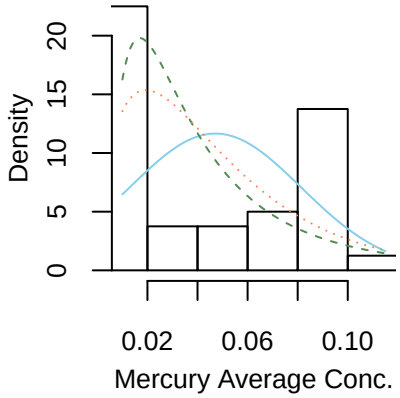


ECDF, Histogram & Q−Q (Detects Only)

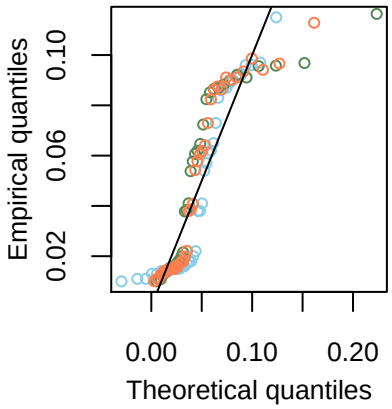
ECDF



Histogram



Q−Q



N = 60	FOD = 67%	Min (detect) = 0.01	Kaplan Meier Mean = 0.035
N (detect) = 40	SD (log detect) = 0.85	Max (detect) = 0.11	Kaplan Meier SD = 0.033

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−13	–	–	–	–	−230.862	−226.673
Lognormal	0.0075	0.027	–	–	–	–	−288.025	−283.836
Gamma	–	–	0.186	0.121	2.144	0.816	−284.561	−280.372

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	4e−05	3.3e−06	–	–	–	–	−152.458	−149.08
Lognormal	9e−05	0.00034	–	–	–	–	−166.773	−163.395
Gamma	–	–	0.2156	0.144	2.511	0.779	−166.123	−162.745

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Ambient Air in UBC−Mercury Average

Exhibit 2: EPC Program and Results
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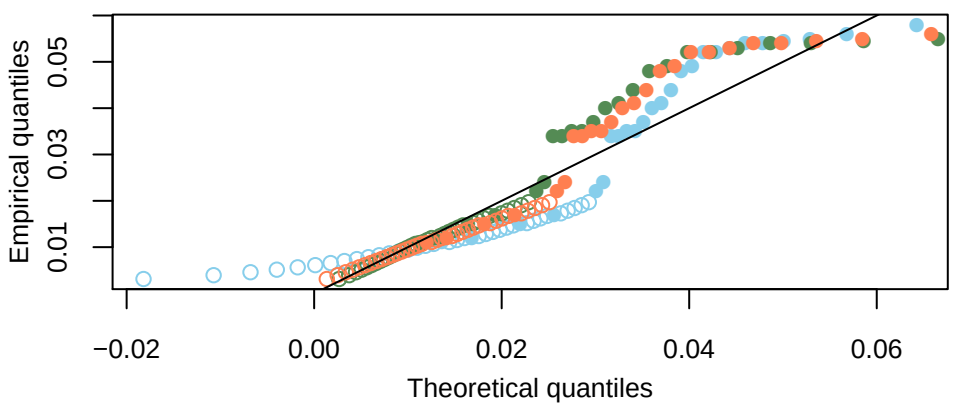
Berry's Creek Study Area Remedial Investigation

Figure **567**

Media:
Ambient Air
Exposure Unit:
MBC
Chemical (ug/m3):
Mercury Average

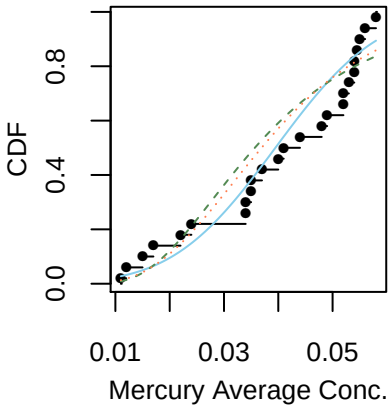
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

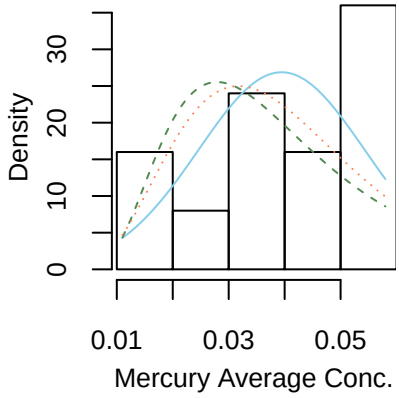


ECDF, Histogram & Q−Q (Detects Only)

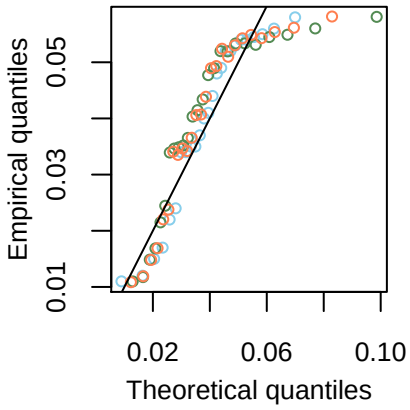
ECDF



Histogram



Q−Q



N = 60	FOD = 42%	Min (detect) = 0.011	Kaplan Meier Mean = 0.022
N (detect) = 25	SD (log detect) = 0.51	Max (detect) = 0.058	Kaplan Meier SD = 0.017

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.7e−08	–	–	–	–	−313.086	−308.897
Lognormal	0.015	0.025	–	–	–	–	−342.806	−338.617
Gamma	–	–	0.1339	0.118	1.669	0.779	−340.128	−335.94

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.015	0.12	–	–	–	–	−135.559	−133.122
Lognormal	0.00067	0.0026	–	–	–	–	−126.885	−124.447
Gamma	–	–	0.189	0.175	1.35	0.747	−130.903	−128.466

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Ambient Air in MBC−Mercury Average

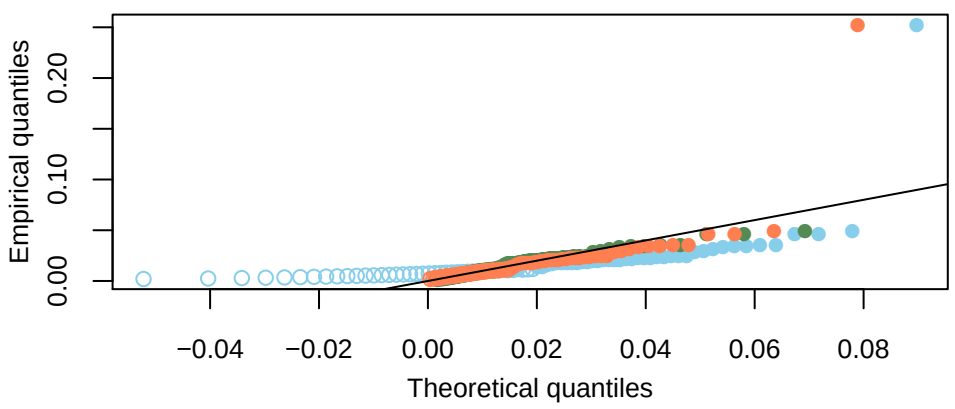
Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **568**

Media:
Ambient Air
Exposure Unit:
BCC
Chemical (ug/m3):
Mercury Average

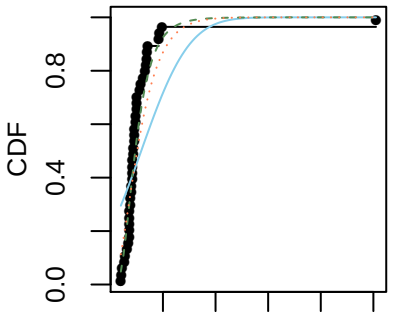
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

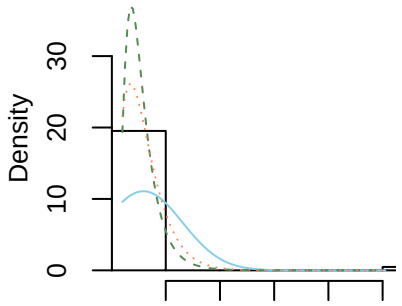


ECDF, Histogram & Q−Q (Detects Only)

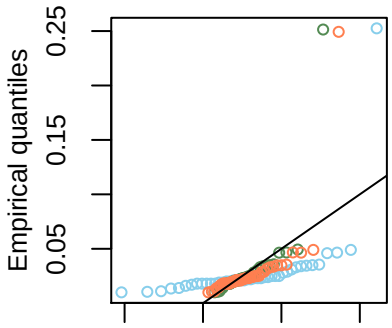
ECDF



Histogram



Q−Q



N = 80	FOD = 52%	Min (detect) = 0.01	Kaplan Meier Mean = 0.02
N (detect) = 42	SD (log detect) = 0.53	Max (detect) = 0.25	Kaplan Meier SD = 0.028

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.9e−17	–	–	–	–	−338.633	−333.869
Lognormal	0.086	0.046	–	–	–	–	−499.86	−495.096
Gamma	–	–	0.1128	0.103	1.46	0.782	−477.855	−473.091

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.4e−13	–	–	–	–	−156.048	−152.572
Lognormal	2e−05	0.0028	–	–	–	–	−246.256	−242.78
Gamma	–	–	0.2267	0.141	3.514	0.759	−223.662	−220.187

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Ambient Air in BCC−Mercury Average

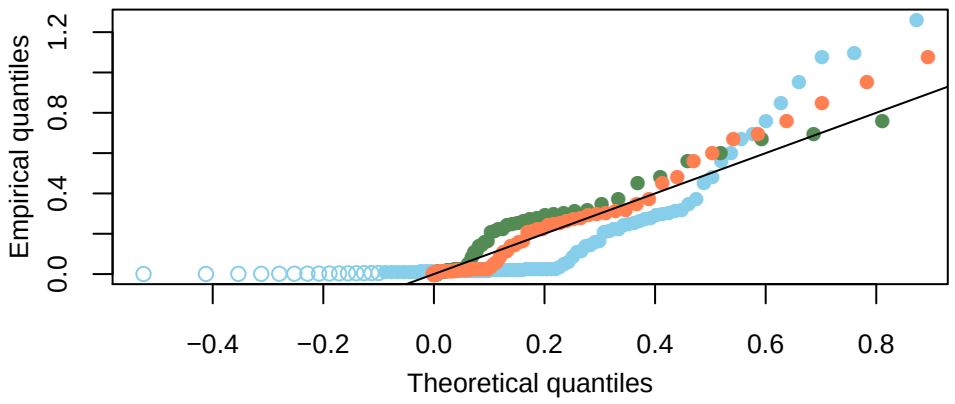
Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **569**

Media:
Ambient Air
Exposure Unit:
LBC
Chemical (ug/m3):
Mercury Average

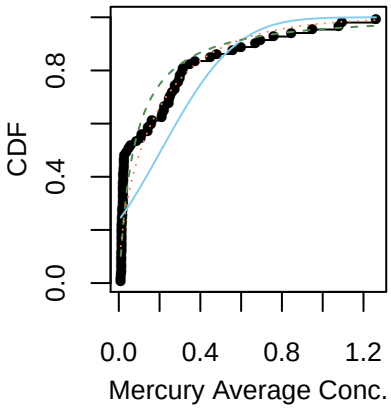
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

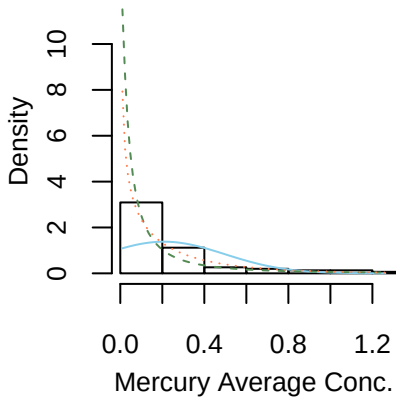


ECDF, Histogram & Q−Q (Detects Only)

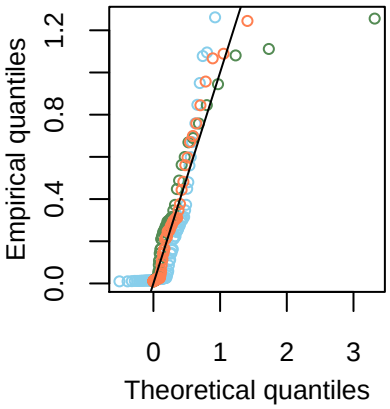
ECDF



Histogram



Q−Q



N = 91	FOD = 84%	Min (detect) = 0.01	Kaplan Meier Mean = 0.18
N (detect) = 76	SD (log detect) = 1.6	Max (detect) = 1	Kaplan Meier SD = 0.27

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	9.8e−19	–	–	–	–	27.2693	32.291
Lognormal	0.0027	1.8e−05	–	–	–	–	−202.093	−197.071
Gamma	–	–	0.2335	0.1043	3.342	0.9159	−190.144	−185.122

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.2e−12	–	–	–	–	31.0604	35.7219
Lognormal	0	7.8e−10	–	–	–	–	−115.114	−110.453
Gamma	–	–	0.2436	0.113	3.974	0.817	−101.459	−96.7976

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Ambient Air in LBC−Mercury Average

Exhibit 2: EPC Program and Results
Attachment M4: Exposure and Risk Estimates
Berry's Creek Study Area Remedial Investigation

Figure **570**

Draft
Exhibit 3: RAGS D Table 3 Exposure Point Concentrations

Exposure and Risk Estimates

Berry's Creek Study Area Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

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TABLE 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Metals	Antimony	mg/kg	2	1.3	(N)	5.7	J	1.3	mg/kg	95% KM (t) UCL	(1)
		Arsenic	mg/kg	29	50	(NP)	130	J	50	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Cadmium	mg/kg	16	34	(NP)	120	J	34	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	14	15	(N)	33	J	15	mg/kg	95% Modified Student's-t UCL	(1)
		Copper	mg/kg	240	350	(L)	710	J	350	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Iron	mg/kg	28,000	29,000	(N)	38,000	J	29,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	1,100	2,600	(NP)	13,000	J	2,600	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Mercury	mg/kg	130	280	(NP)	1,400	J	280	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Nickel	mg/kg	62	88	(L)	180	J	88	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Thallium	mg/kg	4.8	3.1	(N)	15	J	3.1	mg/kg	95% KM (t) UCL	(1)
		Zinc	mg/kg	1,600	3,100	(NP)	10,000	J	3,100	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
	PAHs	Benz[a]anthracene	mg/kg	0.86	1.2	(N)	3.3	J	1.2	mg/kg	95% Student's-t UCL	(1)
		Benzo[a]pyrene	mg/kg	0.98	1.8	(L)	3.2	J	1.8	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Benzo[b]fluoranthene	mg/kg	1.3	2.3	(L)	3.6	J	2.3	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.33	0.68	(L)	1.3	J	0.68	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Indeno[1,2,3-cd]pyrene	mg/kg	0.75	1.3	(L)	2.4	J	1.3	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
	Pesticides	Aldrin	mg/kg	0.036	0.027	(N)	0.088	J	0.027	mg/kg	95% KM (t) UCL	(1)
		Heptachlor epoxide	mg/kg	0.052	0.12	(L)	0.19	J	0.12	mg/kg	97.5% KM (Chebyshev) UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	3.1	6.2	(L)	24	J	6.2	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Metals	Antimony	mg/kg	1.6	1.2	(N)	2.6	J	1.2	mg/kg	95% KM (t) UCL	(1)
		Arsenic	mg/kg	16	19	(N)	48	J	19	mg/kg	95% Modified Student's-t UCL	(1)
		Cadmium	mg/kg	3	3.5	(N)	9.7	J	3.5	mg/kg	95% KM (t) UCL	(1)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	15	19	(N)	95	J	19	mg/kg	95% KM (t) UCL	(1)
		Copper	mg/kg	120	130	(N)	210	J	130	mg/kg	95% Student's-t UCL	(1)
		Iron	mg/kg	31,000	35,000	(N)	84,000	J	35,000	mg/kg	95% Modified Student's-t UCL	(1)
		Manganese	mg/kg	3,400	8,800	(NP)	31,000	J	8,800	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Mercury	mg/kg	18	24	(G)	82	J	24	mg/kg	95% Adjusted Gamma UCL	(1)
		Nickel	mg/kg	45	55	(N)	210	J	55	mg/kg	95% Modified Student's-t UCL	(1)

TABLE 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC (continued)	Metals (continued)	Thallium	mg/kg	15	10	(L)	100	J	10	mg/kg	95% KM (BCA) UCL	(1)
		Zinc	mg/kg	450	520	(N)	1,500	J	520	mg/kg	95% Modified Student's-t UCL	(1)
	PAHs	Benz[a]anthracene	mg/kg	0.76	1.1	(N)	2.5	J	1.1	mg/kg	95% Student's-t UCL	(1)
		Benzo[a]pyrene	mg/kg	0.83	1.1	(N)	2.6	J	1.1	mg/kg	95% Student's-t UCL	(1)
		Benzo[b]fluoranthene	mg/kg	1.1	1.5	(N)	3.7	J	1.5	mg/kg	95% Student's-t UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.19	0.37	(L)	0.6	J	0.37	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Indeno[1,2,3-cd]pyrene	mg/kg	0.59	0.82	(N)	2	J	0.82	mg/kg	95% Student's-t UCL	(1)
	Pesticides	Aldrin	mg/kg	0.034	0.046		0.046	J	0.046	mg/kg	Maximum concentration	(4)
		Heptachlor epoxide	mg/kg	0.019	0.016	(N)	0.034	J	0.016	mg/kg	95% KM (t) UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	1.1	1.6	(G)	4.6	J	1.6	mg/kg	95% Adjusted Gamma UCL	(1)
Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Metals	Antimony	mg/kg	1.8	1.8		1.8	J	1.8	mg/kg	Maximum concentration	(4)
		Arsenic	mg/kg	11	12	(N)	13	J	12	mg/kg	95% Student's-t UCL	(1)
		Cadmium	mg/kg	1.6	2.1	(N)	2.3	J	2.1	mg/kg	95% Student's-t UCL	(1)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	9.9	11	(N)	12	J	11	mg/kg	95% Student's-t UCL	(1)
		Copper	mg/kg	100	120	(N)	130	J	120	mg/kg	95% Student's-t UCL	(1)
		Iron	mg/kg	26,000	31,000	(N)	32,000	J	31,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	350	380	(N)	400	J	380	mg/kg	95% Student's-t UCL	(1)
		Mercury	mg/kg	6.3	13	(G)	18	J	13	mg/kg	95% Adjusted Gamma UCL	(1)
		Nickel	mg/kg	34	39	(N)	41	J	39	mg/kg	95% Student's-t UCL	(1)
		Thallium	mg/kg	3.4	3.4		3.4	J	3.4	mg/kg	Maximum concentration	(4)
		Zinc	mg/kg	260	330	(N)	350	J	330	mg/kg	95% Student's-t UCL	(1)
	PAHs	Benz[a]anthracene	mg/kg	0.8	1.4	(N)	1.7	J	1.4	mg/kg	95% Student's-t UCL	(1)
		Benzo[a]pyrene	mg/kg	0.88	1.4	(N)	1.7	J	1.4	mg/kg	95% Student's-t UCL	(1)
		Benzo[b]fluoranthene	mg/kg	1.2	2	(N)	2.3	J	2	mg/kg	95% Student's-t UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.2	0.6	(L)	0.55	J	0.55	mg/kg	95% Chebyshev (Mean, SD) UCL	(3)
		Indeno[1,2,3-cd]pyrene	mg/kg	0.56	0.95	(N)	1.2	J	0.95	mg/kg	95% Student's-t UCL	(1)
	Pesticides	Aldrin	mg/kg	0.0079	0.01		0.01	J	0.01	mg/kg	Maximum concentration	(4)
		Heptachlor epoxide	mg/kg	0.0048	0.0071	(N)	0.0073	J	0.0071	mg/kg	95% Student's-t UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.39	0.82	(L)	0.91	J	0.82	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)

TABLE 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Metals	Antimony	mg/kg	1.8	1.8		1.8	J	1.8	mg/kg	Maximum concentration	(4)
		Arsenic	mg/kg	13	15	(N)	23	J	15	mg/kg	95% Modified Student's-t UCL	(1)
		Cadmium	mg/kg	1.6	1.8	(N)	2.9	J	1.8	mg/kg	95% Student's-t UCL	(1)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	13	13	(N)	16	J	13	mg/kg	95% Student's-t UCL	(1)
		Copper	mg/kg	100	110	(N)	130	J	110	mg/kg	95% Modified Student's-t UCL	(1)
		Iron	mg/kg	33,000	36,000	(N)	42,000	J	36,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	450	510	(N)	830	J	510	mg/kg	95% Modified Student's-t UCL	(1)
		Mercury	mg/kg	4	4.6	(N)	8.3	J	4.6	mg/kg	95% Student's-t UCL	(1)
		Nickel	mg/kg	39	45	(N)	79	J	45	mg/kg	95% Modified Student's-t UCL	(1)
		Thallium	mg/kg	2.2	1.7	(N)	2.8	J	1.7	mg/kg	95% KM (t) UCL	(1)
		Zinc	mg/kg	260	290	(N)	380	J	290	mg/kg	95% Student's-t UCL	(1)
	PAHs	Benz[a]anthracene	mg/kg	0.49	0.6	(N)	0.93	J	0.6	mg/kg	95% Student's-t UCL	(1)
		Benzo[a]pyrene	mg/kg	0.57	0.7	(N)	0.99	J	0.7	mg/kg	95% Student's-t UCL	(1)
		Benzo[b]fluoranthene	mg/kg	0.73	0.9	(N)	1.3	J	0.9	mg/kg	95% Student's-t UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.14	0.17	(N)	0.26	J	0.17	mg/kg	95% KM (t) UCL	(1)
		Indeno[1,2,3-cd]pyrene	mg/kg	0.41	0.52	(N)	0.78	J	0.52	mg/kg	95% Student's-t UCL	(1)
	Pesticides	Aldrin	mg/kg	0.0045	0.004	(N)	0.0069	J	0.004	mg/kg	95% KM (t) UCL	(1)
		Heptachlor epoxide	mg/kg	0.0029	0.0016	(N)	0.0037	J	0.0016	mg/kg	95% KM (t) UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.33	0.42	(N)	0.9	J	0.42	mg/kg	95% Student's-t UCL	(1)
Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Metals	Antimony	mg/kg	8.5	5.7	(NP)	88	J	5.7	mg/kg	95% KM (BCA) UCL	(1)
		Arsenic	mg/kg	20	34	(L)	150	J	34	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Cadmium	mg/kg	2	3	(L)	17	J	3	mg/kg	95% KM (Chebyshev) UCL	(1)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	15	24	(L)	98	J	24	mg/kg	95% KM (Chebyshev) UCL	(1)
		Copper	mg/kg	190	330	(L)	1,100	J	330	mg/kg	95% Chebyshev (Mean, Sd) UCL	(1)
		Iron	mg/kg	26,000	29,000	(N)	72,000	J	29,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	820	1,700	(NP)	7,400	J	1,700	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Mercury	mg/kg	2.9	3.3	(G)	14	J	3.3	mg/kg	95% KM (Approximate Gamma) UCL	(1)
		Nickel	mg/kg	63	110	(L)	420	J	110	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)

TABLE 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic	Rationale
Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites (continued)	Metals (continued)	Thallium	mg/kg	3.7	1.9 (L)	8.9 J	1.9	mg/kg	95% KM (t) UCL	(1)
		Zinc	mg/kg	320	450 (L)	1,100 J	450	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
	PAHs	Benz[a]anthracene	mg/kg	0.74	1.3 (L)	4	1.3	mg/kg	95% KM (Chebyshev) UCL	(1)
		Benzo[a]pyrene	mg/kg	0.72	1.2 (L)	3.5 J	1.2	mg/kg	95% KM (Chebyshev) UCL	(1)
		Benzo[b]fluoranthene	mg/kg	0.96	1.6 (L)	4.1	1.6	mg/kg	95% KM (Chebyshev) UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.2	0.29 (L)	0.81 J	0.29	mg/kg	95% KM (Chebyshev) UCL	(1)
		Indeno[1,2,3-cd]pyrene	mg/kg	0.49	0.76 (L)	2 J	0.76	mg/kg	95% KM (Chebyshev) UCL	(1)
	Pesticides	Aldrin	mg/kg	0.0068	0.0042 (L)	0.041 J	0.0042	mg/kg	95% KM (BCA) UCL	(1)
		Heptachlor epoxide	mg/kg	0.018	0.026 (NP)	0.096 J	0.026	mg/kg	97.5% KM (Chebyshev) UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.5	1.1 (L)	7 J	1.1	mg/kg	95% KM (Chebyshev) UCL	(1)

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
G = gamma
J = estimated value
KM = Kaplan Meier
L = lognormal
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
N = normal
NP = nonparametric
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = not detected

(1) The 95 UCL is selected as the EPC.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the EPC.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.
(6) No available data.

TABLE 3.2
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in UBC	Metals	Antimony	mg/kg	1.9	1.2	(N)	5.7	J	1.2	mg/kg	95% KM (t) UCL	(1)
		Arsenic	mg/kg	28	45	(NP)	130	J	45	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Cadmium	mg/kg	16	30	(NP)	120	J	30	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	13	15	(N)	33	J	15	mg/kg	95% Modified Student's-t UCL	(1)
		Copper	mg/kg	230	330	(L)	710	J	330	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Iron	mg/kg	28,000	29,000	(N)	39,000	J	29,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	980	2,100	(NP)	13,000	J	2,100	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Mercury	mg/kg	130	260	(NP)	1,400	J	260	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Nickel	mg/kg	59	81	(L)	180	J	81	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Thallium	mg/kg	4.2	2.7	(L)	15	J	2.7	mg/kg	95% KM (t) UCL	(1)
		Zinc	mg/kg	1,600	2,700	(NP)	10,000	J	2,700	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
	PAHs	Benz[a]anthracene	mg/kg	0.82	1	(N)	3.3	J	1	mg/kg	95% Student's-t UCL	(1)
		Benzo[a]pyrene	mg/kg	0.92	1.5	(L)	3.2	J	1.5	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Benzo[b]fluoranthene	mg/kg	1.2	1.5	(N)	3.6	J	1.5	mg/kg	95% Student's-t UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.3	0.53	(L)	1.3	J	0.53	mg/kg	95% KM (Chebyshev) UCL	(1)
		Indeno[1,2,3-cd]pyrene	mg/kg	0.73	1.1	(L)	2.4	J	1.1	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
	Pesticides	Aldrin	mg/kg	0.054	0.041	(L)	0.23	J	0.041	mg/kg	95% KM (BCA) UCL	(1)
		Heptachlor epoxide	mg/kg	0.052	0.087	(L)	0.19	J	0.087	mg/kg	95% KM (Chebyshev) UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	3.1	5.7	(NP)	24	J	5.7	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC	Metals	Antimony	mg/kg	1.6	1.1	(N)	2.6	J	1.1	mg/kg	95% KM (t) UCL	(1)
		Arsenic	mg/kg	16	18	(N)	48	J	18	mg/kg	95% Modified Student's-t UCL	(1)
		Cadmium	mg/kg	3.1	3.5	(N)	9.7	J	3.5	mg/kg	95% KM (t) UCL	(1)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	14	16	(N)	95	J	16	mg/kg	95% KM (t) UCL	(1)
		Copper	mg/kg	120	130	(N)	210	J	130	mg/kg	95% Student's-t UCL	(1)
		Iron	mg/kg	31,000	34,000	(N)	84,000	J	34,000	mg/kg	95% Modified Student's-t UCL	(1)
		Manganese	mg/kg	2,600	6,600	(NP)	31,000	J	6,600	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Mercury	mg/kg	17	21	(G)	82	J	21	mg/kg	95% Approximate Gamma UCL	(1)
		Nickel	mg/kg	43	50	(N)	210	J	50	mg/kg	95% Modified Student's-t UCL	(1)

TABLE 3.2
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC (continued)	Metals (continued)	Thallium	mg/kg	15	7.6	(L)	100	J	7.6	mg/kg	95% KM (BCA) UCL	(1)
		Zinc	mg/kg	450	500	(N)	1,500	J	500	mg/kg	95% Modified Student's-t UCL	(1)
	PAHs	Benz[a]anthracene	mg/kg	0.71	0.94	(N)	2.5	J	0.94	mg/kg	95% Student's-t UCL	(1)
		Benzo[a]pyrene	mg/kg	0.79	1.4	(L)	2.6	J	1.4	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Benzo[b]fluoranthene	mg/kg	1.1	1.4	(N)	3.7	J	1.4	mg/kg	95% Student's-t UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.21	0.39	(L)	0.67	J	0.39	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Indeno[1,2,3-cd]pyrene	mg/kg	0.59	0.78	(N)	2	J	0.78	mg/kg	95% Student's-t UCL	(1)
	Pesticides	Aldrin	mg/kg	0.029	0.014	(N)	0.046	J	0.014	mg/kg	95% KM (t) UCL	(1)
		Heptachlor epoxide	mg/kg	0.018	0.014	(N)	0.034	J	0.014	mg/kg	95% KM (t) UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	1.1	1.4	(G)	4.6	J	1.4	mg/kg	95% Approximate Gamma UCL	(1)
Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in BCC	Metals	Antimony	mg/kg	3.1	4.3		4.3	J	4.3	mg/kg	Maximum concentration	(4)
		Arsenic	mg/kg	13	17	(N)	38	J	17	mg/kg	95% Modified Student's-t UCL	(1)
		Cadmium	mg/kg	1.6	1.9	(N)	3.3	J	1.9	mg/kg	95% Student's-t UCL	(1)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	9.2	9.9	(N)	12	J	9.9	mg/kg	95% KM (t) UCL	(1)
		Copper	mg/kg	90	110	(N)	130	J	110	mg/kg	95% Student's-t UCL	(1)
		Iron	mg/kg	25,000	27,000	(N)	32,000	J	27,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	340	380	(N)	460	J	380	mg/kg	95% Student's-t UCL	(1)
		Mercury	mg/kg	5.6	8.4	(G)	18	J	8.4	mg/kg	95% Adjusted Gamma UCL	(1)
		Nickel	mg/kg	32	37	(N)	60	J	37	mg/kg	95% Student's-t UCL	(1)
		Thallium	mg/kg	2.3	3.4		3.4	J	3.4	mg/kg	Maximum concentration	(4)
		Zinc	mg/kg	270	310	(N)	430	J	310	mg/kg	95% Student's-t UCL	(1)
	PAHs	Benz[a]anthracene	mg/kg	0.54	1	(G)	1.7	J	1	mg/kg	95% Adjusted Gamma UCL	(1)
		Benzo[a]pyrene	mg/kg	0.66	0.81	(N)	1.7	J	0.81	mg/kg	95% KM (t) UCL	(1)
		Benzo[b]fluoranthene	mg/kg	0.91	1.1	(N)	2.3	J	1.1	mg/kg	95% KM (t) UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.15	0.27	(L)	0.55	J	0.27	mg/kg	95% KM (Chebyshev) UCL	(1)
		Indeno[1,2,3-cd]pyrene	mg/kg	0.42	0.52	(N)	1.2	J	0.52	mg/kg	95% KM (t) UCL	(1)
	Pesticides	Aldrin	mg/kg	0.0095	0.0063	(N)	0.02	J	0.0063	mg/kg	95% KM (t) UCL	(1)
		Heptachlor epoxide	mg/kg	0.0053	0.0051	(N)	0.011	J	0.0051	mg/kg	95% KM (t) UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.48	0.59	(N)	1.4	J	0.59	mg/kg	95% KM (t) UCL	(1)

TABLE 3.2
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in LBC	Metals	Antimony	mg/kg	2.1	2.5		2.5	J	2.5	mg/kg	Maximum concentration	(4)
		Arsenic	mg/kg	14	15	(N)	23	J	15	mg/kg	95% Modified Student's-t UCL	(1)
		Cadmium	mg/kg	1.6	1.8	(N)	2.9	J	1.8	mg/kg	95% Student's-t UCL	(1)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	12	13	(N)	18	J	13	mg/kg	95% Student's-t UCL	(1)
		Copper	mg/kg	110	110	(N)	150	J	110	mg/kg	95% Modified Student's-t UCL	(1)
		Iron	mg/kg	34,000	36,000	(N)	52,000	J	36,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	450	490	(N)	830	J	490	mg/kg	95% Modified Student's-t UCL	(1)
		Mercury	mg/kg	4.3	6.7	(NP)	23	J	6.7	mg/kg	95% KM (Chebyshev) UCL	(1)
		Nickel	mg/kg	39	42	(N)	79	J	42	mg/kg	95% Modified Student's-t UCL	(1)
		Thallium	mg/kg	2.1	1.6	(N)	2.8	J	1.6	mg/kg	95% KM (t) UCL	(1)
		Zinc	mg/kg	270	290	(N)	380	J	290	mg/kg	95% Modified Student's-t UCL	(1)
	PAHs	Benz[a]anthracene	mg/kg	0.52	0.61	(N)	1.2	J	0.61	mg/kg	95% Student's-t UCL	(1)
		Benzo[a]pyrene	mg/kg	0.58	0.66	(N)	1.1	J	0.66	mg/kg	95% Student's-t UCL	(1)
		Benzo[b]fluoranthene	mg/kg	0.75	0.86	(N)	1.4	J	0.86	mg/kg	95% Student's-t UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.15	0.15	(N)	0.3	J	0.15	mg/kg	95% KM (t) UCL	(1)
		Indeno[1,2,3-cd]pyrene	mg/kg	0.42	0.49	(N)	0.86	J	0.49	mg/kg	95% Student's-t UCL	(1)
	Pesticides	Aldrin	mg/kg	0.0042	0.0038	(N)	0.0079	J	0.0038	mg/kg	95% KM (t) UCL	(1)
		Heptachlor epoxide	mg/kg	0.0029	0.001	(N)	0.0037	J	0.001	mg/kg	95% KM (t) UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.43	0.52	(N)	1.3	J	0.52	mg/kg	95% Student's-t UCL	(1)
Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites	Metals	Antimony	mg/kg	8.5	5.6	(NP)	88	J	5.6	mg/kg	95% KM (BCA) UCL	(1)
		Arsenic	mg/kg	20	34	(L)	150	J	34	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Cadmium	mg/kg	2	3	(L)	17	J	3	mg/kg	95% KM (Chebyshev) UCL	(1)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	15	24	(L)	98	J	24	mg/kg	95% KM (Chebyshev) UCL	(1)
		Copper	mg/kg	190	330	(L)	1,100	J	330	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Iron	mg/kg	26,000	29,000	(N)	72,000	J	29,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	820	1,700	(NP)	7,400	J	1,700	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Mercury	mg/kg	2.9	3.3	(G)	14	J	3.3	mg/kg	95% KM (Approximate Gamma) UCL	(1)
		Nickel	mg/kg	63	110	(L)	420	J	110	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)

TABLE 3.2
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic	Rationale
Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites (continued)	Metals (continued)	Thallium	mg/kg	3.7	1.9 (L)	8.9 J	1.9	mg/kg	95% KM (t) UCL	(1)
		Zinc	mg/kg	320	450 (L)	1,100 J	450	mg/kg	95% Chebyshev (Mean, Sd) UCL	(1)
	PAHs	Benz[a]anthracene	mg/kg	0.74	1.3 (L)	4	1.3	mg/kg	95% KM (Chebyshev) UCL	(1)
		Benzo[a]pyrene	mg/kg	0.72	1.2 (L)	3.5 J	1.2	mg/kg	95% KM (Chebyshev) UCL	(1)
		Benzo[b]fluoranthene	mg/kg	0.96	1.6 (L)	4.1	1.6	mg/kg	95% KM (Chebyshev) UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.2	0.29 (L)	0.81 J	0.29	mg/kg	95% KM (Chebyshev) UCL	(1)
		Indeno[1,2,3-cd]pyrene	mg/kg	0.49	0.76 (L)	2 J	0.76	mg/kg	95% KM (Chebyshev) UCL	(1)
	Pesticides	Aldrin	mg/kg	0.0068	0.0041 (L)	0.041 J	0.0041	mg/kg	95% KM (BCA) UCL	(1)
		Heptachlor epoxide	mg/kg	0.018	0.026 (NP)	0.096 J	0.026	mg/kg	97.5% KM (Chebyshev) UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.5	1.1 (L)	7 J	1.1	mg/kg	95% KM (Chebyshev) UCL	(1)

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
G = gamma
J = estimated value
KM = Kaplan Meier
L = lognormal
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
N = normal
NP = nonparametric
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = not detected

(1) The 95 UCL is selected as the EPC.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.
(6) No available data.

TABLE 3.3
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Marsh Sediment All Depths

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Marsh Sediment All Depths in Nevertouch Marsh	Metals	Aluminum	mg/kg	13,000	17,000	(N)	18,000	J	17,000	mg/kg	95% Student's-t UCL	(1)
		Antimony	mg/kg	3.3	4.1	(N)	4.2	J	4.1	mg/kg	95% Student's-t UCL	(1)
		Arsenic	mg/kg	54	68	(N)	67	J	67	mg/kg	95% Student's-t UCL	(3)
		Cadmium	mg/kg	18	31	(N)	32	J	31	mg/kg	95% Student's-t UCL	(1)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	18	29	(N)	31	J	29	mg/kg	95% Student's-t UCL	(1)
		Copper	mg/kg	350	550	(N)	560	J	550	mg/kg	95% Student's-t UCL	(1)
		Iron	mg/kg	24,000	28,000	(N)	32,000	J	28,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	2,000	3,300	(N)	4,000	J	3,300	mg/kg	95% Student's-t UCL	(1)
		Mercury	mg/kg	130	180	(N)	370	J	180	mg/kg	95% Student's-t UCL	(1)
		Nickel	mg/kg	110	200	(N)	230	J	200	mg/kg	95% Student's-t UCL	(1)
		Thallium	mg/kg	3.6	4		4	J	4	mg/kg	Maximum concentration	(4)
		Vanadium	mg/kg	72	93	(N)	95	J	93	mg/kg	95% Student's-t UCL	(1)
		Zinc	mg/kg	5,500	22,000	(L)	17,000	J	17,000	mg/kg	95% Chebyshev (Mean, SD) UCL	(3)
	PAHs	Benzo[a]pyrene	mg/kg	0.13	0.14		0.14	J	0.14	mg/kg	Maximum concentration	(4)
		Dibenz[a,h]anthracene	mg/kg	0.017	0.022		0.022	J	0.022	mg/kg	Maximum concentration	(4)
	Pesticides	Aldrin	mg/kg	0.26	0.26		0.26	J	0.26	mg/kg	Maximum concentration	(4)
		Heptachlor	mg/kg	0.21	0.21		0.21	J	0.21	mg/kg	Maximum concentration	(4)
		Heptachlor epoxide	mg/kg	0.15	0.29		0.29	J	0.29	mg/kg	Maximum concentration	(4)
	PCBs	PCBs (total Aroclors)	mg/kg	4	20	(L)	11	J	11	mg/kg	95% Chebyshev (Mean, SD) UCL	(3)
	Volatiles	Trichloroethene	mg/kg	--	--		--		--	--	Not detected	(2)
Marsh Sediment All Depths in Eight Day Swamp	Metals	Aluminum	mg/kg	11,000	13,000		13,000	J	13,000	mg/kg	Maximum concentration	(4)
		Antimony	mg/kg	2.6	2.7		2.7	J	2.7	mg/kg	Maximum concentration	(4)
		Arsenic	mg/kg	38	41		41	J	41	mg/kg	Maximum concentration	(4)
		Cadmium	mg/kg	13	16		16	J	16	mg/kg	Maximum concentration	(4)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	20	24		24	J	24	mg/kg	Maximum concentration	(4)
		Copper	mg/kg	440	580		580	J	580	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	20,000	22,000	(N)	21,000	J	21,000	mg/kg	95% Student's-t UCL	(3)
		Manganese	mg/kg	2,100	2,800	(N)	2,700	J	2,700	mg/kg	95% Student's-t UCL	(3)

TABLE 3.3
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Marsh Sediment All Depths

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Marsh Sediment All Depths in Eight Day Swamp (continued)	Metals (continued)	Mercury	mg/kg	49	57	(N)	67	J	57	mg/kg	95% Student's-t UCL	(1)
		Nickel	mg/kg	160	180		180	J	180	mg/kg	Maximum concentration	(4)
		Thallium	mg/kg	4.8	5.9		5.9	J	5.9	mg/kg	Maximum concentration	(4)
		Vanadium	mg/kg	75	75		75	J	75	mg/kg	Maximum concentration	(4)
		Zinc	mg/kg	1,300	1,400		1,400	J	1,400	mg/kg	Maximum concentration	(4)
	PAHs	Benzo[a]pyrene	mg/kg	0.16	0.18		0.18	J	0.18	mg/kg	Maximum concentration	(4)
		Dibenz[a,h]anthracene	mg/kg	0.021	0.03		0.03	J	0.03	mg/kg	Maximum concentration	(4)
	Pesticides	Aldrin	mg/kg	0.017	0.02		0.02	J	0.02	mg/kg	Maximum concentration	(4)
		Heptachlor	mg/kg	0.012	0.012		0.012	J	0.012	mg/kg	Maximum concentration	(4)
		Heptachlor epoxide	mg/kg	0.016	0.016		0.016	J	0.016	mg/kg	Maximum concentration	(4)
	PCBs	PCBs (total Aroclors)	mg/kg	2.2	6.4	(NP)	5.1	J	5.1	mg/kg	95% Chebyshev (Mean, SD) UCL	(3)
	Volatiles	Trichloroethene	mg/kg	--	--		--		--	--	Not detected	(2)
Marsh Sediment All Depths in Paterson Plank Marsh	Metals	Aluminum	mg/kg	11,000	11,000		11,000	J	11,000	mg/kg	Maximum concentration	(4)
		Antimony	mg/kg	3.2	3.2		3.2	J	3.2	mg/kg	Maximum concentration	(4)
		Arsenic	mg/kg	40	40		40	J	40	mg/kg	Maximum concentration	(4)
		Cadmium	mg/kg	8.8	8.8		8.8	J	8.8	mg/kg	Maximum concentration	(4)
		Chromium (VI)	--	--	--	--	--		--	--	--	(6)
		Cobalt	mg/kg	39	39		39	J	39	mg/kg	Maximum concentration	(4)
		Copper	mg/kg	230	230		230	J	230	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	23,000	25,000		25,000	J	25,000	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	4,000	6,900		6,900	J	6,900	mg/kg	Maximum concentration	(4)
		Mercury	mg/kg	32	44	(N)	47	J	44	mg/kg	95% Student's-t UCL	(1)
		Nickel	mg/kg	200	200		200	J	200	mg/kg	Maximum concentration	(4)
		Thallium	mg/kg	5.9	5.9		5.9	J	5.9	mg/kg	Maximum concentration	(4)
		Vanadium	mg/kg	91	91		91	J	91	mg/kg	Maximum concentration	(4)
		Zinc	mg/kg	1,300	1,300		1,300	J	1,300	mg/kg	Maximum concentration	(4)
	PAHs	Benzo[a]pyrene	mg/kg	0.42	0.42		0.42	J	0.42	mg/kg	Maximum concentration	(4)
		Dibenz[a,h]anthracene	mg/kg	0.085	0.085		0.085	J	0.085	mg/kg	Maximum concentration	(4)
	Pesticides	Aldrin	mg/kg	0.005	0.005		0.005	J	0.005	mg/kg	Maximum concentration	(4)
		Heptachlor	mg/kg	--	--		--		--	--	Not detected	(2)

TABLE 3.3
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Marsh Sediment All Depths

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Marsh Sediment All Depths in Paterson Plank Marsh (continued)	Pesticides (continued)	Heptachlor epoxide	--	--	--		--		--	--	--	(6)
	PCBs	PCBs (total Aroclors)	mg/kg	2.3	3.3		3.3	J	3.3	mg/kg	Maximum concentration	(4)
	Volatiles	Trichloroethene	mg/kg	--	--		--		--	--	Not detected	(2)
Marsh Sediment All Depths in Upper Peach Island Creek Marsh	Metals	Aluminum	mg/kg	13,000	16,000	(N)	18,000	J	16,000	mg/kg	95% Student's-t UCL	(1)
		Antimony	mg/kg	11	17		17	J	17	mg/kg	Maximum concentration	(4)
		Arsenic	mg/kg	130	190	(N)	260	J	190	mg/kg	95% Student's-t UCL	(1)
		Cadmium	mg/kg	11	30	(L)	37	J	30	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	33	120	(L)	150	J	120	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Copper	mg/kg	1,100	4,100	(L)	5,200	J	4,100	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Iron	mg/kg	27,000	32,000	(N)	30,000	J	30,000	mg/kg	95% Student's-t UCL	(3)
		Manganese	mg/kg	1,500	4,800	(L)	3,700	J	3,700	mg/kg	95% Chebyshev (Mean, SD) UCL	(3)
		Mercury	mg/kg	230	320	(N)	430		320	mg/kg	95% Student's-t UCL	(1)
		Nickel	mg/kg	220	860	(L)	1,100	J	860	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Thallium	mg/kg	4.3	6.6		6.6	J	6.6	mg/kg	Maximum concentration	(4)
		Vanadium	mg/kg	120	160	(N)	200	J	160	mg/kg	95% Student's-t UCL	(1)
		Zinc	mg/kg	400	510	(N)	590	J	510	mg/kg	95% Student's-t UCL	(1)
	PAHs	Benzo[a]pyrene	mg/kg	0.37	0.55	(N)	0.55	J	0.55	mg/kg	95% Student's-t UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.063	0.12	(N)	0.11	J	0.11	mg/kg	95% Student's-t UCL	(3)
	Pesticides	Aldrin	mg/kg	0.026	0.045		0.045	J	0.045	mg/kg	Maximum concentration	(4)
		Heptachlor	mg/kg	0.015	0.021		0.021	J	0.021	mg/kg	Maximum concentration	(4)
		Heptachlor epoxide	mg/kg	0.0048	0.0091		0.0091	J	0.0091	mg/kg	Maximum concentration	(4)
	PCBs	PCBs (total Aroclors)	mg/kg	0.71	2.3	(NP)	1.7	J	1.7	mg/kg	97.5% Chebyshev (Mean, SD) UCL	(3)
	Volatiles	Trichloroethene	mg/kg	--	--		--		--	--	Not detected	(2)
Marsh Sediment All Depths in Walden Swamp	Metals	Aluminum	mg/kg	7,900	8,500		8,500	J	8,500	mg/kg	Maximum concentration	(4)
		Antimony	mg/kg	4.6	5.5		5.5	J	5.5	mg/kg	Maximum concentration	(4)
		Arsenic	mg/kg	37	47		47	J	47	mg/kg	Maximum concentration	(4)
		Cadmium	mg/kg	6.7	11		11	J	11	mg/kg	Maximum concentration	(4)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	24	38		38	J	38	mg/kg	Maximum concentration	(4)

TABLE 3.3
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Marsh Sediment All Depths

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Marsh Sediment All Depths in Walden Swamp (continued)	Metals (continued)	Copper	mg/kg	140	190		190	J	190	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	19,000	24,000	(N)	27,000	J	24,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	3,000	13,000	(L)	14,000	J	13,000	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Mercury	mg/kg	41	74	(L)	130	J	74	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Nickel	mg/kg	180	310		310	J	310	mg/kg	Maximum concentration	(4)
		Thallium	mg/kg	5.6	5.7		5.7	J	5.7	mg/kg	Maximum concentration	(4)
		Vanadium	mg/kg	93	130		130	J	130	mg/kg	Maximum concentration	(4)
		Zinc	mg/kg	1,100	2,100		2,100	J	2,100	mg/kg	Maximum concentration	(4)
	PAHs	Benzo[a]pyrene	mg/kg	0.14	0.14		0.14	J	0.14	mg/kg	Maximum concentration	(4)
		Dibenz[a,h]anthracene	mg/kg	0.031	0.031		0.031	J	0.031	mg/kg	Maximum concentration	(4)
	Pesticides	Aldrin	mg/kg	0.018	0.018		0.018	J	0.018	mg/kg	Maximum concentration	(4)
		Heptachlor	mg/kg	0.0058	0.0058		0.0058	J	0.0058	mg/kg	Maximum concentration	(4)
		Heptachlor epoxide	mg/kg	0.0033	0.0033		0.0033	J	0.0033	mg/kg	Maximum concentration	(4)
	PCBs	PCBs (total Aroclors)	mg/kg	1.5	4.5	(L)	6.3	J	4.5	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
	Volatiles	Trichloroethene	mg/kg	--	--		--		--	--	Not detected	(2)
Marsh Sediment All Depths in Ackerman's East Marsh	Metals	Aluminum	mg/kg	13,000	18,000	(N)	20,000	J	18,000	mg/kg	95% Student's-t UCL	(1)
		Antimony	mg/kg	3.4	4.8		4.8		4.8	mg/kg	Maximum concentration	(4)
		Arsenic	mg/kg	18	23	(N)	26		23	mg/kg	95% Student's-t UCL	(1)
		Cadmium	mg/kg	3.5	5	(N)	5.6		5	mg/kg	95% Student's-t UCL	(1)
		Chromium (VI)	mg/kg	17	17		17		17	mg/kg	Maximum concentration	(4)
		Cobalt	mg/kg	19	27	(N)	32		27	mg/kg	95% KM (t) UCL	(1)
		Copper	mg/kg	68	90	(N)	97	J	90	mg/kg	95% Student's-t UCL	(1)
		Iron	mg/kg	21,000	28,000	(N)	31,000	J	28,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	1,900	2,700	(N)	3,600		2,700	mg/kg	95% Student's-t UCL	(1)
		Mercury	mg/kg	27	61	(L)	100	J	61	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Nickel	mg/kg	53	68	(N)	88		68	mg/kg	95% Student's-t UCL	(1)
		Thallium	mg/kg	--	--		--		--	--	Not detected	(2)
		Vanadium	mg/kg	50	57	(N)	62		57	mg/kg	95% Student's-t UCL	(1)
		Zinc	mg/kg	320	420	(N)	450	J	420	mg/kg	95% Student's-t UCL	(1)
	PAHs	Benzo[a]pyrene	mg/kg	0.046	0.06		0.06		0.06	mg/kg	Maximum concentration	(4)

TABLE 3.3
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Marsh Sediment All Depths

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Marsh Sediment All Depths in Ackerman's East Marsh (continued)	PAHs (continued)	Dibenz[a,h]anthracene	mg/kg	0.014	0.015		0.015	J	0.015	mg/kg	Maximum concentration	(4)
	Pesticides	Aldrin	mg/kg	0.0026	0.0044		0.0044	J	0.0044	mg/kg	Maximum concentration	(4)
		Heptachlor	mg/kg	--	--		--		--	--	Not detected	(2)
		Heptachlor epoxide	mg/kg	--	--		--		--	--	Not detected	(2)
	PCBs	PCBs (total Aroclors)	mg/kg	0.42	0.58	(N)	0.87		0.58	mg/kg	95% Student's-t UCL	(1)
	Volatiles	Trichloroethene	mg/kg	0.033	0.033		0.033	J	0.033	mg/kg	Maximum concentration	(4)
Marsh Sediment All Depths in Rutherford Marsh	Metals	Aluminum	mg/kg	9,900	13,000	(N)	15,000	J	13,000	mg/kg	95% Student's-t UCL	(1)
		Antimony	mg/kg	1.2	1.2		1.2	J	1.2	mg/kg	Maximum concentration	(4)
		Arsenic	mg/kg	11	16	(N)	16	J	16	mg/kg	95% Student's-t UCL	(1)
		Cadmium	mg/kg	0.9	1.6		1.6	J	1.6	mg/kg	Maximum concentration	(4)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	10	14	(N)	14	J	14	mg/kg	95% Student's-t UCL	(1)
		Copper	mg/kg	100	140	(N)	160	J	140	mg/kg	95% Student's-t UCL	(1)
		Iron	mg/kg	22,000	22,000		22,000	J	22,000	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	4,600	4,600		4,600	J	4,600	mg/kg	Maximum concentration	(4)
		Mercury	mg/kg	12	14	(N)	16	J	14	mg/kg	95% Student's-t UCL	(1)
		Nickel	mg/kg	46	71	(N)	79	J	71	mg/kg	95% Student's-t UCL	(1)
		Thallium	mg/kg	4.3	5.6	(N)	6.7	J	5.6	mg/kg	95% KM (t) UCL	(1)
		Vanadium	mg/kg	44	55	(N)	58	J	55	mg/kg	95% Student's-t UCL	(1)
		Zinc	mg/kg	230	360	(N)	360	J	360	mg/kg	95% Student's-t UCL	(1)
	PAHs	Benzo[a]pyrene	mg/kg	0.24	0.37	(N)	0.32	J	0.32	mg/kg	95% Student's-t UCL	(3)
		Dibenz[a,h]anthracene	mg/kg	0.038	0.059		0.059		0.059	mg/kg	Maximum concentration	(4)
	Pesticides	Aldrin	mg/kg	0.0053	0.0056		0.0056	J	0.0056	mg/kg	Maximum concentration	(4)
		Heptachlor	mg/kg	--	--		--		--	--	Not detected	(2)
		Heptachlor epoxide	mg/kg	0.0026	0.0027		0.0027	J	0.0027	mg/kg	Maximum concentration	(4)
	PCBs	PCBs (total Aroclors)	mg/kg	0.5	0.5		0.5	J	0.5	mg/kg	Maximum concentration	(4)
	Volatiles	Trichloroethene	mg/kg	--	--		--		--	--	Not detected	(2)
Marsh Sediment All Depths in Tollgate Marsh	Metals	Aluminum	mg/kg	11,000	11,000		11,000	J	11,000	mg/kg	Maximum concentration	(4)
		Antimony	mg/kg	--	--		--		--	--	Not detected	(2)
		Arsenic	mg/kg	9.2	9.2		9.2	J	9.2	mg/kg	Maximum concentration	(4)

TABLE 3.3
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Marsh Sediment All Depths

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Marsh Sediment All Depths in Tollgate Marsh (continued)	Metals (continued)	Cadmium	mg/kg	0.56	0.56		0.56	J	0.56	mg/kg	Maximum concentration	(4)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	11	11		11	J	11	mg/kg	Maximum concentration	(4)
		Copper	mg/kg	66	66		66	J	66	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	25,000	28,000		28,000	J	28,000	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	790	1,100		1,100	J	1,100	mg/kg	Maximum concentration	(4)
		Mercury	mg/kg	9	13	(N)	15	J	13	mg/kg	95% Student's-t UCL	(1)
		Nickel	mg/kg	38	38		38	J	38	mg/kg	Maximum concentration	(4)
		Thallium	mg/kg	2.4	2.4		2.4	J	2.4	mg/kg	Maximum concentration	(4)
		Vanadium	mg/kg	29	29		29	J	29	mg/kg	Maximum concentration	(4)
		Zinc	mg/kg	170	170		170	J	170	mg/kg	Maximum concentration	(4)
	PAHs	Benzo[a]pyrene	mg/kg	0.16	0.27		0.27	J	0.27	mg/kg	Maximum concentration	(4)
		Dibenz[a,h]anthracene	mg/kg	0.039	0.062		0.062	J	0.062	mg/kg	Maximum concentration	(4)
	Pesticides	Aldrin	mg/kg	0.0054	0.0078		0.0078	J	0.0078	mg/kg	Maximum concentration	(4)
		Heptachlor	mg/kg	--	--		--		--	--	Not detected	(2)
		Heptachlor epoxide	mg/kg	--	--		--		--	--	Not detected	(2)
	PCBs	PCBs (total Aroclors)	mg/kg	0.35	0.44		0.44	J	0.44	mg/kg	Maximum concentration	(4)
	Volatiles	Trichloroethene	mg/kg	--	--		--		--	--	Not detected	(2)
Marsh Sediment All Depths in Oritani Marsh	Metals	Aluminum	mg/kg	11,000	14,000		14,000	J	14,000	mg/kg	Maximum concentration	(4)
		Antimony	mg/kg	3	3.2		3.2	J	3.2	mg/kg	Maximum concentration	(4)
		Arsenic	mg/kg	17	23		23	J	23	mg/kg	Maximum concentration	(4)
		Cadmium	mg/kg	0.34	0.34		0.34	J	0.34	mg/kg	Maximum concentration	(4)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	10	16		16	J	16	mg/kg	Maximum concentration	(4)
		Copper	mg/kg	54	67		67	J	67	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	23,000	34,000		34,000	J	34,000	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	310	530		530	J	530	mg/kg	Maximum concentration	(4)
		Mercury	mg/kg	1.8	2.5	(N)	2.9	J	2.5	mg/kg	95% Student's-t UCL	(1)
		Nickel	mg/kg	35	40		40	J	40	mg/kg	Maximum concentration	(4)
		Thallium	mg/kg	--	--		--		--	--	Not detected	(2)

TABLE 3.3
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Marsh Sediment All Depths

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Marsh Sediment All Depths in Oritani Marsh (continued)	Metals (continued)	Vanadium	mg/kg	55	63		63	J	63	mg/kg	Maximum concentration	(4)
		Zinc	mg/kg	150	160		160	J	160	mg/kg	Maximum concentration	(4)
	PAHs	Benzo[a]pyrene	mg/kg	0.2	0.2		0.2	J	0.2	mg/kg	Maximum concentration	(4)
		Dibenz[a,h]anthracene	mg/kg	--	--		--		--	--	Not detected	(2)
	Pesticides	Aldrin	mg/kg	--	--		--		--	--	Not detected	(2)
		Heptachlor	mg/kg	0.0012	0.0012		0.0012	J	0.0012	mg/kg	Maximum concentration	(4)
		Heptachlor epoxide	mg/kg	0.0023	0.0023		0.0023	J	0.0023	mg/kg	Maximum concentration	(4)
	PCBs	PCBs (total Aroclors)	mg/kg	0.016	0.016		0.016	J	0.016	mg/kg	Maximum concentration	(4)
	Volatiles	Trichloroethene	mg/kg	--	--		--		--	--	Not detected	(2)
Marsh Sediment All Depths in Berry's Creek Marsh	Metals	Aluminum	mg/kg	14,000	14,000		14,000	J	14,000	mg/kg	Maximum concentration	(4)
		Antimony	mg/kg	2.2	2.2		2.2	J	2.2	mg/kg	Maximum concentration	(4)
		Arsenic	mg/kg	27	27		27	J	27	mg/kg	Maximum concentration	(4)
		Cadmium	mg/kg	1.2	1.2		1.2	J	1.2	mg/kg	Maximum concentration	(4)
		Chromium (VI)	--	--	--	--	--		--	--	--	(6)
		Cobalt	mg/kg	18	18		18	J	18	mg/kg	Maximum concentration	(4)
		Copper	mg/kg	130	130		130	J	130	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	25,000	30,000		30,000	J	30,000	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	660	800		800	J	800	mg/kg	Maximum concentration	(4)
		Mercury	mg/kg	4.6	6.1	(N)	6.3	J	6.1	mg/kg	95% Student's-t UCL	(1)
		Nickel	mg/kg	94	94		94	J	94	mg/kg	Maximum concentration	(4)
		Thallium	mg/kg	2.6	2.6		2.6	J	2.6	mg/kg	Maximum concentration	(4)
		Vanadium	mg/kg	66	66		66	J	66	mg/kg	Maximum concentration	(4)
		Zinc	mg/kg	390	390		390	J	390	mg/kg	Maximum concentration	(4)
	PAHs	Benzo[a]pyrene	mg/kg	0.18	0.3		0.3	J	0.3	mg/kg	Maximum concentration	(4)
		Dibenz[a,h]anthracene	mg/kg	0.053	0.077		0.077	J	0.077	mg/kg	Maximum concentration	(4)
	Pesticides	Aldrin	mg/kg	--	--		--		--	--	Not detected	(2)
		Heptachlor	mg/kg	--	--		--		--	--	Not detected	(2)
		Heptachlor epoxide	mg/kg	0.0015	0.0015		0.0015	J	0.0015	mg/kg	Maximum concentration	(4)
	PCBs	PCBs (total Aroclors)	mg/kg	0.098	0.14		0.14	J	0.14	mg/kg	Maximum concentration	(4)
	Volatiles	Trichloroethene	mg/kg	--	--		--		--	--	Not detected	(2)

TABLE 3.3
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Marsh Sediment All Depths

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Marsh Sediment All Depths in Former ENCAP Restoration Area	Metals	Aluminum	mg/kg	8,600	8,600		8,600	J	8,600	mg/kg	Maximum concentration	(4)
		Antimony	mg/kg	--	--		--		--	--	Not detected	(2)
		Arsenic	mg/kg	15	15		15	J	15	mg/kg	Maximum concentration	(4)
		Cadmium	mg/kg	--	--		--		--	--	Not detected	(2)
		Chromium (VI)	--	--	--		--		--	--	--	(6)
		Cobalt	mg/kg	6.8	6.8		6.8	J	6.8	mg/kg	Maximum concentration	(4)
		Copper	mg/kg	110	110		110	J	110	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	14,000	14,000		14,000	J	14,000	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	160	160		160	J	160	mg/kg	Maximum concentration	(4)
		Mercury	mg/kg	3.7	3.7		3.7	J	3.7	mg/kg	Maximum concentration	(4)
		Nickel	mg/kg	42	42		42	J	42	mg/kg	Maximum concentration	(4)
		Thallium	mg/kg	--	--		--		--	--	Not detected	(2)
		Vanadium	mg/kg	78	78		78	J	78	mg/kg	Maximum concentration	(4)
		Zinc	mg/kg	140	140		140	J	140	mg/kg	Maximum concentration	(4)
	PAHs	Benzo[a]pyrene	mg/kg	0.35	0.35		0.35	J	0.35	mg/kg	Maximum concentration	(4)
		Dibenz[a,h]anthracene	mg/kg	--	--		--		--	--	Not detected	(2)
	Pesticides	Aldrin	mg/kg	0.0016	0.0016		0.0016	J	0.0016	mg/kg	Maximum concentration	(4)
		Heptachlor	mg/kg	--	--		--		--	--	Not detected	(2)
		Heptachlor epoxide	mg/kg	0.002	0.002		0.002	J	0.002	mg/kg	Maximum concentration	(4)
	PCBs	PCBs (total Aroclors)	mg/kg	0.14	0.2	(N)	0.21	J	0.2	mg/kg	95% Student's-t UCL	(1)
	Volatiles	Trichloroethene	mg/kg	--	--		--		--	--	Not detected	(2)

Notes:

BCSA = Berry's Creek Study Area
EPC = exposure point concentration
J = estimated value
KM = Kaplan Meier
L = lognormal
N = normal
NP = nonparametric
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SD = standard deviation
UCL = upper confidence limit
-- = not detected

Upper Peach Island Creek is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

(1) The 95 UCL is selected as the EPC.
(2) Not detected.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the EPC.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPCn.
(6) No available data.

TABLE 3.4
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Waterway Sediment All Depths

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Waterway Sediment All Depths in UPIC	Metals	Aluminum	mg/kg	14,000	16,000	(N)	20,000	J	16,000	mg/kg	95% Student's-t UCL	(1)
		Antimony	mg/kg	1.9	2.2	(N)	4.1	J	2.2	mg/kg	95% KM (t) UCL	(1)
		Arsenic	mg/kg	43	61	(N)	120	J	61	mg/kg	95% Student's-t UCL	(1)
		Cadmium	mg/kg	60	130	(L)	190	J	130	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Chromium (VI)	--	--	--	--	--		--	--	--	(6)
		Cobalt	mg/kg	17	19	(N)	31	J	19	mg/kg	95% KM (t) UCL	(1)
		Copper	mg/kg	1,300	2,700	(L)	3,500	J	2,700	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Iron	mg/kg	29,000	34,000	(N)	48,000	J	34,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	540	680	(N)	920	J	680	mg/kg	95% Student's-t UCL	(1)
		Mercury	mg/kg	140	280	(L)	350	J	280	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Nickel	mg/kg	300	430	(N)	870	J	430	mg/kg	95% Student's-t UCL	(1)
		Thallium	mg/kg	4.2	3.8	(N)	7.6	J	3.8	mg/kg	95% KM (t) UCL	(1)
		Vanadium	mg/kg	53	61	(N)	74	J	61	mg/kg	95% Student's-t UCL	(1)
		Zinc	mg/kg	2,500	3,500	(N)	6,600	J	3,500	mg/kg	95% Student's-t UCL	(1)
	PAHs	Benzo[a]pyrene	mg/kg	0.81	1.2	(N)	1.3	J	1.2	mg/kg	95% Student's-t UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.24	0.36	(N)	0.38	J	0.36	mg/kg	95% Student's-t UCL	(1)
	Pesticides	Aldrin	mg/kg	0.036	0.05		0.05	J	0.05	mg/kg	Maximum concentration	(4)
		Heptachlor	mg/kg	0.029	0.029		0.029	J	0.029	mg/kg	Maximum concentration	(4)
		Heptachlor epoxide	mg/kg	0.051	0.11		0.11		0.11	mg/kg	Maximum concentration	(4)
	PCBs	PCBs (total Aroclors)	mg/kg	8.2	11	(N)	17	J	11	mg/kg	95% Student's-t UCL	(1)
	Volatiles	Trichloroethene	mg/kg	27	27		27		27	mg/kg	Maximum concentration	(4)
Waterway Sediment All Depths in UBC	Metals	Aluminum	mg/kg	10,000	11,000	(N)	16,000	J	11,000	mg/kg	95% Student's-t UCL	(1)
		Antimony	mg/kg	2.5	2.5	(L)	14	J	2.5	mg/kg	95% KM (t) UCL	(1)
		Arsenic	mg/kg	23	37	(L)	88	J	37	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Cadmium	mg/kg	12	21	(L)	42	J	21	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Chromium (VI)	--	--	--	--	--		--	--	--	(6)
		Cobalt	mg/kg	11	12	(N)	26	J	12	mg/kg	95% Student's-t UCL	(1)
		Copper	mg/kg	210	390	(L)	1,200	J	390	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)

TABLE 3.4
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Waterway Sediment All Depths

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Waterway Sediment All Depths in UBC (continued)	Metals (continued)	Iron	mg/kg	23,000	26,000	(N)	38,000	J	26,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	510	780	(L)	1,600	J	780	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Mercury	mg/kg	110	200	(L)	680	J	200	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Nickel	mg/kg	46	72	(L)	170	J	72	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Thallium	mg/kg	2.4	2.4	(L)	6.5	J	2.4	mg/kg	95% KM (BCA) UCL	(1)
		Vanadium	mg/kg	36	41	(N)	80	J	41	mg/kg	95% Student's-t UCL	(1)
		Zinc	mg/kg	1,200	2,100	(L)	4,000	J	2,100	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
	PAHs	Benzo[a]pyrene	mg/kg	0.84	1	(N)	1.8	J	1	mg/kg	95% Student's-t UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.17	0.21	(N)	0.32	J	0.21	mg/kg	95% Student's-t UCL	(1)
	Pesticides	Aldrin	mg/kg	0.024	0.063	(L)	0.11	J	0.063	mg/kg	97.5% KM (Chebyshev) UCL	(1)
		Heptachlor	mg/kg	0.0097	0.018	(L)	0.029	J	0.018	mg/kg	97.5% KM (Chebyshev) UCL	(1)
		Heptachlor epoxide	mg/kg	0.027	0.077	(L)	0.13	J	0.077	mg/kg	97.5% KM (Chebyshev) UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	2.4	3.6	(G)	16	J	3.6	mg/kg	95% Adjusted Gamma UCL	(1)
	Volatiles	Trichloroethene	mg/kg	0.0015	0.0015		0.0015	J	0.0015	mg/kg	Maximum concentration	(4)
Waterway Sediment All Depths in MBC	Metals	Aluminum	mg/kg	14,000	15,000	(N)	21,000		15,000	mg/kg	95% Student's-t UCL	(1)
		Antimony	mg/kg	2.1	1.6	(N)	6.5		1.6	mg/kg	95% KM (t) UCL	(1)
		Arsenic	mg/kg	17	20	(N)	43		20	mg/kg	95% Student's-t UCL	(1)
		Cadmium	mg/kg	4.7	6.6	(L)	12	J	6.6	mg/kg	95% KM (Chebyshev) UCL	(1)
		Chromium (VI)	mg/kg	2.7	3.8	(N)	4.4		3.8	mg/kg	95% KM (t) UCL	(1)
		Cobalt	mg/kg	13	14	(N)	19		14	mg/kg	95% Student's-t UCL	(1)
		Copper	mg/kg	100	160	(L)	260	J	160	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Iron	mg/kg	32,000	37,000	(N)	100,000	J	37,000	mg/kg	95% Modified Student's-t UCL	(1)
		Manganese	mg/kg	760	1,200	(L)	2,600	J	1,200	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Mercury	mg/kg	44	70	(G)	240	J	70	mg/kg	95% Adjusted Gamma UCL	(1)
		Nickel	mg/kg	38	43	(N)	71	J	43	mg/kg	95% Student's-t UCL	(1)
		Thallium	mg/kg	1.6	1.4	(N)	3.2	J	1.4	mg/kg	95% KM (t) UCL	(1)
		Vanadium	mg/kg	36	39	(N)	56		39	mg/kg	95% Student's-t UCL	(1)
		Zinc	mg/kg	480	840	(L)	2000	J	840	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
	PAHs	Benzo[a]pyrene	mg/kg	0.5	2.2	(L)	4.3	J	2.2	mg/kg	97.5% KM (Chebyshev) UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.1	0.35	(L)	0.63	J	0.35	mg/kg	97.5% KM (Chebyshev) UCL	(1)
	Pesticides	Aldrin	mg/kg	0.018	0.056	(L)	0.047	J	0.047	mg/kg	97.5% KM (Chebyshev) UCL	(3)
		Heptachlor	mg/kg	0.0047	0.0047		0.0047	J	0.0047	mg/kg	Maximum concentration	(4)

TABLE 3.4
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Waterway Sediment All Depths

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Waterway Sediment All Depths in MBC (continued)	Pesticides (continued)	Heptachlor epoxide	mg/kg	0.0092	0.011	(N)	0.014	J	0.011	mg/kg	95% KM (t) UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	4.4	8.6	(L)	29		8.6	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
	Volatiles	Trichloroethene	mg/kg	0.0012	0.0012		0.0012	J	0.0012	mg/kg	Maximum concentration	(4)
Waterway Sediment All Depths in BCC	Metals	Aluminum	mg/kg	11,000	14,000	(N)	17,000	J	14,000	mg/kg	95% Student's-t UCL	(1)
		Antimony	mg/kg	2.3	1.9	(N)	3	J	1.9	mg/kg	95% KM (t) UCL	(1)
		Arsenic	mg/kg	16	23	(N)	38	J	23	mg/kg	95% Student's-t UCL	(1)
		Cadmium	mg/kg	5.1	11	(L)	11	J	11	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Chromium (VI)	--	--	--	--	--		--	--	--	(6)
		Cobalt	mg/kg	11	13	(N)	15	J	13	mg/kg	95% Student's-t UCL	(1)
		Copper	mg/kg	150	210	(N)	300	J	210	mg/kg	95% Student's-t UCL	(1)
		Iron	mg/kg	29,000	38,000	(N)	54,000	J	38,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	490	560	(N)	650	J	560	mg/kg	95% Student's-t UCL	(1)
		Mercury	mg/kg	14	27	(G)	31	J	27	mg/kg	95% Adjusted Gamma UCL	(1)
		Nickel	mg/kg	43	58	(N)	78	J	58	mg/kg	95% Student's-t UCL	(1)
		Thallium	mg/kg	2.2	2.8	(N)	4.2	J	2.8	mg/kg	95% KM (t) UCL	(1)
		Vanadium	mg/kg	35	48	(N)	75	J	48	mg/kg	95% Student's-t UCL	(1)
		Zinc	mg/kg	470	710	(N)	1200	J	710	mg/kg	95% Student's-t UCL	(1)
	PAHs	Benzo[a]pyrene	mg/kg	0.89	1.2	(N)	1.6	J	1.2	mg/kg	95% Student's-t UCL	(1)
		Dibenz[a,h]anthracene	mg/kg	0.15	0.21	(N)	0.25	J	0.21	mg/kg	95% Student's-t UCL	(1)
	Pesticides	Aldrin	mg/kg	0.018	0.027	(N)	0.035	J	0.027	mg/kg	95% Student's-t UCL	(1)
		Heptachlor	mg/kg	--	--		--		--	--	Not detected	(2)
		Heptachlor epoxide	mg/kg	0.0079	0.039	(L)	0.02	J	0.02	mg/kg	99% KM (Chebyshev) UCL	(3)
	PCBs	PCBs (total Aroclors)	mg/kg	1.3	2.5	(G)	3	J	2.5	mg/kg	95% Adjusted Gamma UCL	(1)
	Volatiles	Trichloroethene	mg/kg	--	--		--		--	--	Not detected	(2)
Waterway Sediment All Depths in LBC	Metals	Aluminum	mg/kg	13,000	14,000	(N)	15,000	J	14,000	mg/kg	95% Student's-t UCL	(1)
		Antimony	mg/kg	1.1	1.1	(N)	1.3	J	1.1	mg/kg	95% KM (t) UCL	(1)
		Arsenic	mg/kg	19	24	(N)	29	J	24	mg/kg	95% Student's-t UCL	(1)
		Cadmium	mg/kg	2.5	6.6	(L)	7.1	J	6.6	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Chromium (VI)	--	--	--	--	--		--	--	--	(6)
		Cobalt	mg/kg	14	16	(N)	17	J	16	mg/kg	95% Student's-t UCL	(1)

TABLE 3.4
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Waterway Sediment All Depths

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Waterway Sediment All Depths in LBC (continued)	Metals (continued)	Copper	mg/kg	110	150	(N)	200	J	150	mg/kg	95% Student's-t UCL	(1)
		Iron	mg/kg	41,000	45,000	(N)	51,000	J	45,000	mg/kg	95% Student's-t UCL	(1)
		Manganese	mg/kg	520	640	(N)	750	J	640	mg/kg	95% Student's-t UCL	(1)
		Mercury	mg/kg	5.3	12	(L)	17	J	12	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
		Nickel	mg/kg	45	56	(N)	71	J	56	mg/kg	95% Student's-t UCL	(1)
		Thallium	mg/kg	2.1	2.3	(N)	2.8	J	2.3	mg/kg	95% KM (t) UCL	(1)
		Vanadium	mg/kg	42	47	(N)	52	J	47	mg/kg	95% Student's-t UCL	(1)
		Zinc	mg/kg	300	410	(N)	510	J	410	mg/kg	95% Student's-t UCL	(1)
	PAHs	Benzo[a]pyrene	mg/kg	0.52	1.6	(L)	1.4	J	1.4	mg/kg	95% Chebyshev (Mean, SD) UCL	(3)
		Dibenz[a,h]anthracene	mg/kg	0.089	0.16	(N)	0.21	J	0.16	mg/kg	95% Student's-t UCL	(1)
	Pesticides	Aldrin	mg/kg	0.0064	0.0089	(N)	0.01	J	0.0089	mg/kg	95% Student's-t UCL	(1)
		Heptachlor	mg/kg	0.00074	0.0011	(N)	0.0014		0.0011	mg/kg	95% KM (t) UCL	(1)
		Heptachlor epoxide	mg/kg	0.001	0.0015	(N)	0.0018	J	0.0015	mg/kg	95% Student's-t UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.46	0.89	(L)	1.1	J	0.89	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
	Volatiles	Trichloroethene	mg/kg	--	--		--		--	--	Not detected	(2)

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
BCSA = Berry's Creek Study ARea
EPC = exposure point concentration
G = gamma
J = estimated value
KM = Kaplan Meier
L = lognormal
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
N = normal
NP = nonparametric
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
UPIC = Upper Peach Island Creek
-- = not detected

UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

(1) The 95 UCL is selected as the EPC.
(2) Not detected.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the EPC.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.
(6) No available data.

TABLE 3.5
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: White Perch Fillet

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
White Perch Fillet in UBC	Metals	Antimony	mg/kg	--	--		--		--	--	Not detected	(2)
		Copper	mg/kg	1.6	1.8		1.8	J	1.8	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	10	16		16		16	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	0.35	0.5		0.5	J	0.5	mg/kg	Maximum concentration	(4)
		Mercury (inorganic)	mg/kg	0.11	0.1	(L)	0.51	J	0.1	mg/kg	95% KM (BCA) UCL	(1)
		Selenium	mg/kg	0.75	0.79	(N)	1.1		0.79	mg/kg	95% KM (t) UCL	(1)
	Organometals	Methyl mercury	mg/kg	0.4	0.48	(G)	1.2	J	0.48	mg/kg	95% Approximate Gamma UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.98	1.5	(L)	3.4		1.5	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
White Perch Fillet in MBC	Metals	Antimony	mg/kg	--	--		--		--	--	Not detected	(2)
		Copper	mg/kg	1.1	1.3		1.3	J	1.3	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	9.1	11		11		11	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	0.41	0.53		0.53	J	0.53	mg/kg	Maximum concentration	(4)
		Mercury (inorganic)	mg/kg	0.21	0.21	(G)	1.1		0.21	mg/kg	95% KM (Adjusted Gamma) UCL	(1)
		Selenium	mg/kg	0.78	0.84	(N)	1.2		0.84	mg/kg	95% KM (t) UCL	(1)
	Organometals	Methyl mercury	mg/kg	0.37	0.41	(N)	0.99	J	0.41	mg/kg	95% Student's-t UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.8	1.2	(L)	3.2	J	1.2	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
White Perch Fillet in BCC	Metals	Antimony	mg/kg	0.45	0.47		0.47	J	0.47	mg/kg	Maximum concentration	(4)
		Copper	mg/kg	1	1.2		1.2	J	1.2	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	10	13		13		13	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	0.42	0.69		0.69	J	0.69	mg/kg	Maximum concentration	(4)
		Mercury (inorganic)	mg/kg	0.17	0.12	(G)	0.36		0.12	mg/kg	95% KM (Adjusted Gamma) UCL	(1)
		Selenium	mg/kg	0.9	0.95	(N)	1.4		0.95	mg/kg	95% KM (t) UCL	(1)
	Organometals	Methyl mercury	mg/kg	0.3	0.39	(NP)	0.76		0.39	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.81	1.2	(L)	2.9		1.2	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
White Perch Fillet in LBC	Metals	Antimony	mg/kg	--	--		--		--	--	Not detected	(2)
		Copper	mg/kg	1	1.1		1.1	J	1.1	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	6.8	9		9	J	9	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	0.33	0.59		0.59	J	0.59	mg/kg	Maximum concentration	(4)
		Mercury (inorganic)	mg/kg	0.14	0.14	(L)	0.44	J	0.14	mg/kg	95% KM (Chebyshev) UCL	(1)
		Selenium	mg/kg	0.75	0.75	(N)	1.1		0.75	mg/kg	95% KM (t) UCL	(1)

TABLE 3.5
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: White Perch Fillet

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
White Perch Fillet in LBC (continued)	Organometals	Methyl mercury	mg/kg	0.31	0.34	(N)	0.69		0.34	mg/kg	95% Student's-t UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.43	0.64	(L)	1.7	J	0.64	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
White Perch Fillet in Reference Sites	Metals	Antimony	--	--	--		--		--	--	--	(6)
		Copper	--	--	--		--		--	--	--	(6)
		Iron	--	--	--		--		--	--	--	(6)
		Manganese	--	--	--		--		--	--	--	(6)
		Mercury (inorganic)	mg/kg	0.065	0.045	(L)	0.28	J	0.045	mg/kg	95% KM (t) UCL	(1)
		Selenium	mg/kg	0.77	0.82	(N)	1.1		0.82	mg/kg	95% Student's-t UCL	(1)
	Organometals	Methyl mercury	mg/kg	0.25	0.26	(N)	0.48		0.26	mg/kg	95% Student's-t UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.51	0.66	(NP)	2.1		0.66	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
G = gamma
J = estimated value
KM = Kaplan Meier
L = lognormal
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
N = normal
NP = nonparametric
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = not detected

(1) The 95 UCL is selected as the EPC.
(2) Not detected.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.
(6) No available data.

TABLE 3.6
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Blue Crab Muscle

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Blue Crab Muscle in UBC	Metals	Antimony	mg/kg	--	--		--		--	--	Not detected	(2)
		Copper	mg/kg	12	14		14		14	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	11	11		11	J	11	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	19	35		35	J	35	mg/kg	Maximum concentration	(4)
		Mercury (inorganic)	mg/kg	0.01	0.01		0.01		0.01	mg/kg	Maximum concentration	(4)
		Selenium	mg/kg	0.85	1		1		1	mg/kg	Maximum concentration	(4)
	Organometals	Methyl mercury	mg/kg	0.24	0.26	(N)	0.29	J	0.26	mg/kg	95% Student's-t UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.01	0.013	(L)	0.025		0.013	mg/kg	95% KM (BCA) UCL	(1)
Blue Crab Muscle in MBC	Metals	Antimony	mg/kg	--	--		--		--	--	Not detected	(2)
		Copper	mg/kg	12	16		16		16	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	20	34		34	J	34	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	26	62		62	J	62	mg/kg	Maximum concentration	(4)
		Mercury (inorganic)	mg/kg	0.14	0.14		0.14	J	0.14	mg/kg	Maximum concentration	(4)
		Selenium	mg/kg	1.1	1.5		1.5		1.5	mg/kg	Maximum concentration	(4)
	Organometals	Methyl mercury	mg/kg	0.23	0.28	(N)	0.34		0.28	mg/kg	95% Student's-t UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.017	0.04	(L)	0.047		0.04	mg/kg	97.5% KM (Chebyshev) UCL	(1)
Blue Crab Muscle in BCC	Metals	Antimony	mg/kg	--	--		--		--	--	Not detected	(2)
		Copper	mg/kg	11	14		14		14	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	14	18		18	J	18	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	10	13		13	J	13	mg/kg	Maximum concentration	(4)
		Mercury (inorganic)	mg/kg	0.052	0.052	(N)	0.098		0.052	mg/kg	95% KM (t) UCL	(1)
		Selenium	mg/kg	0.82	0.91		0.91		0.91	mg/kg	Maximum concentration	(4)
	Organometals	Methyl mercury	mg/kg	0.2	0.26	(N)	0.3		0.26	mg/kg	95% Student's-t UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.01	0.011	(N)	0.021		0.011	mg/kg	95% KM (t) UCL	(1)
Blue Crab Muscle in LBC	Metals	Antimony	mg/kg	--	--		--		--	--	Not detected	(2)
		Copper	mg/kg	16	20		20		20	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	130	260		260	J	260	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	5.3	6		6	J	6	mg/kg	Maximum concentration	(4)
		Mercury (inorganic)	mg/kg	0.049	0.079		0.079		0.079	mg/kg	Maximum concentration	(4)
		Selenium	mg/kg	1.2	1.5		1.5		1.5	mg/kg	Maximum concentration	(4)

TABLE 3.6
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Blue Crab Muscle

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Blue Crab Muscle in LBC (continued)	Organometals	Methyl mercury	mg/kg	0.2	0.24	(N)	0.33		0.24	mg/kg	95% Student's-t UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.0082	0.019	(L)	0.038		0.019	mg/kg	95% KM (Chebyshev) UCL	(1)
Blue Crab Muscle in Reference Sites	Metals	Antimony	--	--	--		--		--	--	--	(6)
		Copper	--	--	--		--		--	--	--	(6)
		Iron	--	--	--		--		--	--	--	(6)
		Manganese	--	--	--		--		--	--	--	(6)
		Mercury (inorganic)	mg/kg	0.029	0.02	(N)	0.055	J	0.02	mg/kg	95% KM (t) UCL	(1)
		Selenium	--	--	--		--		--	--	--	(6)
	Organometals	Methyl mercury	mg/kg	0.13	0.21	(L)	0.29	J	0.21	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.0064	0.0059	(N)	0.017	J	0.0059	mg/kg	95% KM (t) UCL	(1)

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
J = estimated value
KM = Kaplan Meier
L = lognormal
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
N = normal
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = not detected

(1) The 95 UCL is selected as the EPC.
(2) Not detected.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.
(6) No available data.

TABLE 3.7
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Blue Crab Muscle & Hepatopancreas

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Blue Crab Muscle & Hepatopancreas in UBC	Metals	Antimony	mg/kg	--	--		--		--	--	Not detected	(2)
		Copper	mg/kg	12	14		14		14	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	11	11		11	J	11	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	19	35		35	J	35	mg/kg	Maximum concentration	(4)
		Mercury (inorganic)	mg/kg	0.011	0.013	(N)	0.014	J	0.013	mg/kg	95% Student's-t UCL	(1)
		Selenium	mg/kg	0.85	1		1		1	mg/kg	Maximum concentration	(4)
	Organometals	Methyl mercury	mg/kg	0.22	0.25	(N)	0.25	J	0.25	mg/kg	95% Student's-t UCL	(3)
	PCBs	PCBs (total Aroclors)	mg/kg	0.15	0.18	(N)	0.25	J	0.18	mg/kg	95% Student's-t UCL	(1)
Blue Crab Muscle & Hepatopancreas in MBC	Metals	Antimony	mg/kg	--	--		--		--	--	Not detected	(2)
		Copper	mg/kg	12	16		16		16	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	20	34		34	J	34	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	26	62		62	J	62	mg/kg	Maximum concentration	(4)
		Mercury (inorganic)	mg/kg	0.05	0.12		0.12	J	0.12	mg/kg	Maximum concentration	(4)
		Selenium	mg/kg	1.1	1.5		1.5		1.5	mg/kg	Maximum concentration	(4)
	Organometals	Methyl mercury	mg/kg	0.17	0.2	(N)	0.19	J	0.19	mg/kg	95% Student's-t UCL	(3)
	PCBs	PCBs (total Aroclors)	mg/kg	0.097	0.13	(N)	0.17		0.13	mg/kg	95% Student's-t UCL	(1)
Blue Crab Muscle & Hepatopancreas in BCC	Metals	Antimony	mg/kg	--	--		--		--	--	Not detected	(2)
		Copper	mg/kg	11	14		14		14	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	14	18		18	J	18	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	10	13		13	J	13	mg/kg	Maximum concentration	(4)
		Mercury (inorganic)	mg/kg	0.038	0.093		0.093	J	0.093	mg/kg	Maximum concentration	(4)
		Selenium	mg/kg	0.82	0.91		0.91		0.91	mg/kg	Maximum concentration	(4)
	Organometals	Methyl mercury	mg/kg	0.21	0.23		0.23	J	0.23	mg/kg	Maximum concentration	(4)
	PCBs	PCBs (total Aroclors)	mg/kg	0.13	0.15	(N)	0.18	J	0.15	mg/kg	95% Student's-t UCL	(1)
Blue Crab Muscle & Hepatopancreas in LBC	Metals	Antimony	mg/kg	--	--		--		--	--	Not detected	(2)
		Copper	mg/kg	16	20		20		20	mg/kg	Maximum concentration	(4)
		Iron	mg/kg	130	260		260	J	260	mg/kg	Maximum concentration	(4)
		Manganese	mg/kg	5.3	6		6	J	6	mg/kg	Maximum concentration	(4)
		Mercury (inorganic)	mg/kg	0.014	0.022		0.022	J	0.022	mg/kg	Maximum concentration	(4)
		Selenium	mg/kg	1.2	1.5		1.5		1.5	mg/kg	Maximum concentration	(4)

TABLE 3.7
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Blue Crab Muscle & Hepatopancreas

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Blue Crab Muscle & Hepatopancreas in LBC (continued)	Organometals	Methyl mercury	mg/kg	0.15	0.2	(N)	0.21	J	0.2	mg/kg	95% Student's-t UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.14	0.33	(L)	0.42	J	0.33	mg/kg	95% Chebyshev (Mean, SD) UCL	(1)
Blue Crab Muscle & Hepatopancreas in Reference Sites	Metals	Antimony	--	--	--		--		--	--	--	(6)
		Copper	--	--	--		--		--	--	--	(6)
		Iron	--	--	--		--		--	--	--	(6)
		Manganese	--	--	--		--		--	--	--	(6)
		Mercury (inorganic)	mg/kg	0.023	0.029	(N)	0.045	J	0.029	mg/kg	95% KM (t) UCL	(1)
		Selenium	--	--	--		--		--	--	--	(6)
	Organometals	Methyl mercury	mg/kg	0.14	0.19	(N)	0.26	J	0.19	mg/kg	95% Student's-t UCL	(1)
	PCBs	PCBs (total Aroclors)	mg/kg	0.11	0.13	(N)	0.21		0.13	mg/kg	95% Student's-t UCL	(1)

Notes:

BCC = Berry's Creek Canal
EPC = exposure point concentration
J = estimated value
KM = Kaplan Meier
L = lognormal
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
N = normal
PCB = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = not detected

(1) The 95 UCL is selected as the EPC.
(2) Not detected.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the EPC.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.
(6) No available data.

TABLE 3.8
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water Total

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Surface Water Total in UBC	Metals	Arsenic	µg/l	4.1	4	(N)	50	J	4	µg/l	95% KM (t) UCL	(1)
		Thallium	µg/l	2.1	0.44	(L)	5.8	J	0.44	µg/l	95% KM (Chebyshev) UCL	(1)
	PAHs	Benzo[a]pyrene	µg/l	0.74	0.66	(L)	2.7		0.66	µg/l	97.5% KM (Chebyshev) UCL	(1)
		Dibenz[a,h]anthracene	µg/l	1	3		3		3	µg/l	Maximum concentration	(4)
	Volatiles	Vinyl chloride	µg/l	0.34	0.25	(N)	0.38	J	0.25	µg/l	95% KM (t) UCL	(1)
Surface Water Total in MBC	Metals	Arsenic	µg/l	3.7	3.6	(N)	50	J	3.6	µg/l	95% KM (t) UCL	(1)
		Thallium	µg/l	2.6	0.56	(NP)	7.5	J	0.56	µg/l	95% KM (Chebyshev) UCL	(1)
	PAHs	Benzo[a]pyrene	µg/l	0.69	0.74	(L)	3.2		0.74	µg/l	99% KM (Chebyshev) UCL	(1)
		Dibenz[a,h]anthracene	µg/l	1.7	4.7		4.7		4.7	µg/l	Maximum concentration	(4)
	Volatiles	Vinyl chloride	µg/l	0.46	0.28	(N)	0.59	J	0.28	µg/l	95% KM (t) UCL	(1)
Surface Water Total in BCC	Metals	Arsenic	µg/l	3.7	3.3	(N)	16		3.3	µg/l	95% KM (t) UCL	(1)
		Thallium	µg/l	2.3	0.48	(L)	6.4	J	0.48	µg/l	95% KM (Chebyshev) UCL	(1)
	PAHs	Benzo[a]pyrene	µg/l	0.041	0.086		0.086	J	0.086	µg/l	Maximum concentration	(4)
		Dibenz[a,h]anthracene	µg/l	0.22	0.22		0.22	J	0.22	µg/l	Maximum concentration	(4)
	Volatiles	Vinyl chloride	µg/l	--	--		--		--	--	Not detected	(2)
Surface Water Total in LBC	Metals	Arsenic	µg/l	3.9	3.6	(N)	50	J	3.6	µg/l	95% KM (t) UCL	(1)
		Thallium	µg/l	5.3	5.5		5.5	J	5.5	µg/l	Maximum concentration	(4)
	PAHs	Benzo[a]pyrene	µg/l	0.16	0.092	(L)	0.9		0.092	µg/l	95% KM (BCA) UCL	(1)
		Dibenz[a,h]anthracene	µg/l	0.42	0.13	(N)	1.3		0.13	µg/l	95% KM (t) UCL	(1)
	Volatiles	Vinyl chloride	µg/l	--	--		--		--	--	Not detected	(2)

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
J = estimated value
KM = Kaplan Meier
L = lognormal
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
N = normal
NP = nonparametric
PAH = polycyclic aromatic hydrocarbon
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = not detected

(1) The 95 UCL is selected as the EPC.
(2) Not detected.
(4) Less than 4 detected values; therefore the maximum concentration is selected as the EPC.

TABLE 3.9
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE & CENTRAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Ambient Air

Exposure Point	Chemical Class	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
									Value	Units	Statistic	Rationale
Ambient Air in UBC	Metals	Mercury average	µg/m^3	0.047	0.043	(NP)	0.11		0.043	µg/m^3	95% KM (BCA) UCL	(1)
Ambient Air in MBC	Metals	Mercury average	µg/m^3	0.039	0.026	(N)	0.058		0.026	µg/m^3	95% KM (t) UCL	(1)
Ambient Air in BCC	Metals	Mercury average	µg/m^3	0.029	0.025	(NP)	0.25		0.025	µg/m^3	95% KM (t) UCL	(1)
Ambient Air in LBC	Metals	Mercury average	ug/m3	0.21	0.36	(NP)	1.3		0.36	µg/m^3	97.5% KM (Chebyshev) UCL	(1)

Notes:
BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
N = normal
NP = nonparametric
UBC = Upper Berry's Creek
UCL = upper confidence limit

(1) The 95 UCL is selected as the EPC.

Draft
Exhibit 4: RAGS D Table 4 Equations and Exposure Parameters Used for Intake Calculations

Exposure and Risk Estimates

Berry's Creek Study Area Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

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Table 4.1 Values used for Daily Intake Calculations
Fish Ingestion: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe:	**Current/Future**
Medium:	**Sediment/Surface Water**
Exposure Medium:	**Fish Tissue**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Ingestion	Angler	Adult	Fish tissue	Cf	Chemical Concentration in Fish Tissue	TBD	mg/g		CDI (mg/kg-day) = Cf x IRf x (1-LOSS) x FI x EF x ED x 1/BW x 1/AT
				IRf	Ingestion Rate of Fish Tissue	22.0	g/day	USEPA 2014a	
				LOSS	Fraction Chemical Lost from Cooking	TBD	unitless	Chemical-specific, default of 0	
				FI	Fraction Ingested from Source	1	unitless	Conservative default	
				EF	Exposure Frequency	27	days/year	Site-specific	
				ED	Exposure Duration	8	years	USEPA 2014b, Sum of receptor age categories is 26	
				BW	Body Weight	80	kg	USEPA 2014b	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014b	
				ATnc	Averaging Time - Noncancer	2,920	days	USEPA 1989	
		Older child (Age 6–18)	Fish tissue	Cf	Chemical Concentration in Fish Tissue	TBD	mg/g		CDI (mg/kg-day) = Cf x IRf x (1-LOSS) x FI x EF x ED x 1/BW x 1/AT
				IRf	Ingestion Rate of Fish Tissue	14.7	g/day	Adult value scaled by 2/3	
				LOSS	Fraction Chemical Lost from Cooking	TBD	unitless	Chemical-specific, default of 0	
				FI	Fraction Ingested from Source	1	unitless	Conservative default	
				EF	Exposure Frequency	27	days/year	Site-specific	
				ED	Exposure Duration	12	years	USEPA 2014b, Sum of receptor age categories is 26	
				BW	Body Weight	48.8	kg	USEPA 2011, age-weighted males and females	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014b	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	
		Younger child (Age 0–6)	Fish tissue	Cf	Chemical Concentration in Fish Tissue	TBD	mg/g		CDI (mg/kg-day) = Cf x IRf x (1-LOSS) x FI x EF x ED x 1/BW x 1/AT
				IRf	Ingestion Rate of Fish Tissue	7.3	g/day	Adult value scaled by 1/3	
				LOSS	Fraction Chemical Lost from Cooking	TBD	unitless	Chemical-specific, default of 0	
				FI	Fraction Ingested from Source	1	unitless	Conservative default	
				EF	Exposure Frequency	27	days/year	Site-specific	
				ED	Exposure Duration	6	years	USEPA 2014b, Sum of receptor age categories is 26	
				BW	Body Weight	15	kg	USEPA 2014b	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014b	
				ATnc	Averaging Time - Noncancer	2,190	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

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Table 4.2 Values used for Daily Intake Calculations
Fish Ingestion: Central Tendency
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe:	**Current/Future**
Medium:	**Sediment/Surface Water**
Exposure Medium:	**Fish Tissue**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Ingestion	Angler	Adult	Fish tissue	Cf	Chemical Concentration in Fish Tissue	TBD	mg/g		CDI (mg/kg-day) = Cf x IRf x (1-LOSS) x FI x EF x ED x 1/BW x 1/AT
				IRf	Ingestion Rate of Fish Tissue	5.0	g/day	USEPA 2014a	
				LOSS	Fraction Chemical Lost from Cooking	TBD	unitless	Chemical-specific, Default of 0	
				FI	Fraction Ingested from Source	1	unitless	Conservative default	
				EF	Exposure Frequency	15	days/year	Site-specific	
				ED	Exposure Duration	12	years	USEPA 2011	
				BW	Body Weight	80	kg	USEPA 2014b	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014b	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

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Table 4.3 Values used for Daily Intake Calculations
Shellfish Ingestion: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe:	**Current/Future**
Medium:	**Sediment/Surface Water**
Exposure Medium:	**Shellfish Tissue**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Ingestion	Crabber	Adult	Shellfish tissue (Blue crab)	Csh	Chemical Concentration in Shellfish Tissue	TBD	mg/g		CDI (mg/kg-day) = Csh x IRsh x (1-LOSS) x FI x EF x ED x 1/BW x 1/AT
				IRsh	Ingestion Rate of Crab Tissue	22.0	g/day	USEPA 2014a	
				LOSS	Fraction Chemical Lost from Cooking	TBD	unitless	Chemical-specific, Default of 0	
				FI	Fraction Ingested from Source	1	unitless	Conservative default	
				EF	Exposure Frequency	27	days/year	Site-specific	
				ED	Exposure Duration	8	years	USEPA 2014b, Sum of receptor age categories is 26	
				BW	Body Weight	80	kg	USEPA 2014b	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014b	
				ATnc	Averaging Time - Noncancer	2,920	days	USEPA 1989	
		Older child (Age 6–18)	Shellfish tissue (Blue crab)	Csh	Chemical Concentration in Shellfish Tissue	TBD	mg/g		CDI (mg/kg-day) = Csh x IRsh x (1-LOSS) x FI x EF x ED x 1/BW x 1/AT
				IRsh	Ingestion Rate of Crab Tissue	14.7	g/day	Adult value scaled by 2/3	
				LOSS	Fraction Chemical Lost from Cooking	TBD	unitless	Chemical-specific, Default of 0	
				FI	Fraction Ingested from Source	1	unitless	Conservative default	
				EF	Exposure Frequency	27	days/year	Site-specific	
				ED	Exposure Duration	12	years	USEPA 2014b, Sum of receptor age categories is 26	
				BW	Body Weight	48.8	kg	USEPA 2011, age-weighted males and females	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014b	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	
		Younger child (Age 0–6)	Shellfish tissue (Blue crab)	Csh	Chemical Concentration in Shellfish Tissue	TBD	mg/g		CDI (mg/kg-day) = Csh x IRsh x (1-LOSS) x FI x EF x ED x 1/BW x 1/AT
				IRsh	Ingestion Rate of Crab Tissue	7.3	g/day	Adult value scaled by 1/3	
				LOSS	Fraction Chemical Lost from Cooking	TBD	unitless	Chemical-specific, Default of 0	
				FI	Fraction Ingested from Source	1	unitless	Conservative default	
				EF	Exposure Frequency	27	days/year	Site-specific	
				ED	Exposure Duration	6	years	USEPA 2014b, Sum of receptor age categories is 26	
				BW	Body Weight	15	kg	USEPA 2014b	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014b	
				ATnc	Averaging Time - Noncancer	2,190	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

USEPA. 2011. Exposure factors handbook: 2011 edition. EPA/600/R-09/052F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment. September.

USEPA. 2014a. Estimated fish consumption rates for the U.S. population and selected subpopulations (NHANES 2003-2010). Final Report. EPA-820-R-14-002. U.S. Environmental Protection Agency, Washington, DC. 110 pp. April.

USEPA. 2014b. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Table 4.4 Values used for Daily Intake Calculations
Shellfish Ingestion: Central Tendency
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe:	**Current/Future**
Medium:	**Sediment/Surface Water**
Exposure Medium:	**Shellfish Tissue**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Ingestion	Crabber	Adult	Shellfish tissue (Blue crab)	Csh	Chemical Concentration in Fish Tissue	TBD	mg/g		CDI (mg/kg-day) = Csh x IRsh x (1-LOSS) x FI x EF x ED x 1/BW x 1/AT
				IRsh	Ingestion Rate of Crab Tissue	5.0	g/day	USEPA 2014a	
				LOSS	Fraction Chemical Lost from Cooking	TBD	unitless	Chemical-specific, Default of 0	
				FI	Fraction Ingested from Source	1	unitless	Conservative default	
				EF	Exposure Frequency	15	days/year	Site-specific	
				ED	Exposure Duration	12	years	USEPA 2011	
				BW	Body Weight	80	kg	USEPA 2014b	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014b	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

USEPA. 2011. Exposure factors handbook: 2011 edition. EPA/600/R-09/052F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment. September.

USEPA. 2014a. Estimated fish consumption rates for the U.S. population and selected subpopulations (NHANES 2003-2010). Final Report. EPA-820-R-14-002. U.S. Environmental Protection Agency, Washington, DC. 110 pp. April.

USEPA. 2014b. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Table 4.5 Values used for Daily Intake Calculations
Sediment Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe	**Current/Future**
Medium:	**Sediment**
Exposure Medium:	**Sediment**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Ingestion	Angler/ Crabber	Adult	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		CDI(mg/kg-day) = Cs × IRs × RBA x FI × EF x ED x CF1 x 1/BW x 1/AT
				IRs	Ingestion Rate of Sediment	100	mg/day	USEPA 2014	
				RBA	Relative bioavailability	chemical-specific	unitless		
				FI	Fraction Ingested	1	unitless	Conservative default	
				EF	Exposure Frequency	27	days/year	Site-specific	
				ED	Exposure Duration	8	years	USEPA 2014, Sum of receptor age categories is 26	
				CF1	Conversion Factor	1.00E-06	kg/mg		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	2,920	days	USEPA 1989	
		Older child (6–18)	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		CDI(mg/kg-day) = Cs × IRs × RBA x FI × EF x ED x CF1 x 1/BW x 1/AT
				IRs	Ingestion Rate of Sediment	100	mg/day	USEPA 2014	
				RBA	Relative bioavailability	chemical-specific	unitless		
				FI	Fraction Ingested	1	unitless	Conservative default	
				EF	Exposure Frequency	27	days/year	Site-specific	
				ED	Exposure Duration	12	years	USEPA 2014, Sum of receptor age categories is 26	
				CF1	Conversion Factor	1.00E-06	kg/mg		
				BW	Body Weight	48.8	kg	USEPA 2011, age-weighted males and females	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	
	Construction worker	Adult	Waterway and marsh sediment (All study segments, subsurface and surface)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		CDI(mg/kg-day) = Cs × IRs × RBA x FI × EF x ED x CF1 x 1/BW x 1/AT
				IRs	Ingestion Rate of Sediment	330	mg/day	USEPA 2002	
				RBA	Relative bioavailability	chemical-specific	unitless		
				FI	Fraction Ingested	1	unitless	Conservative default	
				EF	Exposure Frequency	40	days/year	Site-specific, assuming 8 weeks of work, at 5 days per week	
				ED	Exposure Duration	1	year	USEPA 2002	
				CF1	Conversion Factor	1.00E-06	kg/mg		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	365	days	USEPA 1989	
Dermal	Angler/ Crabber	Adult	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		Dermal Absorbed Dose (DAD) (mg/kg-day) = DA-event x EF x ED x EV x SA x 1/BW x 1/AT where Absorbed Dose per Event (DA-event)(mg/cm^2-event) = Cs x CF1 x AF x ABSd
				CF1	Conversion Factor	1.00E-06	kg/mg		
				SA	Skin Surface Area Available for Contact	4,760	cm^2	USEPA 2011 (Males and females forearms, hands, lower legs)	
				AF	Soil to Skin Adherence Factor	0.3	mg/cm^2-event	USEPA 2004	
				ABSd	Dermal Absorption Factor	chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 2004	
				EF	Exposure Frequency	27	days/year	Site-specific	
				ED	Exposure Duration	8	years	USEPA 2014, Sum of receptor age categories is 26	
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	2,920	days	USEPA 1989	

Table 4.5 Values used for Daily Intake Calculations
Sediment Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe	**Current/Future**
Medium:	**Sediment**
Exposure Medium:	**Sediment**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal	Angler/ Crabber	Older child (6–18)	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		Dermal Absorbed Dose (DAD) (mg/kg-day) = DA-event x EF x ED x EV x SA x 1/BW x 1/AT where Absorbed Dose per Event (DA-event)(mg/cm^2-event) = Cs x CF1 x AF x ABSd
				CF1	Conversion Factor	1.00E-06	kg/mg		
				SA	Skin Surface Area Available for Contact	3,108	cm^2	USEPA 2011 (Males and females forearms, hands, lower legs)	
				AF	Soil to Skin Adherence Factor	0.2	mg/cm^2-event	USEPA 2004	
				ABSd	Dermal Absorption Factor	chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 2004	
				EF	Exposure Frequency	27	days/year	Site-specific	
				ED	Exposure Duration	12	years	USEPA 2014, Sum of receptor age categories is 26	
				BW	Body Weight	48.8	kg	USEPA 2011, age-weighted males and females	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	
	Construction worker	Adult	Waterway and marsh sediment (All study segments, subsurface and surface)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		Dermal Absorbed Dose (DAD) (mg/kg-day) = DA-event x EF x ED x EV x SA x 1/BW x 1/AT where Absorbed Dose per Event (DA-event)(mg/cm^2-event) = Cs x CF1 x AF x ABSd
				CF1	Conversion Factor	1.00E-06	kg/mg		
				SA	Skin Surface Area Available for Contact	3,470	cm^2	USEPA 2014 (Head, hands, and forearms)	
				AF	Soil to Skin Adherence Factor	0.3	mg/cm^2-event	USEPA 2002	
				ABSd	Dermal Absorption Factor	chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 2002	
				EF	Exposure Frequency	40	days/year	Assumes activities last for 8 weeks at 5 days per week	
				ED	Exposure Duration	1	years	USEPA 2002	
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	365	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

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Table 4.6 Values used for Daily Intake Calculations
Sediment Contact: Central Tendency
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe:	**Current/Future**
Medium:	**Sediment**
Exposure Medium:	**Sediment**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Ingestion	Angler/ Crabber	Adult	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		CDI(mg/kg-day) = Cs × IRs × RBA × FI × EF x ED x CF1 x 1/BW x 1/AT
				IRs	Ingestion Rate of Sediment	20	mg/day	USEPA 2011	
				RBA	Relative bioavailability	chemical-specific	unitless		
				FI	Fraction Ingested	1	unitless	Conservative default	
				EF	Exposure Frequency	15	days/year	Site-specific	
				ED	Exposure Duration	12	years	USEPA 2011	
				CF1	Conversion Factor	1.00E-06	kg/mg		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	
	Construction worker	Adult	Waterway and marsh sediment (All study segments, subsurface and surface)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		CDI(mg/kg-day) = Cs × IRs × RBA× FI × EF x ED x CF1 x 1/BW x 1/AT
				IRs	Ingestion Rate of Sediment	100	mg/day	USEPA 2014, default for outdoor workers	
				RBA	Relative bioavailability	chemical-specific	unitless		
				FI	Fraction Ingested	1	unitless	Conservative default	
				EF	Exposure Frequency	10	days/year	Assumes activities last for 2 weeks at 5 days per week	
				ED	Exposure Duration	1	year	USEPA 2002	
				CF1	Conversion Factor	1.00E-06	kg/mg		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	365	days	USEPA 1989	
Dermal	Angler/ Crabber	Adult	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		Dermal Absorbed Dose (DAD) (mg/kg-day) = DA-event x EF x ED x EV x SA x 1/BW x 1/AT where Absorbed Dose per Event (DA-event)(mg/cm^2-event) = Cs x CF1 x AF x ABSd
				CF1	Conversion Factor	1.00E-06	kg/mg		
				SA	Skin Surface Area Available for Contact	4,760	cm^2	USEPA 2011 (Males and females forearms, hands, lower legs)	
				AF	Soil to Skin Adherence Factor	0.3	mg/cm^2-event	USEPA 2004	
				ABSd	Dermal Absorption Factor	chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 2004	
				EF	Exposure Frequency	15	days/year	Site-specific	
				ED	Exposure Duration	12	years	USEPA 2011	
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	

Table 4.6 Values used for Daily Intake Calculations
Sediment Contact: Central Tendency
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe:	**Current/Future**
Medium:	**Sediment**
Exposure Medium:	**Sediment**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal	Construction worker	Adult	Waterway and marsh sediment (All study segments, subsurface and surface)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		Dermal Absorbed Dose (DAD) (mg/kg-day) = DA-event x EF x ED x EV x SA x 1/BW x 1/AT where Absorbed Dose per Event (DA-event)(mg/cm^2-event) = Cs x CF1 x AF x ABSd
				CF1	Conversion Factor	1.00E-06	kg/mg		
				SA	Skin Surface Area Available for Contact	3,470	cm^2	USEPA 2014	
				AF	Soil to Skin Adherence Factor	0.3	mg/cm^2-event	USEPA 2002	
				ABSd	Dermal Absorption Factor	chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 2004	
				EF	Exposure Frequency	10	days/year	Assumes activities last for 2 weeks at 5 days per week	
				ED	Exposure Duration	1	year	USEPA 2002	
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	365	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

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Table 4.7 Values used for Daily Intake Calculations
Sediment Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Ingestion	Kayaker/ Canoer	Adult	Bank/Nearshore sediment (Waterways, all study segments), surface only	Cs	Chemical Concentration in Sediment	TBD	mg/kg		CDI(mg/kg-day) = Cs × IRs × RBA x FI × EF x ED x CF1 x 1/BW x 1/AT
				IRs	Ingestion Rate of Sediment	100	mg/day	USEPA 2014	
				RBA	Relative bioavailability	chemical-specific	unitless		
				FI	Fraction Ingested	1	unitless	Conservative default	
				EF	Exposure Frequency	18	days/year	Assumes 2 events per month from spring through fall	
				ED	Exposure Duration	8	years	Site-specific, as per agreement with EPA	
				CF1	Conversion Factor	1.00E-06	kg/mg		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	2,920	days	USEPA 1989	
		Older child (6–18)	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		CDI(mg/kg-day) = Cs × IRs × RBA x FI × EF x ED x CF1 x 1/BW x 1/AT
				IRs	Ingestion Rate of Sediment	100	mg/day	USEPA 2014	
				RBA	Relative bioavailability	chemical-specific	unitless		
				FI	Fraction Ingested	1	unitless	Conservative default	
				EF	Exposure Frequency	18	days/year	Assumes 2 events per month from spring through fall	
				ED	Exposure Duration	12	years	Site-specific	
				CF1	Conversion Factor	1.00E-06	kg/mg		
				BW	Body Weight	48.8	kg	USEPA 2011, age-weighted males and females	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	
Dermal	Kayaker/ Canoer	Adult	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		Dermal Absorbed Dose (DAD) (mg/kg-day) = DA-event x EF x ED x EV x SA x 1/BW x 1/AT where Absorbed Dose per Event (DA-event)(mg/cm^2-event) = Cs x CF1 x AF x ABSd
				CF1	Conversion Factor	1.00E-06	kg/mg		
				SA	Skin Surface Area Available for Contact	4,760	cm^2	USEPA 2011 (Males and females forearms, hands, lower legs)	
				AF	Soil to Skin Adherence Factor	0.3	mg/cm^2-event	USEPA 2004	
				ABSd	Dermal Absorption Factor	chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 2004	
				EF	Exposure Frequency	18	days/year	Assumes 2 events per month from spring through fall	
				ED	Exposure Duration	8	years	Site-specific, as per agreement with EPA	
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	2,920	days	USEPA 1989	

Table 4.7 Values used for Daily Intake Calculations
Sediment Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: **Current**
Medium: **Sediment**
Exposure Medium: **Sediment**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal	Kayaker/ Canoer	Older child (6–18)	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		Dermal Absorbed Dose (DAD) (mg/kg-day) = DA-event x EF x ED x EV x SA x 1/BW x 1/AT where Absorbed Dose per Event (DA-event)(mg/cm^2-event) = Cs x CF1 x AF x ABSd
				CF1	Conversion Factor	1.00E-06	kg/mg		
				SA	Skin Surface Area Available for Contact	3,108	cm^2	USEPA 2011 (Males and females forearms, hands, lower legs)	
				AF	Soil to Skin Adherence Factor	0.2	mg/cm^2-event	USEPA 2004	
				ABSd	Dermal Absorption Factor	chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 2004	
				EF	Exposure Frequency	18	days/year	Assumes 2 events per month from spring through fall	
				ED	Exposure Duration	12	years	Site-specific	
				BW	Body Weight	48.8	kg	USEPA 2011, age-weighted males and females	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

USEPA. 2004. Risk assessment guidance for Superfund: Volume 1 - Human health evaluation manual (Part E, Supplemental guidance for dermal risk assessment). Final. EPA/540/R/99/005. OSWER 9285.7-02EP. PB99-963312. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation, Washington, DC. July. 186 pp.

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Table 4.8 Values used for Daily Intake Calculations
Sediment Contact: Central Tendency
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Ingestion	Kayaker/ Canoer	Adult	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		CDI(mg/kg-day) = Cs × IRs x RBA× FI × EF x ED x CF1 x 1/BW x 1/AT
				IRs	Ingestion Rate of Sediment	20	mg/day	USEPA 2011	
				RBA	Relative bioavailability	chemical-specific	unitless		
				FI	Fraction Ingested	1	unitless	Conservative default	
				EF	Exposure Frequency	9	days/year	Assumes 1 event per month from spring through fall	
				ED	Exposure Duration	12	years	USEPA 2011	
				CF1	Conversion Factor	1.00E-06	kg/mg		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	
Dermal	Kayaker/ Canoer	Adult	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		Dermal Absorbed Dose (DAD) (mg/kg-day) = DA-event x EF x ED x EV x SA x 1/BW x 1/AT where Absorbed Dose per Event (DA-event)(mg/cm^2-event) = Cs x CF1 x AF x ABSd
				CF1	Conversion Factor	1.00E-06	kg/mg		
				SA	Skin Surface Area Available for Contact	4,760	cm^2	USEPA 2011 (Males and females forearms, hands, lower legs)	
				AF	Soil to Skin Adherence Factor	0.3	mg/cm^2-event	USEPA 2004	
				ABSd	Dermal Absorption Factor	chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 2004	
				EF	Exposure Frequency	9	days/year	Assumes 1 event per month from spring through fall	
				ED	Exposure Duration	12	years	USEPA 2011	
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

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Table 4.9 Values used for Daily Intake Calculations
Sediment Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Ingestion	Kayaker/ Canoer	Adult	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		CDI(mg/kg-day) = Cs × IRs x RBA × FI × EF x ED x CF1 x 1/BW x 1/AT
				IRs	Ingestion Rate of Sediment	100	mg/day	USEPA 2014	
				RBA	Relative bioavailability	chemical-specific	unitless		
				FI	Fraction Ingested	1	unitless	Conservative default	
				EF	Exposure Frequency	39	days/year	Assumes 1 event per week from spring through fall	
				ED	Exposure Duration	8	years	Site-specific, as per agreement with EPA	
				CF1	Conversion Factor	1.00E-06	kg/mg		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	2,920	days	USEPA 1989	
		Older child (6–18)	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		CDI(mg/kg-day) = Cs × IRs × RBA x FI × EF x ED x CF1 x 1/BW x 1/AT
				IRs	Ingestion Rate of Sediment	100	mg/day	USEPA 2014	
				RBA	Relative bioavailability	chemical-specific	unitless		
				FI	Fraction Ingested	1	unitless	Conservative default	
				EF	Exposure Frequency	39	days/year	Assumes 1 event per week from spring through fall	
				ED	Exposure Duration	12	years	Site-specific	
				CF1	Conversion Factor	1.00E-06	kg/mg		
				BW	Body Weight	48.8	kg	USEPA 2011, age-weighted males and females	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	
Dermal	Kayaker/ Canoer	Adult	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		Dermal Absorbed Dose (DAD) (mg/kg-day) = DA-event x EF x ED x EV x SA x 1/BW x 1/AT where Absorbed Dose per Event (DA-event)(mg/cm^2-event) = Cs x CF1 x AF x ABSd
				CF1	Conversion Factor	1.00E-06	kg/mg		
				SA	Skin Surface Area Available for Contact	4,760	cm^2	USEPA 2011 (Males and females forearms, hands, lower legs)	
				AF	Soil to Skin Adherence Factor	0.3	mg/cm^2-event	USEPA 2004	
				ABSd	Dermal Absorption Factor	chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 2004	
				EF	Exposure Frequency	39	days/year	Assumes 1 event per week from spring through fall	
				ED	Exposure Duration	8	years	Site-specific, as per agreement with EPA	
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	2,920	days	USEPA 1989	

Table 4.9 Values used for Daily Intake Calculations
Sediment Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal	Kayaker/ Canoer	Older child (6–18)	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		Dermal Absorbed Dose (DAD) (mg/kg-day) = DA-event x EF x ED x EV x SA x 1/BW x 1/AT where Absorbed Dose per Event (DA-event)(mg/cm^2-event) = Cs x CF1 x AF x ABSd
				CF1	Conversion Factor	1.00E-06	kg/mg		
				SA	Skin Surface Area Available for Contact	3,108	cm^2	USEPA 2011 (Males and females forearms, hands, lower legs)	
				AF	Soil to Skin Adherence Factor	0.2	mg/cm^2-event	USEPA 2004	
				ABSd	Dermal Absorption Factor	chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 2004	
				EF	Exposure Frequency	39	days/year	Assumes 1 event per week from spring through fall	
				ED	Exposure Duration	12	years	Site-specific	
				BW	Body Weight	48.8	kg	USEPA 2011, age-weighted males and females	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: http://www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

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Table 4.10 Values used for Daily Intake Calculations
Sediment Contact: Central Tendency
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe:	**Future**
Medium:	**Sediment**
Exposure Medium:	**Sediment**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Ingestion	Kayaker/ Canoer	Adult	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		CDI(mg/kg-day) = Cs × IRs × RBA x FI × EF x ED x CF1 x 1/BW x 1/AT
				IRs	Ingestion Rate of Sediment	20	mg/day	USEPA 2011	
				RBA	Relative bioavailability	chemical-specific	unitless		
				FI	Fraction Ingested	1	unitless	Conservative default	
				EF	Exposure Frequency	19	days/year	Assumes 1 event every other week from spring through fall	
				ED	Exposure Duration	12	years	USEPA 2011	
				CF1	Conversion Factor	1.00E-06	kg/mg		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	
Dermal	Kayaker/ Canoer	Adult	Bank/Nearshore sediment (Waterways, all study segments, surface only)	Cs	Chemical Concentration in Sediment	TBD	mg/kg		Dermal Absorbed Dose (DAD) (mg/kg-day) = DA-event x EF x ED x EV x SA x 1/BW x 1/AT where Absorbed Dose per Event (DA-event)(mg/cm^2-event) = Cs x CF1 x AF x ABSd
				CF1	Conversion Factor	1.00E-06	kg/mg		
				SA	Skin Surface Area Available for Contact	4,760	cm^2	USEPA 2011 (Males and females forearms, hands, lower legs)	
				AF	Soil to Skin Adherence Factor	0.3	mg/cm^2-event	USEPA 2004	
				ABSd	Dermal Absorption Factor	chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 2004	
				EF	Exposure Frequency	19	days/year	Assumes 1 event every other week from spring through fall	
				ED	Exposure Duration	12	years	USEPA 2011	
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

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Table 4.11 Values used for Daily Intake Calculations
Surface Water Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal Contact	Angler/ Crabber	Adult	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		Dermally Absorbed Dose (DAD) (mg/kg-day) = DA-event x EV x ED x EF x SA x 1/BW x 1/AT where for organic compounds, Absorbed Dose per Event (DA-event) (mg/cm^2-event) = 2 FA x Kp x Cw x CF2 x SQRT ((6 x tau-event x t-event)/pi) or DA-event = FA x Kp x Cw x (t-event(1+B)) + 2 x tau-event x ((1+(3 x B) + (3 x B x B))/(1 + B)2)) and where for inorganic compounds, DA-event = Kp x Cw x CF2 x t-event
				FA	Fraction Absorbed Water	Chemical-specific	unitless		
				Kp	Permeability Constant	Chemical-specific	cm/hr		
				SA	Skin Surface Area	4,760	cm^2	USEPA 2011 (Males and females forearms, hands, lower legs)	
				tau-event	Lag time per event	Chemical-specific	hours/event		
				t-event	Event Duration	2.4	hours/event	Assumes surface water contact for 25% of time spent angling	
				B	Ratio of permeability coefficient of chemical through stratum corneum relative to permeability coefficient across the epidermis	Chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	27	days/year	Site-specific	
				ED	Exposure Duration	8	years	USEPA 2014, Sum of receptor age categories is 26	
				CF2	Volumetric Conversion Factor for Water	0.001	L/cm^3		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	2,920	days	USEPA 1989	
Dermal Contact	Angler/ Crabber	Older child (6–18)	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		Dermally Absorbed Dose (DAD) (mg/kg-day) = DA-event x EV x ED x EF x SA x 1/BW x 1/AT where for organic compounds, Absorbed Dose per Event (DA-event) (mg/cm^2-event) = 2 FA x Kp x Cw x CF2 x SQRT ((6 x tau-event x t-event)/pi) or DA-event = FA x Kp x Cw x (t-event(1+B)) + 2 x tau-event x ((1+(3 x B) + (3 x B x B))/(1 + B)2)) and where for inorganic compounds, DA-event = Kp x Cw x CF2 x t-event
				FA	Fraction Absorbed Water	Chemical-specific	unitless		
				Kp	Permeability Constant	Chemical-specific	cm/hr		
				SA	Skin Surface Area	3,108	cm^2	USEPA 2011 (Males and females forearms, hands, lower legs)	
				tau-event	Lag time per event	Chemical-specific	hours/event		
				t-event	Event Duration	2.4	hours/event	Assumes surface water contact for 25% of time spent angling	
				B	Ratio of permeability coefficient of chemical through stratum corneum relative to permeability coefficient across the epidermis	Chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	27	days/year	Site-specific	
				ED	Exposure Duration	12	years	USEPA 2014, Sum of receptor age categories is 26	
				CF2	Volumetric Conversion Factor for Water	0.001	L/cm^3		
				BW	Body Weight	48.8	kg	USEPA 2011, age-weighted males and females	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

USEPA. 2011. Exposure factors handbook: 2011 edition. EPA/600/R-09/052F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment. September.

USEPA. 2014. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Table 4.12 Values used for Daily Intake Calculations
Surface Water Contact: Central Tendency
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Water**
Exposure Medium:	**Surface Water**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal Contact	Angler/ Crabber	Adult	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		Dermally Absorbed Dose (DAD) (mg/kg-day) = DA-event x EV x ED x EF x SA x 1/BW x 1/AT where for organic compounds, Absorbed Dose per Event (DA-event) (mg/cm^2-event) = 2 FA x Kp x Cw x CF2 x SQRT ((6 x tau-event x t-event)/pi) or DA-event = FA x Kp x Cw x (t-event(1+B)) + 2 x tau-event x ((1+(3 x B) + (3 x B x B))/(1 + B)2)) and where for inorganic compounds, DA-event = Kp x Cw x CF2 x t-event
				FA	Fraction Absorbed Water	Chemical-specific	unitless		
				Kp	Permeability Constant	Chemical-specific	cm/hr		
				SA	Skin Surface Area	4,760	cm^2	USEPA 2011 (Males and females forearms, hands, lower legs)	
				tau-event	Lag time per event	Chemical-specific	hours/event		
				t-event	Event Duration	0.4	hours/event	Assumes surface water contact for 10% of time spent angling	
				B	Ratio of permeability coefficient of chemical through stratum corneum relative to permeability coefficient across the epidermis	Chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	15	days/year	Site-specific	
				ED	Exposure Duration	12	years	USEPA 2011	
				CF2	Volumetric Conversion Factor for Water	0.001	L/cm^3		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

USEPA. 2011. Exposure factors handbook: 2011 edition. EPA/600/R-09/052F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment. September.

USEPA. 2014. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Table 4.13 Values used for Daily Intake Calculations
Surface Water Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe	**Current**
Medium:	**Surface Water**
Exposure Medium:	**Surface Water**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Incidental Ingestion	Kayaker/ Canoer	Adult	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		CDI (mg/kg-day) = Cw x IRw x ET x EV x EF x ED x 1/BW x 1/AT
				IR_w	Incidental Ingestion Rate	0.05	L/hr	USEPA 1989	
				ET	Exposure Time	0.25	hr/event	Assumes boater spends 15 minutes in water after going overboard	
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	18	days/yr	Assumes boater goes overboard 2 times per month from spring through fall	
				ED	Exposure Duration	8	years	Site-specific, as per agreement with EPA	
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	2,920	days	USEPA 1989	
		Older child (6–18)	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		CDI (mg/kg-day) = Cw x IRw x ET x EV x EF x ED x 1/BW x 1/AT
				IR_w	Incidental Ingestion Rate	0.05	L/hr	USEPA 1989	
				ET	Exposure Time	0.25	hr/event	Assumes boater spends 15 minutes in water after going overboard	
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	18	days/yr	Assumes boater goes overboard 2 times per month from spring through fall	
				ED	Exposure Duration	12	years	Site-specific	
				BW	Body Weight	48.8	kg	USEPA 2011, age-weighted males and females	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	
Dermal Contact	Kayaker/ Canoer	Adult	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		Dermally Absorbed Dose (DAD) (mg/kg-day) = DA-event x EV x ED x EF x SA x 1/BW x 1/AT where for organic compounds, Absorbed Dose per Event (DA-event) (mg/cm^2-event) = 2 FA x Kp x Cw x CF2 x SQRT ((6 x tau-event x t-event)/pi) or DA-event = FA x Kp x Cw x (t-event(1+B)) + 2 x tau-event x ((1+(3 x B) + (3 x B x B))/(1 + B)2)) and where for inorganic compounds, DA-event = Kp x Cw x CF2 x t-event
				FA	Fraction Absorbed Water	Chemical-specific	unitless		
				Kp	Permeability Constant	Chemical-specific	cm/hr		
				SA	Skin Surface Area	20,900	cm^2	USEPA 2014 (total body)	
				tau-event	Lag time per event	Chemical-specific	hours/event		
				t-event	Event Duration	0.25	hours/event	Assumes boater spends 15 minutes in water after going overboard	
				B	Ratio of permeability coefficient of chemical through stratum corneum relative to permeability coefficient across the epidermis	Chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	18	days/year	Assumes boater goes overboard 2 times per month from spring through fall	
				ED	Exposure Duration	8	years	Site-specific, as per agreement with EPA	
				CF2	Volumetric Conversion Factor for Water	0.001	L/cm^3		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	2,920	days	USEPA 1989	

Table 4.13 Values used for Daily Intake Calculations
Surface Water Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe:	**Current**
Medium:	**Surface Water**
Exposure Medium:	**Surface Water**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal Contact	Kayaker/ Canoer	Older child (6–18)	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		Dermally Absorbed Dose (DAD) (mg/kg-day) = DA-event x EV x ED x EF x SA x 1/BW x 1/AT where for organic compounds, Absorbed Dose per Event (DA-event) (mg/cm^2-event) = 2 FA x Kp x Cw x CF2 x SQRT ((6 x tau-event x t-event)/pi) or DA-event = FA x Kp x Cw x (t-event(1+B)) + 2 x tau-event x ((1+(3 x B) + (3 x B x B))/(1 + B)2)) and where for inorganic compounds, DA-event = Kp x Cw x CF2 x t-event
				FA	Fraction Absorbed Water	Chemical-specific	unitless		
				Kp	Permeability Constant	Chemical-specific	cm/hr		
				SA	Skin Surface Area	14,180	cm^2	USEPA 2011 (Total body)	
				tau-event	Lag time per event	Chemical-specific	hours/event		
				t-event	Event Duration	0.25	hours/event	Assumes boater spends 15 minutes in water after going overboard	
				B	Ratio of permeability coefficient of chemical through stratum corneum relative to permeability coefficient across the epidermis	Chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	18	days/year	Assumes boater goes overboard 2 times per month from spring through fall	
				ED	Exposure Duration	12	years	Site-specific	
				CF2	Volumetric Conversion Factor for Water	0.001	L/cm^3		
				BW	Body Weight	48.8	kg	USEPA 2011, age-weighted males and females	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

USEPA. 2011. Exposure factors handbook: 2011 edition. EPA/600/R-09/052F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment. September.

USEPA. 2014. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Table 4.14 Values used for Daily Intake Calculations
Surface Water Contact: Central Tendency
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Incidental Ingestion	Kayaker/ Canoer	Adult	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		CDI (mg/kg-day) = Cw x IRw x ET x EV x EF x ED x 1/BW x 1/AT
				IR_w	Incidental Ingestion Rate	0.05	L/hr	USEPA 1989	
				ET	Exposure Time	0.08	hr/event	Assumes boater spends 5 minutes in water after going overboard	
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	9	days/yr	Assumes boater goes overboard once per month from spring through fall	
				ED	Exposure Duration	12	years	USEPA 2011	
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	
Dermal Contact	Kayaker/ Canoer	Adult	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		Dermally Absorbed Dose (DAD) (mg/kg-day) = DA-event x EV x ED x EF x SA x 1/BW x 1/AT where for organic compounds, Absorbed Dose per Event (DA-event) (mg/cm^2-event) = 2 FA x Kp x Cw x CF2 x SQRT ((6 x tau-event x t-event)/pi) or DA-event = FA x Kp x Cw x (t-event(1+B)) + 2 x tau-event x ((1+(3 x B) + (3 x B x B))/(1 + B)2)) and where for inorganic compounds, DA-event = Kp x Cw x CF2 x t-event
				FA	Fraction Absorbed Water	Chemical-specific	unitless		
				Kp	Permeability Constant	Chemical-specific	cm/hr		
				SA	Skin Surface Area	20,900	cm^2	USEPA 2014 (total body)	
				tau-event	Lag time per event	Chemical-specific	hours/event		
				t-event	Event Duration	0.08	hours/event	Best Professional Judgment	
				B	Ratio of permeability coefficient of chemical through stratum corneum relative to permeability coefficient across the epidermis	Chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	9	days/year	Assumes boater goes overboard once per month from spring through fall	
				ED	Exposure Duration	12	years	USEPA 2011	
				CF2	Volumetric Conversion Factor for Water	0.001	L/cm^3		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

USEPA. 2011. Exposure factors handbook: 2011 edition. EPA/600/R-09/052F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment. September.

USEPA. 2014. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Table 4.15 Values used for Daily Intake Calculations
Surface Water Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Incidental Ingestion	Kayaker/ Canoer	Adult	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		CDI (mg/kg-day) = Cw x IRw x ET x EV x EF x ED x 1/BW x 1/AT
				IR_w	Incidental Ingestion Rate	0.05	L/hr	USEPA 1989	
				ET	Exposure Time	0.25	hr/event	Assumes boater spends 15 minutes in water after going overboard	
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	39	days/yr	Assumes 1 event per week for spring through fall months	
				ED	Exposure Duration	8	years	Site-specific, as per agreement with EPA	
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	2,920	days	USEPA 1989	
		Older child (6–18)	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		CDI (mg/kg-day) = Cw x IRw x ET x EV x EF x ED x 1/BW x 1/AT
				IR_w	Incidental Ingestion Rate	0.05	L/hr	USEPA 1989	
				ET	Exposure Time	0.25	hr/event	Assumes boater spends 15 minutes in water after going overboard	
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	39	days/yr	Assumes 1 event per week for spring through fall months	
				ED	Exposure Duration	12	years	Site-specific	
				BW	Body Weight	48.8	kg	USEPA 2011, age-weighted males and females	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	
Dermal Contact	Kayaker/ Canoer	Adult	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		Dermally Absorbed Dose (DAD) (mg/kg-day) = DA-event x EV x ED x EF x SA x 1/BW x 1/AT where for organic compounds, Absorbed Dose per Event (DA-event) (mg/cm^2-event) = 2 FA x Kp x Cw x CF2 x SQRT ((6 x tau-event x t-event)/pi) or DA-event = FA x Kp x Cw x (t-event(1+B)) + 2 x tau-event x ((1+(3 x B) + (3 x B x B))/(1 + B)2)) and where for inorganic compounds, DA-event = Kp x Cw x CF2 x t-event
				FA	Fraction Absorbed Water	Chemical-specific	unitless		
				Kp	Permeability Constant	Chemical-specific	cm/hr		
				SA	Skin Surface Area	20,900	cm^2	USEPA 2014 (total body)	
				tau-event	Lag time per event	Chemical-specific	hours/event		
				t-event	Event Duration	0.25	hours/event	Assumes boater spends 15 minutes in water after going overboard	
				B	Ratio of permeability coefficient of chemical through stratum corneum relative to permeability coefficient across the epidermis	Chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	39	days/yr	Assumes 1 event per week for spring through fall months	
				ED	Exposure Duration	8	years	Site-specific, as per agreement with EPA	
				CF2	Volumetric Conversion Factor for Water	0.001	L/cm^3		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	2,920	days	USEPA 1989	

Table 4.15 Values used for Daily Intake Calculations
Surface Water Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe:	**Future**
Medium:	**Surface Water**
Exposure Medium:	**Surface Water**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal Contact	Kayaker/ Canoer	Older child (6–18)	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		Dermally Absorbed Dose (DAD) (mg/kg-day) = DA-event x EV x ED x EF x SA x 1/BW x 1/AT where for organic compounds, Absorbed Dose per Event (DA-event) (mg/cm^2-event) = 2 FA x Kp x Cw x CF2 x SQRT ((6 x tau-event x t-event)/pi) or DA-event = FA x Kp x Cw x (t-event(1+B)) + 2 x tau-event x ((1+(3 x B) + (3 x B x B))/(1 + B)2)) and where for inorganic compounds, DA-event = Kp x Cw x CF2 x t-event
				FA	Fraction Absorbed Water	Chemical-specific	unitless		
				Kp	Permeability Constant	Chemical-specific	cm/hr		
				SA	Skin Surface Area	14,180	cm^2	USEPA 2011 (Total body)	
				tau-event	Lag time per event	Chemical-specific	hours/event		
				t-event	Event Duration	0.25	hours/event	Assumes boater spends 15 minutes in water after going overboard	
				B	Ratio of permeability coefficient of chemical through stratum corneum relative to permeability coefficient across the epidermis	Chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	39	days/yr	Assumes 1 event per week for spring through fall months	
				ED	Exposure Duration	12	years	Site-specific	
				CF2	Volumetric Conversion Factor for Water	0.001	L/cm^3		
				BW	Body Weight	48.8	kg	USEPA 2011, age-weighted males and females	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

USEPA. 2011. Exposure factors handbook: 2011 edition. EPA/600/R-09/052F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment. September.

USEPA. 2014. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Table 4.16 Values used for Daily Intake Calculations
Surface Water Contact: Central Tendency
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe:	**Future**
Medium:	**Surface Water**
Exposure Medium:	**Surface Water**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Incidental Ingestion	Kayaker/ Canoer	Adult	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		CDI (mg/kg-day) = Cw x IRw x ET x EV x EF x ED x 1/BW x 1/AT
				IR_w	Incidental Ingestion Rate	0.05	L/hr	USEPA 1989	
				ET	Exposure Time	0.08	hr/event	Assumes boater spends 5 minutes in water after going overboard	
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	19	days/yr	Assumes event every other week during spring through fall months	
				ED	Exposure Duration	12	years	USEPA 2011	
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	
Dermal Contact	Kayaker/ Canoer	Adult	Surface water	Cw	Chemical Concentration in Surface Water	TBD	mg/l		Dermally Absorbed Dose (DAD) (mg/kg-day) = DA-event x EV x ED x EF x SA x 1/BW x 1/AT where for organic compounds, Absorbed Dose per Event (DA-event) (mg/cm^2-event) = 2 FA x Kp x Cw x CF2 x SQRT ((6 x tau-event x t-event)/pi) or DA-event = FA x Kp x Cw x (t-event(1+B)) + 2 x tau-event x ((1+(3 x B) + (3 x B x B))/(1 + B)2)) and where for inorganic compounds, DA-event = Kp x Cw x CF2 x t-event
				FA	Fraction Absorbed Water	Chemical-specific	unitless		
				Kp	Permeability Constant	Chemical-specific	cm/hr		
				SA	Skin Surface Area	20,900	cm^2	USEPA 2014 (total body)	
				tau-event	Lag time per event	Chemical-specific	hours/event		
				t-event	Event Duration	0.08	hours/event	Best Professional Judgment	
				B	Ratio of permeability coefficient of chemical through stratum corneum relative to permeability coefficient across the epidermis	Chemical-specific	unitless		
				EV	Event Frequency	1	events/day	USEPA 1989	
				EF	Exposure Frequency	19	days/yr	Assumes event every other week during spring through fall months	
				ED	Exposure Duration	12	years	USEPA 2011	
				CF2	Volumetric Conversion Factor for Water	0.001	L/cm^3		
				BW	Body Weight	80	kg	USEPA 2014	
				ATc	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
				ATnc	Averaging Time - Noncancer	4,380	days	USEPA 1989	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

USEPA. 2011. Exposure factors handbook: 2011 edition. EPA/600/R-09/052F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment. September.

USEPA. 2014. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Table 4.17 Values used for Daily Intake Calculations
Surface Water Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Inhalation	Angler/ Crabber	Adult	Volatiles released from surface water to ambient air	C_A	Chemical Concentration in Air	TBD	mg/m^3		Exposure Concentration (mg/m^3) = CA x ET x EF x ED x CF x 1/AT
				ET	Exposure Time	9.5	hours/day	USEPA 1997	
				EF	Exposure Frequency	27	days/yr	Site-specific	
				ED	Exposure Duration	8	yrs	USEPA 2014, Sum of receptor age categories is 26	
				CF	Conversion Factor	0.04	day/hours		
				AT_{nc}	Averaging Time - Noncancer	2,920	days	USEPA 1989	
				AT_c	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
		Older child (6–18)	Volatiles released from surface water to ambient air	C_A	Chemical Concentration in Air	TBD	mg/m^3		Exposure Concentration (mg/m^3) = CA x ET x EF x ED x CF x 1/AT
				ET	Exposure Time	9.5	hours/day	USEPA 1997	
				EF	Exposure Frequency	27	days/yr	Site-specific	
				ED	Exposure Duration	12	yrs	USEPA 2014, Sum of receptor age categories is 26	
				CF	Conversion Factor	0.04	day/hours		
				AT_{nc}	Averaging Time - Noncancer	4,380	days	USEPA 1989	
				AT_c	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
	Construction worker	Adult	Volatiles released from surface water to ambient air	C_A	Chemical Concentration in Air	TBD	mg/m^3		Exposure Concentration (mg/m^3) = CA x ET x EF x ED x CF x 1/AT
				ET	Exposure Time	8	hours/day	USEPA 2014	
				EF	Exposure Frequency	40	days/yr	Assumes activities take 2 months to complete	
				ED	Exposure Duration	1	yrs	USEPA 2002	
				CF	Conversion Factor	0.04	day/hours		
				AT_{nc}	Averaging Time - Noncancer	365	days	USEPA 1989	
				AT_c	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

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USEPA. 2002. Supplemental guidance for developing soil screening levels for Superfund sites. OSWER 9355.4-24. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. December.

USEPA. 2014. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Table 4.18 Values used for Daily Intake Calculations
Surface Water Contact: Central Tendency
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Inhalation	Angler/ Crabber	Adult	Volatiles released from surface water to ambient air	C_A	Chemical Concentration in Air	TBD	mg/m^3		Exposure Concentration (mg/m^3) = CA x ET x EF x ED x CF x 1/AT
				ET	Exposure Time	3.5	hours/day	USEPA 1997	
				EF	Exposure Frequency	15	days/yr	Site-specific	
				ED	Exposure Duration	12	yrs	USEPA 2011	
				CF	Conversion Factor	0.04	day/hours		
				AT_{nc}	Averaging Time - Noncancer	4,380	days	USEPA 1989	
				AT_c	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
	Construction worker	Adult	Volatiles released from surface water to ambient air	C_A	Chemical Concentration in Air	TBD	mg/m^3		Exposure Concentration (mg/m^3) = CA x ET x EF x ED x CF x 1/AT
				ET	Exposure Time	8	hours/day	USEPA 2014	
				EF	Exposure Frequency	10	days/yr	Assumes activities take 2 weeks to complete	
				ED	Exposure Duration	1	yrs	USEPA 2002	
				CF	Conversion Factor	0.04	day/hours		
				AT_{nc}	Averaging Time - Noncancer	365	days	USEPA 1989	
				AT_c	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

USEPA. 1997. Exposure factors handbook. Final. EPA/600/P-95/002Fa,b,c. U.S. Environmental Protection Agency, Office of Health and Environmental Assessment, Washington, DC. August. 1193 pp.

USEPA. 2002. Supplemental guidance for developing soil screening levels for Superfund sites. OSWER 9355.4-24. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. December.

USEPA. 2011. Exposure factors handbook: 2011 edition. EPA/600/R-09/052F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment.

USEPA. 2014. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Table 4.19 Values used for Daily Intake Calculations
Surface Water Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Inhalation	Kayaker/ Canoer	Adult	Volatiles released from surface water to ambient air	C_A	Chemical Concentration in Air	TBD	mg/m^3		Exposure Concentration (mg/m^3) = CA x ET x EF x ED x CF x 1/AT
				ET	Exposure Time	4	hours/day	Site-specific	
				EF	Exposure Frequency	18	days/yr	Assumes 2 events per month for spring through fall months	
				ED	Exposure Duration	8	years	Site-specific, as per agreement with EPA	
				CF	Conversion Factor	0.04	day/hours		
				AT_{nc}	Averaging Time - Noncancer	2,920	days	USEPA 1989	
				AT_c	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
		Older child (6–18)	Volatiles released from surface water to ambient air	C_A	Chemical Concentration in Air	TBD	mg/m^3		Exposure Concentration (mg/m^3) = CA x ET x EF x ED x CF x 1/AT
				ET	Exposure Time	4	hours/day	Site-specific	
				EF	Exposure Frequency	18	days/yr	Assumes 2 events per month for spring through fall months	
				ED	Exposure Duration	12	yrs	Site-specific	
				CF	Conversion Factor	0.04	day/hours		
				AT_{nc}	Averaging Time - Noncancer	4,380	days	USEPA 1989	
				AT_c	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

USEPA. 2014. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Table 4.20 Values used for Daily Intake Calculations
Surface Water Contact: Central Tendency
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Inhalation	Kayaker/ Canoer	Adult	Volatiles released from surface water to ambient air	C_A	Chemical Concentration in Air	TBD	mg/m^3		Exposure Concentration (mg/m^3) = CA x ET x EF x ED x CF x 1/AT
				ET	Exposure Time	2	hours/day	Site-specific	
				EF	Exposure Frequency	9	days/yr	Assumes 1 event per month for spring through fall months	
				ED	Exposure Duration	12	yrs	USEPA 2011	
				CF	Conversion Factor	0.04	day/hours		
				AT_{nc}	Averaging Time - Noncancer	4,380	days	USEPA 1989	
				AT_c	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

USEPA. 2011. Exposure factors handbook: 2011 edition. EPA/600/R-09/052F. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment. September.

USEPA. 2014. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Table 4.21 Values used for Daily Intake Calculations
Surface Water Contact: Reasonable Maximum Exposure
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Inhalation	Kayaker/ Canoer	Adult	Volatiles released from surface water to ambient air	C_A	Chemical Concentration in Air	TBD	mg/m^3		Exposure Concentration (mg/m^3) = CA x ET x EF x ED x CF x 1/AT
				ET	Exposure Time	4	hours/day	Site-specific	
				EF	Exposure Frequency	39	days/yr	Assumes 1 event per week for spring through fall months	
				ED	Exposure Duration	8	years	Site-specific, as per agreement with EPA	
				CF	Conversion Factor	0.04	day/hours		
				AT_{nc}	Averaging Time - Noncancer	2,920	days	USEPA 1989	
				AT_c	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	
		Older Child (6-18)	Volatiles released from surface water to ambient air	C_A	Chemical Concentration in Air	TBD	mg/m^3		Exposure Concentration (mg/m^3) = CA x ET x EF x ED x CF x 1/AT
				ET	Exposure Time	4	hours/day	Site-specific	
				EF	Exposure Frequency	39	days/yr	Assumes 1 event per week for spring through fall months	
				ED	Exposure Duration	12	yrs	Site-specific	
				CF	Conversion Factor	0.04	day/hours		
				AT_{nc}	Averaging Time - Noncancer	4,380	days	USEPA 1989	
				AT_c	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

USEPA. 2014. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Table 4.22 Values used for Daily Intake Calculations
Surface Water Contact: Central Tendency
Berry's Creek Study Area
Risk Assessment Guidance for Superfund (RAGS) - Part D, Table 4

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Inhalation	Kayaker/ Canoer	Adult	Volatiles released from surface water to ambient air	C_A	Chemical Concentration in Air	TBD	mg/m^3		Exposure Concentration (mg/m^3) = CA x ET x EF x ED x CF x 1/AT
				ET	Exposure Time	2	hours/day	Site-specific	
				EF	Exposure Frequency	19	days/yr	Assumes event every other week during spring through fall months	
				ED	Exposure Duration	12	yrs	USEPA 2011	
				CF	Conversion Factor	0.04	day/hours		
				AT_{nc}	Averaging Time - Noncancer	4,380	days	USEPA 1989	
				AT_c	Averaging Time - Cancer	25,550	days	USEPA 1989, 2014	

Sources:

USEPA. 1989. Risk assessment guidance for Superfund (RAGS). Volume I: Human health evaluation manual (Part A). EPA/540/1-89/002. Interim Final. Available at: www.epa.gov/oswer/riskassessment/ragsa/pdf/rags-vol1-pta_complete.pdf. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. December. 287 pp.

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USEPA. 2014. Human health evaluation manual, supplemental guidance: Update of standard default exposure factors. OSWER Directive 9200.1-120. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. 7 pp. February 6.

Draft
Exhibit 5: RAGS D Table 7 Calculation of Cancer Risk and Noncancer Hazards

Exposure and Risk Estimates

Berry's Creek Study Area Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

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TABLE 7.1 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Ingestion	Metals	Antimony	1.3	mg/kg	1.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00031
					Arsenic	50	mg/kg	3.2E-07	mg/kg-day	1.5E+00	(mg/kg-day)	4.8E-07	2.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0093
					Cadmium	34	mg/kg	3.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0032
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	1.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0047
					Copper	350	mg/kg	3.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00081
					Iron	29000	mg/kg	3.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0039
					Manganese	2600	mg/kg	2.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0017
					Mercury	280	mg/kg	3.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-05	mg/kg-day	3.0E-04	mg/kg-day	0.088
					Nickel	88	mg/kg	9.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00041
					Thallium	3.1	mg/kg	3.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-07	mg/kg-day	1.0E-05	mg/kg-day	0.029
					Zinc	3100	mg/kg	3.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-04	mg/kg-day	3.0E-01	mg/kg-day	0.00096
				PAHs	Benz[a]anthracene	1.2	mg/kg	1.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.9E-09	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	1.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-07	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	2.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-08	2.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	7.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.3E-08	6.3E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	1.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	2.8E-10	mg/kg-day	1.7E+01	(mg/kg-day)	4.8E-09	2.5E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000082
					Heptachlor epoxide	0.12	mg/kg	1.3E-09	mg/kg-day	9.1E+00	(mg/kg-day)	1.2E-08	1.1E-08	mg/kg-day	1.3E-05	mg/kg-day	0.00085
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	6.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.3E-07	5.7E-07	mg/kg-day	2.0E-05	mg/kg-day	0.028
			Exp. Route Total									8.5E-07					0.17
			Dermal	Metals	Antimony	1.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	50	mg/kg	2.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.4E-07	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0067
					Cadmium	34	mg/kg	5.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.5E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0018
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	350	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	280	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	88	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	3100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.2	mg/kg	2.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-08	2.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	3.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.6E-07	3.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	4.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.2E-08	3.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	1.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	9.8E-08	1.2E-07	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	2.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.9E-08	2.3E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.12	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.3E-07	mg/kg-day	2.0E+00	(mg/kg-day)	2.6E-07	1.1E-06	mg/kg-day	2.0E-05	mg/kg-day	0.057
			Exp. Route Total									1.0E-06					0.065
		Exposure Point Total										1.9E-06					0.24
	Exposure Medium Total											1.9E-06					0.24
Sediment Total												1.9E-06					0.24

TABLE 7.1 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	**Exposure Medium**	**Exposure Point**	**Exposure Route**	**Chemical Class**	**COPC**	**Value**	**Units**	**Value**	**Units**	**Value**	**Units**	**Cancer Risk**	**Value**	**Units**	**Value**	**Units**	**Hazard Quotient**
Surface Water	White Perch Fillet	White Perch Fillet in UBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	1.8	mg/kg	4.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00092
					Iron	16	mg/kg	3.7E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00046
					Manganese	0.5	mg/kg	1.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-05	mg/kg-day	1.4E-01	mg/kg-day	0.000073
					Mercury (inorganic)	0.1	mg/kg	2.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0069
					Selenium	0.79	mg/kg	1.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0032
				Organometals	Methyl mercury	0.48	mg/kg	1.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	9.7E-06	mg/kg-day	1.0E-04	mg/kg-day	0.097
				PCBs	PCBs (total Aroclors)	1.5	mg/kg	3.4E-06	mg/kg-day	2.0E+00	(mg/kg-day)	6.8E-06	3.0E-05	mg/kg-day	2.0E-05	mg/kg-day	1.5
			Exp. Route Total									6.8E-06					1.6
		Exposure Point Total										6.8E-06					1.6
	Exposure Medium Total											6.8E-06					1.6
	Surface Water Total	Surface Water Total in UBC	Dermal	Metals	Arsenic	4	ug/l	4.9E-09	mg/kg-day	1.5E+00	(mg/kg-day)	7.3E-09	4.3E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00014
					Thallium	0.44	ug/l	5.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00046
				Volatiles	Vinyl chloride	0.25	ug/l	3.0E-09	mg/kg-day	7.2E-01	(mg/kg-day)	2.2E-09	2.6E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000088
			Exp. Route Total									9.5E-09					0.00061
		Exposure Point Total										9.5E-09					0.00061
	Exposure Medium Total											9.5E-09					0.00061
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	1.4E-07	mg/m3	NA	(mg/kg-day)	NA	1.2E-06	mg/m3	3.0E-04	mg/m3	0.004
			Exp. Route Total									NA					0.004
		Exposure Point Total										NA					0.004
	Exposure Medium Total											NA					0.004
Surface Water Total												6.8E-06					1.6
Total Receptor Risks												9E-06					2

Notes:
-- = not detected
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek

TABLE 7.2 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Ingestion	Metals	Antimony	1.3	mg/kg	3.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00051
					Arsenic	50	mg/kg	7.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-06	4.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.015
					Cadmium	34	mg/kg	8.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0052
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	4.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0078
					Copper	350	mg/kg	9.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0013
					Iron	29000	mg/kg	7.7E-04	mg/kg-day	NA	(mg/kg-day)	NA	4.5E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0064
					Manganese	2600	mg/kg	6.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0028
					Mercury	280	mg/kg	7.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.14
					Nickel	88	mg/kg	2.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00066
					Thallium	3.1	mg/kg	8.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-07	mg/kg-day	1.0E-05	mg/kg-day	0.048
					Zinc	3100	mg/kg	8.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-04	mg/kg-day	3.0E-01	mg/kg-day	0.0016
				PAHs	Benz[a]anthracene	1.2	mg/kg	8.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.9E-08	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	1.3E-07	mg/kg-day	7.3E+00	(mg/kg-day)	9.1E-07	2.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	1.6E-07	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-07	3.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	4.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	3.5E-07	1.0E-07	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	9.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.9E-08	2.0E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	6.9E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.2E-08	4.0E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00013
					Heptachlor epoxide	0.12	mg/kg	3.1E-09	mg/kg-day	9.1E+00	(mg/kg-day)	2.8E-08	1.8E-08	mg/kg-day	1.3E-05	mg/kg-day	0.0014
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.6E-07	mg/kg-day	2.0E+00	(mg/kg-day)	3.2E-07	9.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.047
			Exp. Route Total									3.0E-06					0.28
			Dermal	Metals	Antimony	1.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	50	mg/kg	2.4E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.7E-07	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0048
					Cadmium	34	mg/kg	5.5E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0013
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	350	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	280	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	88	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	3100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.2	mg/kg	6.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.8E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	1.0E-07	mg/kg-day	7.3E+00	(mg/kg-day)	7.4E-07	2.2E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	1.3E-07	mg/kg-day	7.3E-01	(mg/kg-day)	9.3E-08	2.8E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	3.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-07	8.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	7.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.5E-08	1.6E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.12	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.4E-07	mg/kg-day	2.0E+00	(mg/kg-day)	2.8E-07	8.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.041
			Exp. Route Total									1.9E-06					0.047
		Exposure Point Total										4.9E-06					0.33
	Exposure Medium Total											4.9E-06					0.33
Sediment Total												4.9E-06					0.33

TABLE 7.2 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	**Exposure Medium**	**Exposure Point**	**Exposure Route**	**Chemical Class**	**COPC**	**Value**	**Units**	**Value**	**Units**	**Value**	**Units**	**Cancer Risk**	**Value**	**Units**	**Value**	**Units**	**Hazard Quotient**
Surface Water	White Perch Fillet	White Perch Fillet in UBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	1.8	mg/kg	6.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.001
					Iron	16	mg/kg	6.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0005
					Manganese	0.5	mg/kg	1.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00008
					Mercury (inorganic)	0.1	mg/kg	3.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0076
					Selenium	0.79	mg/kg	3.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0035
				Organometals	Methyl mercury	0.48	mg/kg	1.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	1.0E-04	mg/kg-day	0.11
				PCBs	PCBs (total Aroclors)	1.5	mg/kg	5.6E-06	mg/kg-day	2.0E+00	(mg/kg-day)	1.1E-05	3.3E-05	mg/kg-day	2.0E-05	mg/kg-day	1.6
			Exp. Route Total									1.1E-05					1.8
		Exposure Point Total										1.1E-05					1.8
	Exposure Medium Total											1.1E-05					1.8
	Surface Water Total	Surface Water Total in UBC	Dermal	Metals	Arsenic	4	ug/l	7.8E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-08	4.6E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00015
					Thallium	0.44	ug/l	8.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-09	mg/kg-day	1.0E-05	mg/kg-day	0.0005
				Volatiles	Vinyl chloride	0.25	ug/l	3.9E-07	mg/kg-day	7.2E-01	(mg/kg-day)	2.8E-07	2.8E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000094
			Exp. Route Total									2.9E-07					0.00066
		Exposure Point Total										2.9E-07					0.00066
	Exposure Medium Total											2.9E-07					0.00066
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	2.1E-07	mg/m3	NA	(mg/kg-day)	NA	1.2E-06	mg/m3	3.0E-04	mg/m3	0.004
			Exp. Route Total									NA					0.004
		Exposure Point Total										NA					0.004
	Exposure Medium Total											NA					0.004
Surface Water Total												1.1E-05					1.8
Total Receptor Risks												2E-05					2

Notes:
-- = not detected
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek

TABLE 7.3 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in UBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	1.8	mg/kg	5.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0016
					Iron	16	mg/kg	4.9E-05	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00081
					Manganese	0.5	mg/kg	1.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00013
					Mercury (inorganic)	0.1	mg/kg	3.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.012
					Selenium	0.79	mg/kg	2.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0057
				Organometals	Methyl mercury	0.48	mg/kg	1.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	1.0E-04	mg/kg-day	0.17
				PCBs	PCBs (total Aroclors)	1.5	mg/kg	4.5E-06	mg/kg-day	2.0E+00	(mg/kg-day)	9.0E-06	5.3E-05	mg/kg-day	2.0E-05	mg/kg-day	2.6
			Exp. Route Total									9.0E-06					2.8
		Exposure Point Total										9.0E-06					2.8
	Exposure Medium Total											9.0E-06					2.8
Surface Water Total												9.0E-06					2.8
Total Receptor Risks												9E-06					3

Notes:
-- = not detected
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek

TABLE 7.4 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Ingestion	Metals	Antimony	1.3	mg/kg	1.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00031
					Arsenic	50	mg/kg	3.2E-07	mg/kg-day	1.5E+00	(mg/kg-day)	4.8E-07	2.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0093
					Cadmium	34	mg/kg	3.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0032
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	1.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0047
					Copper	350	mg/kg	3.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00081
					Iron	29000	mg/kg	3.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0039
					Manganese	2600	mg/kg	2.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0017
					Mercury	280	mg/kg	3.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-05	mg/kg-day	3.0E-04	mg/kg-day	0.088
					Nickel	88	mg/kg	9.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00041
					Thallium	3.1	mg/kg	3.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-07	mg/kg-day	1.0E-05	mg/kg-day	0.029
					Zinc	3100	mg/kg	3.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-04	mg/kg-day	3.0E-01	mg/kg-day	0.00096
				PAHs	Benz[a]anthracene	1.2	mg/kg	1.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.9E-09	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	1.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-07	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	2.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-08	2.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	7.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.3E-08	6.3E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	1.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	2.8E-10	mg/kg-day	1.7E+01	(mg/kg-day)	4.8E-09	2.5E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000082
					Heptachlor epoxide	0.12	mg/kg	1.3E-09	mg/kg-day	9.1E+00	(mg/kg-day)	1.2E-08	1.1E-08	mg/kg-day	1.3E-05	mg/kg-day	0.00085
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	6.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.3E-07	5.7E-07	mg/kg-day	2.0E-05	mg/kg-day	0.028
			Exp. Route Total									8.5E-07					0.17
			Dermal	Metals	Antimony	1.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	50	mg/kg	2.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.4E-07	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0067
					Cadmium	34	mg/kg	5.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.5E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0018
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	350	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	280	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	88	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	3100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.2	mg/kg	2.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-08	2.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	3.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.6E-07	3.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	4.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.2E-08	3.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	1.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	9.8E-08	1.2E-07	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	2.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.9E-08	2.3E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.12	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.3E-07	mg/kg-day	2.0E+00	(mg/kg-day)	2.6E-07	1.1E-06	mg/kg-day	2.0E-05	mg/kg-day	0.057
			Exp. Route Total									1.0E-06					0.065
		Exposure Point Total										1.9E-06					0.24
	Exposure Medium Total											1.9E-06					0.24
Sediment Total												1.9E-06					0.24

TABLE 7.4 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in UBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	3.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0069
					Iron	11	mg/kg	2.7E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00033
					Manganese	35	mg/kg	8.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.1E-04	mg/kg-day	1.4E-01	mg/kg-day	0.005
					Mercury (inorganic)	0.01	mg/kg	2.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00068
					Selenium	1	mg/kg	2.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0041
				Organometals	Methyl mercury	0.26	mg/kg	6.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-06	mg/kg-day	1.0E-04	mg/kg-day	0.053
				PCBs	PCBs (total Aroclors)	0.013	mg/kg	3.0E-08	mg/kg-day	2.0E+00	(mg/kg-day)	5.9E-08	2.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.013
			Exp. Route Total									5.9E-08					0.082
		Exposure Point Total										5.9E-08					0.082
	Exposure Medium Total											5.9E-08					0.082
	Surface Water Total	Surface Water Total in UBC	Dermal	Metals	Arsenic	4	ug/l	4.9E-09	mg/kg-day	1.5E+00	(mg/kg-day)	7.3E-09	4.3E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00014
					Thallium	0.44	ug/l	5.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00046
				Volatiles	Vinyl chloride	0.25	ug/l	3.0E-09	mg/kg-day	7.2E-01	(mg/kg-day)	2.2E-09	2.6E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000088
			Exp. Route Total									9.5E-09					0.00061
		Exposure Point Total										9.5E-09					0.00061
	Exposure Medium Total											9.5E-09					0.00061
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	1.4E-07	mg/m3	NA	(mg/kg-day)	NA	1.2E-06	mg/m3	3.0E-04	mg/m3	0.004
			Exp. Route Total									NA					0.004
		Exposure Point Total										NA					0.004
	Exposure Medium Total											NA					0.004
Surface Water Total												6.8E-08					0.087
Total Receptor Risks												2E-06					0.3

Notes:
-- = not detected
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek

TABLE 7.5 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Ingestion	Metals	Antimony	1.3	mg/kg	3.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00051
					Arsenic	50	mg/kg	7.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-06	4.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.015
					Cadmium	34	mg/kg	8.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0052
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	4.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0078
					Copper	350	mg/kg	9.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0013
					Iron	29000	mg/kg	7.7E-04	mg/kg-day	NA	(mg/kg-day)	NA	4.5E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0064
					Manganese	2600	mg/kg	6.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0028
					Mercury	280	mg/kg	7.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.14
					Nickel	88	mg/kg	2.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00066
					Thallium	3.1	mg/kg	8.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-07	mg/kg-day	1.0E-05	mg/kg-day	0.048
					Zinc	3100	mg/kg	8.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-04	mg/kg-day	3.0E-01	mg/kg-day	0.0016
				PAHs	Benz[a]anthracene	1.2	mg/kg	8.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.9E-08	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	1.3E-07	mg/kg-day	7.3E+00	(mg/kg-day)	9.1E-07	2.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	1.6E-07	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-07	3.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	4.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	3.5E-07	1.0E-07	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	9.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.9E-08	2.0E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	6.9E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.2E-08	4.0E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00013
					Heptachlor epoxide	0.12	mg/kg	3.1E-09	mg/kg-day	9.1E+00	(mg/kg-day)	2.8E-08	1.8E-08	mg/kg-day	1.3E-05	mg/kg-day	0.0014
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.6E-07	mg/kg-day	2.0E+00	(mg/kg-day)	3.2E-07	9.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.047
			Exp. Route Total									3.0E-06					0.28
			Dermal	Metals	Antimony	1.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	50	mg/kg	2.4E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.7E-07	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0048
					Cadmium	34	mg/kg	5.5E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0013
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	350	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	280	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	88	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	3100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.2	mg/kg	6.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.8E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	1.0E-07	mg/kg-day	7.3E+00	(mg/kg-day)	7.4E-07	2.2E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	1.3E-07	mg/kg-day	7.3E-01	(mg/kg-day)	9.3E-08	2.8E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	3.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-07	8.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	7.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.5E-08	1.6E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.12	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.4E-07	mg/kg-day	2.0E+00	(mg/kg-day)	2.8E-07	8.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.041
			Exp. Route Total									1.9E-06					0.047
		Exposure Point Total										4.9E-06					0.33
	Exposure Medium Total											4.9E-06					0.33
Sediment Total												4.9E-06					0.33

TABLE 7.5 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in UBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	5.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0075
					Iron	11	mg/kg	4.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00036
					Manganese	35	mg/kg	1.3E-04	mg/kg-day	NA	(mg/kg-day)	NA	7.7E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0055
					Mercury (inorganic)	0.01	mg/kg	3.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00074
					Selenium	1	mg/kg	3.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0045
				Organometals	Methyl mercury	0.26	mg/kg	9.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-06	mg/kg-day	1.0E-04	mg/kg-day	0.058
				PCBs	PCBs (total Aroclors)	0.013	mg/kg	4.8E-08	mg/kg-day	2.0E+00	(mg/kg-day)	9.7E-08	2.8E-07	mg/kg-day	2.0E-05	mg/kg-day	0.014
			Exp. Route Total									9.7E-08					0.09
		Exposure Point Total										9.7E-08					0.09
	Exposure Medium Total											9.7E-08					0.09
	Surface Water Total	Surface Water Total in UBC	Dermal	Metals	Arsenic	4	ug/l	7.8E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-08	4.6E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00015
					Thallium	0.44	ug/l	8.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-09	mg/kg-day	1.0E-05	mg/kg-day	0.0005
				Volatiles	Vinyl chloride	0.25	ug/l	3.9E-07	mg/kg-day	7.2E-01	(mg/kg-day)	2.8E-07	2.8E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000094
			Exp. Route Total									2.9E-07					0.00066
		Exposure Point Total										2.9E-07					0.00066
	Exposure Medium Total											2.9E-07					0.00066
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	2.1E-07	mg/m3	NA	(mg/kg-day)	NA	1.2E-06	mg/m3	3.0E-04	mg/m3	0.004
			Exp. Route Total									NA					0.004
		Exposure Point Total										NA					0.004
	Exposure Medium Total											NA					0.004
Surface Water Total												3.9E-07					0.095
Total Receptor Risks												5E-06					0.4

Notes:
-- = not detected
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek

TABLE 7.6 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in UBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	4.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-04	mg/kg-day	4.0E-02	mg/kg-day	0.012
					Iron	11	mg/kg	3.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00059
					Manganese	35	mg/kg	1.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-03	mg/kg-day	1.4E-01	mg/kg-day	0.0089
					Mercury (inorganic)	0.01	mg/kg	3.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0012
					Selenium	1	mg/kg	3.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0072
				Organometals	Methyl mercury	0.26	mg/kg	8.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.3E-06	mg/kg-day	1.0E-04	mg/kg-day	0.093
				PCBs	PCBs (total Aroclors)	0.013	mg/kg	3.9E-08	mg/kg-day	2.0E+00	(mg/kg-day)	7.8E-08	4.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.023
			Exp. Route Total									7.8E-08					0.15
		Exposure Point Total										7.8E-08					0.15
	Exposure Medium Total											7.8E-08					0.15
Surface Water Total												7.8E-08					0.15
Total Receptor Risks												8E-08					0.1

Notes:
-- = not detected
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek

TABLE 7.7 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Ingestion	Metals	Antimony	1.3	mg/kg	1.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00031
					Arsenic	50	mg/kg	3.2E-07	mg/kg-day	1.5E+00	(mg/kg-day)	4.8E-07	2.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0093
					Cadmium	34	mg/kg	3.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0032
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	1.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0047
					Copper	350	mg/kg	3.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00081
					Iron	29000	mg/kg	3.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0039
					Manganese	2600	mg/kg	2.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0017
					Mercury	280	mg/kg	3.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-05	mg/kg-day	3.0E-04	mg/kg-day	0.088
					Nickel	88	mg/kg	9.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00041
					Thallium	3.1	mg/kg	3.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-07	mg/kg-day	1.0E-05	mg/kg-day	0.029
					Zinc	3100	mg/kg	3.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-04	mg/kg-day	3.0E-01	mg/kg-day	0.00096
				PAHs	Benz[a]anthracene	1.2	mg/kg	1.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.9E-09	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	1.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-07	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	2.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-08	2.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	7.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.3E-08	6.3E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	1.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	2.8E-10	mg/kg-day	1.7E+01	(mg/kg-day)	4.8E-09	2.5E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000082
					Heptachlor epoxide	0.12	mg/kg	1.3E-09	mg/kg-day	9.1E+00	(mg/kg-day)	1.2E-08	1.1E-08	mg/kg-day	1.3E-05	mg/kg-day	0.00085
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	6.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.3E-07	5.7E-07	mg/kg-day	2.0E-05	mg/kg-day	0.028
			Exp. Route Total									8.5E-07					0.17
			Dermal	Metals	Antimony	1.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	50	mg/kg	2.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.4E-07	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0067
					Cadmium	34	mg/kg	5.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.5E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0018
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	350	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	280	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	88	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	3100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.2	mg/kg	2.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-08	2.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	3.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.6E-07	3.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	4.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.2E-08	3.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	1.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	9.8E-08	1.2E-07	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	2.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.9E-08	2.3E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.12	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.3E-07	mg/kg-day	2.0E+00	(mg/kg-day)	2.6E-07	1.1E-06	mg/kg-day	2.0E-05	mg/kg-day	0.057
			Exp. Route Total									1.0E-06					0.065
		Exposure Point Total										1.9E-06					0.24
	Exposure Medium Total											1.9E-06					0.24
Sediment Total												1.9E-06					0.24

TABLE 7.7 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in UBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	3.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0069
					Iron	11	mg/kg	2.7E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00033
					Manganese	35	mg/kg	8.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.1E-04	mg/kg-day	1.4E-01	mg/kg-day	0.005
					Mercury (inorganic)	0.013	mg/kg	3.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0009
					Selenium	1	mg/kg	2.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0041
				Organometals	Methyl mercury	0.25	mg/kg	5.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-06	mg/kg-day	1.0E-04	mg/kg-day	0.051
				PCBs	PCBs (total Aroclors)	0.18	mg/kg	4.1E-07	mg/kg-day	2.0E+00	(mg/kg-day)	8.3E-07	3.6E-06	mg/kg-day	2.0E-05	mg/kg-day	0.18
			Exp. Route Total									8.3E-07					0.25
		Exposure Point Total										8.3E-07					0.25
	Exposure Medium Total											8.3E-07					0.25
	Surface Water Total	Surface Water Total in UBC	Dermal	Metals	Arsenic	4	ug/l	4.9E-09	mg/kg-day	1.5E+00	(mg/kg-day)	7.3E-09	4.3E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00014
					Thallium	0.44	ug/l	5.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00046
				Volatiles	Vinyl chloride	0.25	ug/l	3.0E-09	mg/kg-day	7.2E-01	(mg/kg-day)	2.2E-09	2.6E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000088
			Exp. Route Total									9.5E-09					0.00061
		Exposure Point Total										9.5E-09					0.00061
	Exposure Medium Total											9.5E-09					0.00061
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	1.4E-07	mg/m3	NA	(mg/kg-day)	NA	1.2E-06	mg/m3	3.0E-04	mg/m3	0.004
			Exp. Route Total									NA					0.004
		Exposure Point Total										NA					0.004
	Exposure Medium Total											NA					0.004
Surface Water Total												8.4E-07					0.25
Total Receptor Risks												3E-06					0.5

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.8 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Ingestion	Metals	Antimony	1.3	mg/kg	3.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00051
					Arsenic	50	mg/kg	7.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-06	4.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.015
					Cadmium	34	mg/kg	8.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0052
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	4.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0078
					Copper	350	mg/kg	9.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0013
					Iron	29000	mg/kg	7.7E-04	mg/kg-day	NA	(mg/kg-day)	NA	4.5E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0064
					Manganese	2600	mg/kg	6.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0028
					Mercury	280	mg/kg	7.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.14
					Nickel	88	mg/kg	2.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00066
					Thallium	3.1	mg/kg	8.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-07	mg/kg-day	1.0E-05	mg/kg-day	0.048
					Zinc	3100	mg/kg	8.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-04	mg/kg-day	3.0E-01	mg/kg-day	0.0016
				PAHs	Benz[a]anthracene	1.2	mg/kg	8.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.9E-08	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	1.3E-07	mg/kg-day	7.3E+00	(mg/kg-day)	9.1E-07	2.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	1.6E-07	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-07	3.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	4.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	3.5E-07	1.0E-07	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	9.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.9E-08	2.0E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	6.9E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.2E-08	4.0E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00013
					Heptachlor epoxide	0.12	mg/kg	3.1E-09	mg/kg-day	9.1E+00	(mg/kg-day)	2.8E-08	1.8E-08	mg/kg-day	1.3E-05	mg/kg-day	0.0014
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.6E-07	mg/kg-day	2.0E+00	(mg/kg-day)	3.2E-07	9.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.047
			Exp. Route Total									3.0E-06					0.28
			Dermal	Metals	Antimony	1.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	50	mg/kg	2.4E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.7E-07	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0048
					Cadmium	34	mg/kg	5.5E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0013
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	350	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	280	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	88	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	3100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.2	mg/kg	6.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.8E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	1.0E-07	mg/kg-day	7.3E+00	(mg/kg-day)	7.4E-07	2.2E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	1.3E-07	mg/kg-day	7.3E-01	(mg/kg-day)	9.3E-08	2.8E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	3.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-07	8.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	7.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.5E-08	1.6E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.12	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.4E-07	mg/kg-day	2.0E+00	(mg/kg-day)	2.8E-07	8.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.041
			Exp. Route Total									1.9E-06					0.047
		Exposure Point Total										4.9E-06					0.33
	Exposure Medium Total											4.9E-06					0.33
Sediment Total												4.9E-06					0.33

TABLE 7.8 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in UBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	5.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0075
					Iron	11	mg/kg	4.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00036
					Manganese	35	mg/kg	1.3E-04	mg/kg-day	NA	(mg/kg-day)	NA	7.7E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0055
					Mercury (inorganic)	0.013	mg/kg	5.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00099
					Selenium	1	mg/kg	3.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0045
				Organometals	Methyl mercury	0.25	mg/kg	9.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.6E-06	mg/kg-day	1.0E-04	mg/kg-day	0.056
				PCBs	PCBs (total Aroclors)	0.18	mg/kg	6.8E-07	mg/kg-day	2.0E+00	(mg/kg-day)	1.4E-06	4.0E-06	mg/kg-day	2.0E-05	mg/kg-day	0.2
			Exp. Route Total									1.4E-06					0.27
		Exposure Point Total										1.4E-06					0.27
	Exposure Medium Total											1.4E-06					0.27
	Surface Water Total	Surface Water Total in UBC	Dermal	Metals	Arsenic	4	ug/l	7.8E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-08	4.6E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00015
					Thallium	0.44	ug/l	8.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-09	mg/kg-day	1.0E-05	mg/kg-day	0.0005
				Volatiles	Vinyl chloride	0.25	ug/l	3.9E-07	mg/kg-day	7.2E-01	(mg/kg-day)	2.8E-07	2.8E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000094
			Exp. Route Total									2.9E-07					0.00066
		Exposure Point Total										2.9E-07					0.00066
	Exposure Medium Total											2.9E-07					0.00066
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	2.1E-07	mg/m3	NA	(mg/kg-day)	NA	1.2E-06	mg/m3	3.0E-04	mg/m3	0.004
			Exp. Route Total									NA					0.004
		Exposure Point Total										NA					0.004
	Exposure Medium Total											NA					0.004
Surface Water Total												1.7E-06					0.28
Total Receptor Risks												7E-06					0.6

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.9 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in UBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	4.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-04	mg/kg-day	4.0E-02	mg/kg-day	0.012
					Iron	11	mg/kg	3.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00059
					Manganese	35	mg/kg	1.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-03	mg/kg-day	1.4E-01	mg/kg-day	0.0089
					Mercury (inorganic)	0.013	mg/kg	4.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0016
					Selenium	1	mg/kg	3.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0072
				Organometals	Methyl mercury	0.25	mg/kg	7.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.0E-06	mg/kg-day	1.0E-04	mg/kg-day	0.09
				PCBs	PCBs (total Aroclors)	0.18	mg/kg	5.5E-07	mg/kg-day	2.0E+00	(mg/kg-day)	1.1E-06	6.4E-06	mg/kg-day	2.0E-05	mg/kg-day	0.32
			Exp. Route Total									1.1E-06					0.44
		Exposure Point Total										1.1E-06					0.44
	Exposure Medium Total											1.1E-06					0.44
Surface Water Total												1.1E-06					0.44
Total Receptor Risks												1E-06					0.4

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.10 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in UBC	Ingestion	Metals	Antimony	1.2	mg/kg	8.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	7.5E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00019
					Arsenic	45	mg/kg	1.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.8E-07	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0055
					Cadmium	30	mg/kg	2.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	1.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
					Copper	330	mg/kg	2.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00051
					Iron	29000	mg/kg	2.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0026
					Manganese	2100	mg/kg	1.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-04	mg/kg-day	1.4E-01	mg/kg-day	0.00094
					Mercury	260	mg/kg	1.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-05	mg/kg-day	3.0E-04	mg/kg-day	0.053
					Nickel	81	mg/kg	5.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00025
					Thallium	2.7	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-07	mg/kg-day	1.0E-05	mg/kg-day	0.017
					Zinc	2700	mg/kg	1.9E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-04	mg/kg-day	3.0E-01	mg/kg-day	0.00056
				PAHs	Benz[a]anthracene	1	mg/kg	7.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	5.2E-09	6.2E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.5	mg/kg	1.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)	7.5E-08	9.0E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	1.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.7E-09	9.2E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.53	mg/kg	3.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-08	3.3E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.1	mg/kg	8.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	5.9E-09	7.1E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.041	mg/kg	2.9E-10	mg/kg-day	1.7E+01	(mg/kg-day)	4.9E-09	2.5E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000084
					Heptachlor epoxide	0.087	mg/kg	6.1E-10	mg/kg-day	9.1E+00	(mg/kg-day)	5.6E-09	5.4E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00041
				PCBs	PCBs (total Aroclors)	5.7	mg/kg	4.0E-08	mg/kg-day	2.0E+00	(mg/kg-day)	8.0E-08	3.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.018
			Exp. Route Total									5.0E-07					0.1
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	45	mg/kg	1.4E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.0E-07	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
					Cadmium	30	mg/kg	3.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	260	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	81	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	2700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1	mg/kg	1.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.7E-09	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.5	mg/kg	1.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-07	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	2.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-08	1.7E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.53	mg/kg	7.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.1E-08	6.1E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.1	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	1.3E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.041	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.087	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	5.7	mg/kg	8.0E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.6E-07	7.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.035
			Exp. Route Total									5.9E-07					0.04
		Exposure Point Total										1.1E-06					0.14
	Exposure Medium Total											1.1E-06					0.14
Sediment Total												1.1E-06					0.14

TABLE 7.10 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in UBC	Ingestion	Metals	Arsenic	4	ug/l	3.5E-09	mg/kg-day	1.5E+00	(mg/kg-day)	5.3E-09	3.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0001
					Thallium	0.44	ug/l	3.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00034
				PAHs	Benzo[a]pyrene	0.66	ug/l	5.8E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.2E-09	5.1E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	3	ug/l	2.6E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.9E-08	2.3E-08	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	0.25	ug/l	2.2E-10	mg/kg-day	7.2E-01	(mg/kg-day)	1.6E-10	2.0E-09	mg/kg-day	3.0E-03	mg/kg-day	0.00000065
			Exp. Route Total									2.9E-08					0.00044
			Dermal	Metals	Arsenic	4	ug/l	1.5E-09	mg/kg-day	1.5E+00	(mg/kg-day)	2.2E-09	1.3E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000043
					Thallium	0.44	ug/l	1.6E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00014
				Volatiles	Vinyl chloride	0.25	ug/l	2.1E-09	mg/kg-day	7.2E-01	(mg/kg-day)	1.5E-09	1.8E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000061
			Exp. Route Total									3.7E-09					0.00019
		Exposure Point Total										3.3E-08					0.00063
	Exposure Medium Total											3.3E-08					0.00063
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	3.8E-08	mg/m3	NA	(mg/kg-day)	NA	3.4E-07	mg/m3	3.0E-04	mg/m3	0.0011
			Exp. Route Total									NA					0.0011
		Exposure Point Total										NA					0.0011
	Exposure Medium Total											NA					0.0011
Surface Water Total												3.3E-08					0.0018
Total Receptor Risks												1E-06					0.1

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.11 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in UBC	Ingestion	Metals	Antimony	1.2	mg/kg	2.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00031
					Arsenic	45	mg/kg	4.7E-07	mg/kg-day	1.5E+00	(mg/kg-day)	7.0E-07	2.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0091
					Cadmium	30	mg/kg	5.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0031
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	2.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0049
					Copper	330	mg/kg	5.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00083
					Iron	29000	mg/kg	5.0E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0042
					Manganese	2100	mg/kg	3.7E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0015
					Mercury	260	mg/kg	4.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-05	mg/kg-day	3.0E-04	mg/kg-day	0.087
					Nickel	81	mg/kg	1.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00041
					Thallium	2.7	mg/kg	4.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-07	mg/kg-day	1.0E-05	mg/kg-day	0.028
					Zinc	2700	mg/kg	4.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-04	mg/kg-day	3.0E-01	mg/kg-day	0.00093
				PAHs	Benz[a]anthracene	1	mg/kg	4.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.5E-08	1.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.5	mg/kg	6.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	5.0E-07	1.5E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	7.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.1E-08	1.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.53	mg/kg	2.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.8E-07	5.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.1	mg/kg	5.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.9E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.041	mg/kg	7.0E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.2E-08	4.1E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00014
					Heptachlor epoxide	0.087	mg/kg	1.5E-09	mg/kg-day	9.1E+00	(mg/kg-day)	1.4E-08	8.8E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00068
				PCBs	PCBs (total Aroclors)	5.7	mg/kg	9.9E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.0E-07	5.8E-07	mg/kg-day	2.0E-05	mg/kg-day	0.029
			Exp. Route Total									1.7E-06					0.17
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	45	mg/kg	1.5E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.2E-07	8.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0028
					Cadmium	30	mg/kg	3.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-08	mg/kg-day	2.5E-05	mg/kg-day	0.00076
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	260	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	81	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	2700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1	mg/kg	3.8E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.8E-08	8.3E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.5	mg/kg	5.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.0E-07	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	5.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.1E-08	1.2E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.53	mg/kg	2.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-07	4.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.1	mg/kg	4.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.2E-08	9.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.041	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.087	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	5.7	mg/kg	8.6E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.7E-07	5.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.025
			Exp. Route Total									1.0E-06					0.029
		Exposure Point Total										2.8E-06					0.2
	Exposure Medium Total											2.8E-06					0.2
Sediment Total												2.8E-06					0.2

TABLE 7.11 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in UBC	Ingestion	Metals	Arsenic	4	ug/l	8.7E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.3E-08	5.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00017
					Thallium	0.44	ug/l	9.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00055
				PAHs	Benzo[a]pyrene	0.66	ug/l	3.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-08	8.3E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	3	ug/l	1.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-07	3.8E-08	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	0.25	ug/l	6.5E-08	mg/kg-day	7.2E-01	(mg/kg-day)	4.7E-08	3.2E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000011
			Exp. Route Total									2.2E-07					0.00072
			Dermal	Metals	Arsenic	4	ug/l	2.5E-09	mg/kg-day	1.5E+00	(mg/kg-day)	3.7E-09	1.4E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000048
					Thallium	0.44	ug/l	2.7E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00016
				Volatiles	Vinyl chloride	0.25	ug/l	4.2E-07	mg/kg-day	7.2E-01	(mg/kg-day)	3.0E-07	2.0E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000068
			Exp. Route Total									3.0E-07					0.00021
		Exposure Point Total										5.2E-07					0.00094
	Exposure Medium Total											5.2E-07					0.00094
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	5.8E-08	mg/m3	NA	(mg/kg-day)	NA	3.4E-07	mg/m3	3.0E-04	mg/m3	0.0011
			Exp. Route Total									NA					0.0011
		Exposure Point Total										NA					0.0011
	Exposure Medium Total											NA					0.0011
Surface Water Total												5.2E-07					0.0021
Total Receptor Risks												3E-06					0.2

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.12 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in UBC	Ingestion	Metals	Antimony	1.2	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00041
					Arsenic	45	mg/kg	4.1E-07	mg/kg-day	1.5E+00	(mg/kg-day)	6.2E-07	3.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.012
					Cadmium	30	mg/kg	4.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0041
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	2.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0065
					Copper	330	mg/kg	5.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0011
					Iron	29000	mg/kg	4.4E-04	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0056
					Manganese	2100	mg/kg	3.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-04	mg/kg-day	1.4E-01	mg/kg-day	0.002
					Mercury	260	mg/kg	4.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-05	mg/kg-day	3.0E-04	mg/kg-day	0.12
					Nickel	81	mg/kg	1.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00054
					Thallium	2.7	mg/kg	4.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-07	mg/kg-day	1.0E-05	mg/kg-day	0.037
					Zinc	2700	mg/kg	4.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-04	mg/kg-day	3.0E-01	mg/kg-day	0.0012
				PAHs	Benz[a]anthracene	1	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.5	mg/kg	2.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.6E-07	2.0E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	2.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-08	2.0E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.53	mg/kg	8.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.0E-08	7.1E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.1	mg/kg	1.8E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.3E-08	1.5E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.041	mg/kg	6.2E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.1E-08	5.4E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00018
					Heptachlor epoxide	0.087	mg/kg	1.3E-09	mg/kg-day	9.1E+00	(mg/kg-day)	1.2E-08	1.2E-08	mg/kg-day	1.3E-05	mg/kg-day	0.0009
				PCBs	PCBs (total Aroclors)	5.7	mg/kg	8.7E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.7E-07	7.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.038
			Exp. Route Total									1.1E-06					0.22
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	45	mg/kg	2.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	4.4E-07	2.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0086
					Cadmium	30	mg/kg	6.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0023
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	260	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	81	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	2700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1	mg/kg	2.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.1E-08	2.5E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.5	mg/kg	4.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	3.0E-07	3.6E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	4.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.1E-08	3.7E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.53	mg/kg	1.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-07	1.3E-07	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.1	mg/kg	3.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.4E-08	2.8E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.041	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.087	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	5.7	mg/kg	1.7E-07	mg/kg-day	2.0E+00	(mg/kg-day)	3.5E-07	1.5E-06	mg/kg-day	2.0E-05	mg/kg-day	0.076
			Exp. Route Total									1.3E-06					0.087
		Exposure Point Total										2.4E-06					0.31
	Exposure Medium Total											2.4E-06					0.31
Sediment Total												2.4E-06					0.31

TABLE 7.12 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in UBC	Ingestion	Metals	Arsenic	4	ug/l	7.7E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-08	6.7E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00022
					Thallium	0.44	ug/l	8.4E-10	mg/kg-day	NA	(mg/kg-day)	NA	7.3E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00073
				PAHs	Benzo[a]pyrene	0.66	ug/l	1.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	9.1E-09	1.1E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	3	ug/l	5.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.2E-08	5.0E-08	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	0.25	ug/l	4.8E-10	mg/kg-day	7.2E-01	(mg/kg-day)	3.5E-10	4.2E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000014
			Exp. Route Total									6.3E-08					0.00096
			Dermal	Metals	Arsenic	4	ug/l	3.2E-09	mg/kg-day	1.5E+00	(mg/kg-day)	4.8E-09	2.8E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000094
					Thallium	0.44	ug/l	3.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00031
				Volatiles	Vinyl chloride	0.25	ug/l	4.5E-09	mg/kg-day	7.2E-01	(mg/kg-day)	3.3E-09	4.0E-08	mg/kg-day	3.0E-03	mg/kg-day	0.000013
			Exp. Route Total									8.1E-09					0.00041
		Exposure Point Total										7.1E-08					0.0014
	Exposure Medium Total											7.1E-08					0.0014
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	8.3E-08	mg/m3	NA	(mg/kg-day)	NA	7.3E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												7.1E-08					0.0038
Total Receptor Risks												2E-06					0.3

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.13 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in UBC	Ingestion	Metals	Antimony	1.2	mg/kg	4.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00067
					Arsenic	45	mg/kg	1.0E-06	mg/kg-day	1.5E+00	(mg/kg-day)	1.5E-06	5.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
					Cadmium	30	mg/kg	1.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	6.6E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0066
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	5.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.011
					Copper	330	mg/kg	1.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.2E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0018
					Iron	29000	mg/kg	1.1E-03	mg/kg-day	NA	(mg/kg-day)	NA	6.4E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0091
					Manganese	2100	mg/kg	8.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0033
					Mercury	260	mg/kg	9.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-05	mg/kg-day	3.0E-04	mg/kg-day	0.19
					Nickel	81	mg/kg	3.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00088
					Thallium	2.7	mg/kg	1.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.06
					Zinc	2700	mg/kg	1.0E-04	mg/kg-day	NA	(mg/kg-day)	NA	6.0E-04	mg/kg-day	3.0E-01	mg/kg-day	0.002
				PAHs	Benz[a]anthracene	1	mg/kg	1.0E-07	mg/kg-day	7.3E-01	(mg/kg-day)	7.5E-08	2.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.5	mg/kg	1.5E-07	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-06	3.2E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	1.5E-07	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-07	3.3E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.53	mg/kg	5.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.0E-07	1.2E-07	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.1	mg/kg	1.2E-07	mg/kg-day	7.3E-01	(mg/kg-day)	8.5E-08	2.5E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.041	mg/kg	1.5E-09	mg/kg-day	1.7E+01	(mg/kg-day)	2.6E-08	8.9E-09	mg/kg-day	3.0E-05	mg/kg-day	0.0003
					Heptachlor epoxide	0.087	mg/kg	3.3E-09	mg/kg-day	9.1E+00	(mg/kg-day)	3.0E-08	1.9E-08	mg/kg-day	1.3E-05	mg/kg-day	0.0015
				PCBs	PCBs (total Aroclors)	5.7	mg/kg	2.1E-07	mg/kg-day	2.0E+00	(mg/kg-day)	4.3E-07	1.3E-06	mg/kg-day	2.0E-05	mg/kg-day	0.063
			Exp. Route Total									3.8E-06					0.37
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	45	mg/kg	3.1E-07	mg/kg-day	1.5E+00	(mg/kg-day)	4.7E-07	1.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0061
					Cadmium	30	mg/kg	7.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0017
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	260	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	81	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	2700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1	mg/kg	8.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.0E-08	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.5	mg/kg	1.2E-07	mg/kg-day	7.3E+00	(mg/kg-day)	8.8E-07	2.6E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	1.2E-07	mg/kg-day	7.3E-01	(mg/kg-day)	8.9E-08	2.6E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.53	mg/kg	4.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	3.2E-07	9.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.1	mg/kg	9.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.9E-08	2.0E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.041	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.087	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	5.7	mg/kg	1.9E-07	mg/kg-day	2.0E+00	(mg/kg-day)	3.7E-07	1.1E-06	mg/kg-day	2.0E-05	mg/kg-day	0.054
			Exp. Route Total									2.3E-06					0.062
		Exposure Point Total										6.0E-06					0.43
	Exposure Medium Total											6.0E-06					0.43
Sediment Total												6.0E-06					0.43

TABLE 7.13 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in UBC	Ingestion	Metals	Arsenic	4	ug/l	1.9E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.8E-08	1.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00037
					Thallium	0.44	ug/l	2.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0012
				PAHs	Benzo[a]pyrene	0.66	ug/l	8.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.1E-08	1.8E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	3	ug/l	3.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-07	8.2E-08	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	0.25	ug/l	6.6E-08	mg/kg-day	7.2E-01	(mg/kg-day)	4.8E-08	6.9E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000023
			Exp. Route Total									4.1E-07					0.0016
			Dermal	Metals	Arsenic	4	ug/l	5.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)	8.0E-09	3.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0001
					Thallium	0.44	ug/l	5.8E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00034
				Volatiles	Vinyl chloride	0.25	ug/l	4.2E-07	mg/kg-day	7.2E-01	(mg/kg-day)	3.0E-07	4.4E-08	mg/kg-day	3.0E-03	mg/kg-day	0.000015
			Exp. Route Total									3.1E-07					0.00046
		Exposure Point Total										7.3E-07					0.002
	Exposure Medium Total											7.3E-07					0.002
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	1.2E-07	mg/m3	NA	(mg/kg-day)	NA	7.3E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												7.3E-07					0.0045
Total Receptor Risks												7E-06					0.4

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.14 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in UBC	Ingestion	Metals	Aluminum	11000	mg/kg	7.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-03	mg/kg-day	1.0E+00	mg/kg-day	0.005
					Antimony	2.5	mg/kg	1.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	4.0E-04	mg/kg-day	0.0028
					Arsenic	37	mg/kg	1.4E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.1E-07	1.0E-05	mg/kg-day	3.0E-04	mg/kg-day	0.033
					Cadmium	21	mg/kg	1.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.5E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0095
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	12	mg/kg	7.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.019
					Copper	390	mg/kg	2.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0044
					Iron	26000	mg/kg	1.7E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-02	mg/kg-day	7.0E-01	mg/kg-day	0.017
					Manganese	780	mg/kg	5.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0025
					Mercury	200	mg/kg	1.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	9.2E-05	mg/kg-day	3.0E-04	mg/kg-day	0.31
					Nickel	72	mg/kg	4.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0016
					Thallium	2.4	mg/kg	1.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	1.0E-05	mg/kg-day	0.11
					Vanadium	41	mg/kg	2.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0037
					Zinc	2100	mg/kg	1.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	9.4E-04	mg/kg-day	3.0E-01	mg/kg-day	0.0031
				PAHs	Benzo[a]pyrene	1	mg/kg	6.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.9E-08	4.7E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.21	mg/kg	1.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	9.8E-09	9.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.063	mg/kg	4.1E-10	mg/kg-day	1.7E+01	(mg/kg-day)	6.9E-09	2.8E-08	mg/kg-day	3.0E-05	mg/kg-day	0.00095
					Heptachlor	0.018	mg/kg	1.2E-10	mg/kg-day	4.5E+00	(mg/kg-day)	5.4E-10	8.3E-09	mg/kg-day	5.0E-04	mg/kg-day	0.000017
					Heptachlor epoxide	0.077	mg/kg	5.0E-10	mg/kg-day	9.1E+00	(mg/kg-day)	4.5E-09	3.5E-08	mg/kg-day	1.3E-05	mg/kg-day	0.0027
				PCBs	PCBs (total Aroclors)	3.6	mg/kg	2.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.6E-08	1.6E-06	mg/kg-day	2.0E-05	mg/kg-day	0.081
				Volatiles	Trichloroethene	0.0015	mg/kg	9.8E-12	mg/kg-day	4.6E-02	(mg/kg-day)	4.5E-13	6.9E-10	mg/kg-day	5.0E-04	mg/kg-day	0.0000014
			Exp. Route Total									3.3E-07					0.6
			Dermal	Metals	Aluminum	11000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	2.5	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	37	mg/kg	2.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)	3.4E-08	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0053
					Cadmium	21	mg/kg	4.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0012
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	12	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	390	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	26000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	780	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	200	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	72	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	41	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	2100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	1	mg/kg	2.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.0E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.21	mg/kg	5.5E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.0E-09	3.9E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.063	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.018	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.077	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	3.6	mg/kg	1.0E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.0E-08	7.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.036
				Volatiles	Trichloroethene	0.0015	mg/kg	NA	mg/kg-day	4.6E-02	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
			Exp. Route Total									7.8E-08					0.042
		Exposure Point Total										4.1E-07					0.64
	Exposure Medium Total											4.1E-07					0.64
Sediment Total												4.1E-07					0.64

TABLE 7.14 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	2.1E-08	mg/m3	NA	(mg/kg-day)	NA	1.5E-06	mg/m3	3.0E-04	mg/m3	0.005
			Exp. Route Total									NA					0.005
		Exposure Point Total										NA					0.005
	Exposure Medium Total											NA					0.005
Surface Water Total												NA					0.005
Total Receptor Risks												4E-07					0.6

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.15 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in UPIC	Ingestion	Metals	Aluminum	16000	mg/kg	1.0E-04	mg/kg-day	NA	(mg/kg-day)	NA	7.2E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0072
					Antimony	2.2	mg/kg	1.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-06	mg/kg-day	4.0E-04	mg/kg-day	0.0025
					Arsenic	61	mg/kg	2.4E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.5E-07	1.6E-05	mg/kg-day	3.0E-04	mg/kg-day	0.055
					Cadmium	130	mg/kg	8.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-05	mg/kg-day	1.0E-03	mg/kg-day	0.058
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	1.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.029
					Copper	2700	mg/kg	1.7E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-03	mg/kg-day	4.0E-02	mg/kg-day	0.03
					Iron	34000	mg/kg	2.2E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-02	mg/kg-day	7.0E-01	mg/kg-day	0.022
					Manganese	680	mg/kg	4.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0022
					Mercury	280	mg/kg	1.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-04	mg/kg-day	3.0E-04	mg/kg-day	0.42
					Nickel	430	mg/kg	2.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-04	mg/kg-day	2.0E-02	mg/kg-day	0.0097
					Thallium	3.8	mg/kg	2.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-06	mg/kg-day	1.0E-05	mg/kg-day	0.17
					Vanadium	61	mg/kg	3.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0055
					Zinc	3500	mg/kg	2.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-03	mg/kg-day	3.0E-01	mg/kg-day	0.0053
				PAHs	Benzo[a]pyrene	1.2	mg/kg	7.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.7E-08	5.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.36	mg/kg	2.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.7E-08	1.6E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.05	mg/kg	3.2E-10	mg/kg-day	1.7E+01	(mg/kg-day)	5.5E-09	2.3E-08	mg/kg-day	3.0E-05	mg/kg-day	0.00075
					Heptachlor	0.029	mg/kg	1.9E-10	mg/kg-day	4.5E+00	(mg/kg-day)	8.4E-10	1.3E-08	mg/kg-day	5.0E-04	mg/kg-day	0.000026
					Heptachlor epoxide	0.11	mg/kg	7.1E-10	mg/kg-day	9.1E+00	(mg/kg-day)	6.5E-09	5.0E-08	mg/kg-day	1.3E-05	mg/kg-day	0.0038
				PCBs	PCBs (total Aroclors)	11	mg/kg	7.0E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.4E-07	4.9E-06	mg/kg-day	2.0E-05	mg/kg-day	0.25
				Volatiles	Trichloroethene	27	mg/kg	1.7E-07	mg/kg-day	4.6E-02	(mg/kg-day)	8.0E-09	1.2E-05	mg/kg-day	5.0E-04	mg/kg-day	0.024
			Exp. Route Total									5.9E-07					1.1
			Dermal	Metals	Aluminum	16000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	2.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	61	mg/kg	3.7E-08	mg/kg-day	1.5E+00	(mg/kg-day)	5.6E-08	2.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0087
					Cadmium	130	mg/kg	2.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-07	mg/kg-day	2.5E-05	mg/kg-day	0.0073
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	2700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	34000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	680	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	280	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	430	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	61	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	3500	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	1.2	mg/kg	3.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.3E-08	2.2E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.36	mg/kg	9.6E-10	mg/kg-day	7.3E+00	(mg/kg-day)	7.0E-09	6.7E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.05	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.029	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.11	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	11	mg/kg	3.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	6.2E-08	2.2E-06	mg/kg-day	2.0E-05	mg/kg-day	0.11
				Volatiles	Trichloroethene	27	mg/kg	NA	mg/kg-day	4.6E-02	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
			Exp. Route Total									1.5E-07					0.12
		Exposure Point Total										7.4E-07					1.2
	Exposure Medium Total											7.4E-07					1.2
Sediment Total												7.4E-07					1.2
Total Receptor Risks												7E-07					1

TABLE 7.15 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UPIC = Upper Peach Island Creek
-- = not detected

UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

TABLE 7.16 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Ingestion	Metals	Antimony	1.2	mg/kg	1.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00027
					Arsenic	19	mg/kg	1.2E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.8E-07	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0035
					Cadmium	3.5	mg/kg	3.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00033
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	2.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0058
					Copper	130	mg/kg	1.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0003
					Iron	35000	mg/kg	3.7E-04	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0046
					Manganese	8800	mg/kg	9.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0058
					Mercury	24	mg/kg	2.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0073
					Nickel	55	mg/kg	5.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00025
					Thallium	10	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.4E-07	mg/kg-day	1.0E-05	mg/kg-day	0.094
					Zinc	520	mg/kg	5.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00016
				PAHs	Benz[a]anthracene	1.1	mg/kg	1.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.1E-09	9.7E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	1.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.6E-08	1.0E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	1.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	3.9E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-08	3.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	8.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	6.3E-09	7.5E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	4.9E-10	mg/kg-day	1.7E+01	(mg/kg-day)	8.3E-09	4.3E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00014
					Heptachlor epoxide	0.016	mg/kg	1.7E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.5E-09	1.4E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00011
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.4E-08	1.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0073
			Exp. Route Total									3.6E-07					0.13
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	19	mg/kg	8.5E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.3E-07	7.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0025
					Cadmium	3.5	mg/kg	5.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	35000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	8800	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	55	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	10	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	520	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.1	mg/kg	2.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-08	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	2.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.6E-07	1.9E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	3.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.2E-08	2.6E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	7.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.3E-08	6.3E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	1.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-08	1.4E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	3.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	6.7E-08	2.9E-07	mg/kg-day	2.0E-05	mg/kg-day	0.015
			Exp. Route Total									4.6E-07					0.017
		Exposure Point Total										8.2E-07					0.15
	Exposure Medium Total											8.2E-07					0.15
Sediment Total												8.2E-07					0.15

TABLE 7.16 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	**Exposure Medium**	**Exposure Point**	**Exposure Route**	**Chemical Class**	**COPC**	**Value**	**Units**	**Value**	**Units**	**Value**	**Units**	**Cancer Risk**	**Value**	**Units**	**Value**	**Units**	**Hazard Quotient**
Surface Water	White Perch Fillet	White Perch Fillet in MBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	1.3	mg/kg	3.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00066
					Iron	11	mg/kg	2.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00031
					Manganese	0.53	mg/kg	1.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	1.4E-01	mg/kg-day	0.000077
					Mercury (inorganic)	0.21	mg/kg	4.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.014
					Selenium	0.84	mg/kg	1.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0034
				Organometals	Methyl mercury	0.41	mg/kg	9.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.4E-06	mg/kg-day	1.0E-04	mg/kg-day	0.084
				PCBs	PCBs (total Aroclors)	1.2	mg/kg	2.7E-06	mg/kg-day	2.0E+00	(mg/kg-day)	5.4E-06	2.3E-05	mg/kg-day	2.0E-05	mg/kg-day	1.2
			Exp. Route Total									5.4E-06					1.3
		Exposure Point Total										5.4E-06					1.3
	Exposure Medium Total											5.4E-06					1.3
	Surface Water Total	Surface Water Total in MBC	Dermal	Metals	Arsenic	3.6	ug/l	4.3E-09	mg/kg-day	1.5E+00	(mg/kg-day)	6.5E-09	3.8E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00013
					Thallium	0.56	ug/l	6.8E-10	mg/kg-day	NA	(mg/kg-day)	NA	6.0E-09	mg/kg-day	1.0E-05	mg/kg-day	0.0006
				Volatiles	Vinyl chloride	0.28	ug/l	3.3E-09	mg/kg-day	7.2E-01	(mg/kg-day)	2.4E-09	2.9E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000096
			Exp. Route Total									8.8E-09					0.00073
		Exposure Point Total										8.8E-09					0.00073
	Exposure Medium Total											8.8E-09					0.00073
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	8.4E-08	mg/m3	NA	(mg/kg-day)	NA	7.3E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												5.4E-06					1.3
Total Receptor Risks												6E-06					1

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.17 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Ingestion	Metals	Antimony	1.2	mg/kg	3.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00044
					Arsenic	19	mg/kg	2.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	4.4E-07	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0057
					Cadmium	3.5	mg/kg	9.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00053
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	4.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0095
					Copper	130	mg/kg	3.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00049
					Iron	35000	mg/kg	9.0E-04	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0075
					Manganese	8800	mg/kg	2.3E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-03	mg/kg-day	1.4E-01	mg/kg-day	0.0095
					Mercury	24	mg/kg	6.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.012
					Nickel	55	mg/kg	1.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	8.3E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00042
					Thallium	10	mg/kg	2.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-06	mg/kg-day	1.0E-05	mg/kg-day	0.15
					Zinc	520	mg/kg	1.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.9E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00026
				PAHs	Benz[a]anthracene	1.1	mg/kg	7.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.4E-08	1.6E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	7.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	5.7E-07	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	1.1E-07	mg/kg-day	7.3E-01	(mg/kg-day)	7.9E-08	2.3E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	2.6E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.9E-07	5.6E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	5.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.2E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	1.2E-09	mg/kg-day	1.7E+01	(mg/kg-day)	2.0E-08	7.0E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00023
					Heptachlor epoxide	0.016	mg/kg	4.1E-10	mg/kg-day	9.1E+00	(mg/kg-day)	3.7E-09	2.4E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00018
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	4.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	8.2E-08	2.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.012
			Exp. Route Total									1.5E-06					0.21
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	19	mg/kg	9.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.4E-07	5.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0018
					Cadmium	3.5	mg/kg	5.7E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00013
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	35000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	8800	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	55	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	10	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	520	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.1	mg/kg	6.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.4E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	6.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.6E-07	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	8.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.4E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	2.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-07	4.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	4.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.4E-08	1.0E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	3.6E-08	mg/kg-day	2.0E+00	(mg/kg-day)	7.2E-08	2.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.01
			Exp. Route Total									9.6E-07					0.012
		Exposure Point Total										2.4E-06					0.23
	Exposure Medium Total											2.4E-06					0.23
Sediment Total												2.4E-06					0.23

TABLE 7.17 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in MBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	1.3	mg/kg	5.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00072
					Iron	11	mg/kg	4.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00034
					Manganese	0.53	mg/kg	2.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-05	mg/kg-day	1.4E-01	mg/kg-day	0.000084
					Mercury (inorganic)	0.21	mg/kg	8.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.016
					Selenium	0.84	mg/kg	3.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0037
				Organometals	Methyl mercury	0.41	mg/kg	1.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	9.2E-06	mg/kg-day	1.0E-04	mg/kg-day	0.092
				PCBs	PCBs (total Aroclors)	1.2	mg/kg	4.4E-06	mg/kg-day	2.0E+00	(mg/kg-day)	8.8E-06	2.6E-05	mg/kg-day	2.0E-05	mg/kg-day	1.3
			Exp. Route Total									8.8E-06					1.4
		Exposure Point Total										8.8E-06					1.4
	Exposure Medium Total											8.8E-06					1.4
	Surface Water Total	Surface Water Total in MBC	Dermal	Metals	Arsenic	3.6	ug/l	6.9E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-08	4.0E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00013
					Thallium	0.56	ug/l	1.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	6.4E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00064
				Volatiles	Vinyl chloride	0.28	ug/l	4.2E-07	mg/kg-day	7.2E-01	(mg/kg-day)	3.0E-07	3.1E-08	mg/kg-day	3.0E-03	mg/kg-day	0.00001
			Exp. Route Total									3.1E-07					0.00078
		Exposure Point Total										3.1E-07					0.00078
	Exposure Medium Total											3.1E-07					0.00078
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	1.3E-07	mg/m3	NA	(mg/kg-day)	NA	7.3E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												9.1E-06					1.4
Total Receptor Risks												1E-05					2

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.18 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in MBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	1.3	mg/kg	4.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0012
					Iron	11	mg/kg	3.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00055
					Manganese	0.53	mg/kg	1.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00014
					Mercury (inorganic)	0.21	mg/kg	6.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.025
					Selenium	0.84	mg/kg	2.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-05	mg/kg-day	5.0E-03	mg/kg-day	0.006
				Organometals	Methyl mercury	0.41	mg/kg	1.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-05	mg/kg-day	1.0E-04	mg/kg-day	0.15
				PCBs	PCBs (total Aroclors)	1.2	mg/kg	3.6E-06	mg/kg-day	2.0E+00	(mg/kg-day)	7.1E-06	4.2E-05	mg/kg-day	2.0E-05	mg/kg-day	2.1
			Exp. Route Total									7.1E-06					2.3
		Exposure Point Total										7.1E-06					2.3
	Exposure Medium Total											7.1E-06					2.3
Surface Water Total												7.1E-06					2.3
Total Receptor Risks												7E-06					2

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.19 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Ingestion	Metals	Antimony	1.2	mg/kg	1.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00027
					Arsenic	19	mg/kg	1.2E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.8E-07	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0035
					Cadmium	3.5	mg/kg	3.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00033
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	2.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0058
					Copper	130	mg/kg	1.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0003
					Iron	35000	mg/kg	3.7E-04	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0046
					Manganese	8800	mg/kg	9.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0058
					Mercury	24	mg/kg	2.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0073
					Nickel	55	mg/kg	5.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00025
					Thallium	10	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.4E-07	mg/kg-day	1.0E-05	mg/kg-day	0.094
					Zinc	520	mg/kg	5.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00016
				PAHs	Benz[a]anthracene	1.1	mg/kg	1.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.1E-09	9.7E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	1.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.6E-08	1.0E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	1.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	3.9E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-08	3.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	8.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	6.3E-09	7.5E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	4.9E-10	mg/kg-day	1.7E+01	(mg/kg-day)	8.3E-09	4.3E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00014
					Heptachlor epoxide	0.016	mg/kg	1.7E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.5E-09	1.4E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00011
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.4E-08	1.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0073
			Exp. Route Total									3.6E-07					0.13
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	19	mg/kg	8.5E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.3E-07	7.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0025
					Cadmium	3.5	mg/kg	5.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	35000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	8800	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	55	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	10	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	520	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.1	mg/kg	2.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-08	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	2.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.6E-07	1.9E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	3.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.2E-08	2.6E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	7.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.3E-08	6.3E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	1.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-08	1.4E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	3.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	6.7E-08	2.9E-07	mg/kg-day	2.0E-05	mg/kg-day	0.015
			Exp. Route Total									4.6E-07					0.017
		Exposure Point Total										8.2E-07					0.15
	Exposure Medium Total											8.2E-07					0.15
Sediment Total												8.2E-07					0.15

TABLE 7.19 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	**Exposure Medium**	**Exposure Point**	**Exposure Route**	**Chemical Class**	**COPC**	**Value**	**Units**	**Value**	**Units**	**Value**	**Units**	**Cancer Risk**	**Value**	**Units**	**Value**	**Units**	**Hazard Quotient**
Surface Water	Blue Crab Muscle	Blue Crab Muscle in MBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	16	mg/kg	3.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0083
					Iron	34	mg/kg	8.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.0E-04	mg/kg-day	7.0E-01	mg/kg-day	0.001
					Manganese	62	mg/kg	1.4E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-03	mg/kg-day	1.4E-01	mg/kg-day	0.009
					Mercury (inorganic)	0.14	mg/kg	3.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0095
					Selenium	1.5	mg/kg	3.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0061
				Organometals	Methyl mercury	0.28	mg/kg	6.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.6E-06	mg/kg-day	1.0E-04	mg/kg-day	0.056
				PCBs	PCBs (total Aroclors)	0.04	mg/kg	9.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.9E-07	8.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.041
			Exp. Route Total									1.9E-07					0.13
		Exposure Point Total										1.9E-07					0.13
	Exposure Medium Total											1.9E-07					0.13
	Surface Water Total	Surface Water Total in MBC	Dermal	Metals	Arsenic	3.6	ug/l	4.3E-09	mg/kg-day	1.5E+00	(mg/kg-day)	6.5E-09	3.8E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00013
					Thallium	0.56	ug/l	6.8E-10	mg/kg-day	NA	(mg/kg-day)	NA	6.0E-09	mg/kg-day	1.0E-05	mg/kg-day	0.0006
				Volatiles	Vinyl chloride	0.28	ug/l	3.3E-09	mg/kg-day	7.2E-01	(mg/kg-day)	2.4E-09	2.9E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000096
			Exp. Route Total									8.8E-09					0.00073
		Exposure Point Total										8.8E-09					0.00073
	Exposure Medium Total											8.8E-09					0.00073
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	8.4E-08	mg/m3	NA	(mg/kg-day)	NA	7.3E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												1.9E-07					0.13
Total Receptor Risks												1E-06					0.3

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.20 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Ingestion	Metals	Antimony	1.2	mg/kg	3.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00044
					Arsenic	19	mg/kg	2.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	4.4E-07	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0057
					Cadmium	3.5	mg/kg	9.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00053
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	4.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0095
					Copper	130	mg/kg	3.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00049
					Iron	35000	mg/kg	9.0E-04	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0075
					Manganese	8800	mg/kg	2.3E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-03	mg/kg-day	1.4E-01	mg/kg-day	0.0095
					Mercury	24	mg/kg	6.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.012
					Nickel	55	mg/kg	1.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	8.3E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00042
					Thallium	10	mg/kg	2.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-06	mg/kg-day	1.0E-05	mg/kg-day	0.15
					Zinc	520	mg/kg	1.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.9E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00026
				PAHs	Benz[a]anthracene	1.1	mg/kg	7.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.4E-08	1.6E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	7.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	5.7E-07	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	1.1E-07	mg/kg-day	7.3E-01	(mg/kg-day)	7.9E-08	2.3E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	2.6E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.9E-07	5.6E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	5.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.2E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	1.2E-09	mg/kg-day	1.7E+01	(mg/kg-day)	2.0E-08	7.0E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00023
					Heptachlor epoxide	0.016	mg/kg	4.1E-10	mg/kg-day	9.1E+00	(mg/kg-day)	3.7E-09	2.4E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00018
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	4.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	8.2E-08	2.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.012
			Exp. Route Total									1.5E-06					0.21
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	19	mg/kg	9.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.4E-07	5.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0018
					Cadmium	3.5	mg/kg	5.7E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00013
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	35000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	8800	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	55	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	10	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	520	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.1	mg/kg	6.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.4E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	6.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.6E-07	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	8.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.4E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	2.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-07	4.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	4.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.4E-08	1.0E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	3.6E-08	mg/kg-day	2.0E+00	(mg/kg-day)	7.2E-08	2.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.01
			Exp. Route Total									9.6E-07					0.012
		Exposure Point Total										2.4E-06					0.23
	Exposure Medium Total											2.4E-06					0.23
Sediment Total												2.4E-06					0.23

TABLE 7.20 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in MBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	16	mg/kg	6.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0091
					Iron	34	mg/kg	1.3E-04	mg/kg-day	NA	(mg/kg-day)	NA	7.7E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0011
					Manganese	62	mg/kg	2.4E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-03	mg/kg-day	1.4E-01	mg/kg-day	0.0099
					Mercury (inorganic)	0.14	mg/kg	5.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
					Selenium	1.5	mg/kg	5.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0067
				Organometals	Methyl mercury	0.28	mg/kg	1.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	6.1E-06	mg/kg-day	1.0E-04	mg/kg-day	0.061
				PCBs	PCBs (total Aroclors)	0.04	mg/kg	1.5E-07	mg/kg-day	2.0E+00	(mg/kg-day)	3.1E-07	8.9E-07	mg/kg-day	2.0E-05	mg/kg-day	0.045
			Exp. Route Total									3.1E-07					0.14
		Exposure Point Total										3.1E-07					0.14
	Exposure Medium Total											3.1E-07					0.14
	Surface Water Total	Surface Water Total in MBC	Dermal	Metals	Arsenic	3.6	ug/l	6.9E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-08	4.0E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00013
					Thallium	0.56	ug/l	1.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	6.4E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00064
				Volatiles	Vinyl chloride	0.28	ug/l	4.2E-07	mg/kg-day	7.2E-01	(mg/kg-day)	3.0E-07	3.1E-08	mg/kg-day	3.0E-03	mg/kg-day	0.00001
			Exp. Route Total									3.1E-07					0.00078
		Exposure Point Total										3.1E-07					0.00078
	Exposure Medium Total											3.1E-07					0.00078
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	1.3E-07	mg/m3	NA	(mg/kg-day)	NA	7.3E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												6.2E-07					0.15
Total Receptor Risks												3E-06					0.4

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.21 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in MBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	16	mg/kg	5.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-04	mg/kg-day	4.0E-02	mg/kg-day	0.015
					Iron	34	mg/kg	1.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0018
					Manganese	62	mg/kg	1.9E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-03	mg/kg-day	1.4E-01	mg/kg-day	0.016
					Mercury (inorganic)	0.14	mg/kg	4.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.017
					Selenium	1.5	mg/kg	4.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-05	mg/kg-day	5.0E-03	mg/kg-day	0.011
				Organometals	Methyl mercury	0.28	mg/kg	8.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.9E-06	mg/kg-day	1.0E-04	mg/kg-day	0.099
				PCBs	PCBs (total Aroclors)	0.04	mg/kg	1.2E-07	mg/kg-day	2.0E+00	(mg/kg-day)	2.5E-07	1.4E-06	mg/kg-day	2.0E-05	mg/kg-day	0.072
			Exp. Route Total									2.5E-07					0.23
		Exposure Point Total										2.5E-07					0.23
	Exposure Medium Total											2.5E-07					0.23
Surface Water Total												2.5E-07					0.23
Total Receptor Risks												2E-07					0.2

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.22 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Ingestion	Metals	Antimony	1.2	mg/kg	1.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00027
					Arsenic	19	mg/kg	1.2E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.8E-07	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0035
					Cadmium	3.5	mg/kg	3.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00033
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	2.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0058
					Copper	130	mg/kg	1.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0003
					Iron	35000	mg/kg	3.7E-04	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0046
					Manganese	8800	mg/kg	9.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0058
					Mercury	24	mg/kg	2.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0073
					Nickel	55	mg/kg	5.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00025
					Thallium	10	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.4E-07	mg/kg-day	1.0E-05	mg/kg-day	0.094
					Zinc	520	mg/kg	5.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00016
				PAHs	Benz[a]anthracene	1.1	mg/kg	1.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.1E-09	9.7E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	1.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.6E-08	1.0E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	1.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	3.9E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-08	3.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	8.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	6.3E-09	7.5E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	4.9E-10	mg/kg-day	1.7E+01	(mg/kg-day)	8.3E-09	4.3E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00014
					Heptachlor epoxide	0.016	mg/kg	1.7E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.5E-09	1.4E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00011
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.4E-08	1.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0073
			Exp. Route Total									3.6E-07					0.13
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	19	mg/kg	8.5E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.3E-07	7.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0025
					Cadmium	3.5	mg/kg	5.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	35000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	8800	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	55	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	10	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	520	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.1	mg/kg	2.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-08	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	2.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.6E-07	1.9E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	3.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.2E-08	2.6E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	7.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.3E-08	6.3E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	1.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-08	1.4E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	3.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	6.7E-08	2.9E-07	mg/kg-day	2.0E-05	mg/kg-day	0.015
			Exp. Route Total									4.6E-07					0.017
		Exposure Point Total										8.2E-07					0.15
	Exposure Medium Total											8.2E-07					0.15
Sediment Total												8.2E-07					0.15

TABLE 7.22 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in MBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	16	mg/kg	3.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0083
					Iron	34	mg/kg	8.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.0E-04	mg/kg-day	7.0E-01	mg/kg-day	0.001
					Manganese	62	mg/kg	1.4E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-03	mg/kg-day	1.4E-01	mg/kg-day	0.009
					Mercury (inorganic)	0.12	mg/kg	2.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0082
					Selenium	1.5	mg/kg	3.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0061
				Organometals	Methyl mercury	0.19	mg/kg	4.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-06	mg/kg-day	1.0E-04	mg/kg-day	0.039
				PCBs	PCBs (total Aroclors)	0.13	mg/kg	3.0E-07	mg/kg-day	2.0E+00	(mg/kg-day)	6.0E-07	2.6E-06	mg/kg-day	2.0E-05	mg/kg-day	0.13
			Exp. Route Total									6.0E-07					0.2
		Exposure Point Total										6.0E-07					0.2
	Exposure Medium Total											6.0E-07					0.2
	Surface Water Total	Surface Water Total in MBC	Dermal	Metals	Arsenic	3.6	ug/l	4.3E-09	mg/kg-day	1.5E+00	(mg/kg-day)	6.5E-09	3.8E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00013
					Thallium	0.56	ug/l	6.8E-10	mg/kg-day	NA	(mg/kg-day)	NA	6.0E-09	mg/kg-day	1.0E-05	mg/kg-day	0.0006
				Volatiles	Vinyl chloride	0.28	ug/l	3.3E-09	mg/kg-day	7.2E-01	(mg/kg-day)	2.4E-09	2.9E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000096
			Exp. Route Total									8.8E-09					0.00073
		Exposure Point Total										8.8E-09					0.00073
	Exposure Medium Total											8.8E-09					0.00073
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	8.4E-08	mg/m3	NA	(mg/kg-day)	NA	7.3E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												6.1E-07					0.21
Total Receptor Risks												1E-06					0.4

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.23 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Ingestion	Metals	Antimony	1.2	mg/kg	3.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00044
					Arsenic	19	mg/kg	2.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	4.4E-07	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0057
					Cadmium	3.5	mg/kg	9.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00053
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	4.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0095
					Copper	130	mg/kg	3.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00049
					Iron	35000	mg/kg	9.0E-04	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0075
					Manganese	8800	mg/kg	2.3E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-03	mg/kg-day	1.4E-01	mg/kg-day	0.0095
					Mercury	24	mg/kg	6.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.012
					Nickel	55	mg/kg	1.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	8.3E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00042
					Thallium	10	mg/kg	2.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-06	mg/kg-day	1.0E-05	mg/kg-day	0.15
					Zinc	520	mg/kg	1.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.9E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00026
				PAHs	Benz[a]anthracene	1.1	mg/kg	7.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.4E-08	1.6E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	7.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	5.7E-07	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	1.1E-07	mg/kg-day	7.3E-01	(mg/kg-day)	7.9E-08	2.3E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	2.6E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.9E-07	5.6E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	5.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.2E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	1.2E-09	mg/kg-day	1.7E+01	(mg/kg-day)	2.0E-08	7.0E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00023
					Heptachlor epoxide	0.016	mg/kg	4.1E-10	mg/kg-day	9.1E+00	(mg/kg-day)	3.7E-09	2.4E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00018
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	4.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	8.2E-08	2.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.012
			Exp. Route Total									1.5E-06					0.21
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	19	mg/kg	9.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.4E-07	5.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0018
					Cadmium	3.5	mg/kg	5.7E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00013
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	35000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	8800	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	55	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	10	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	520	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.1	mg/kg	6.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.4E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	6.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.6E-07	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	8.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.4E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	2.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-07	4.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	4.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.4E-08	1.0E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	3.6E-08	mg/kg-day	2.0E+00	(mg/kg-day)	7.2E-08	2.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.01
			Exp. Route Total									9.6E-07					0.012
		Exposure Point Total										2.4E-06					0.23
	Exposure Medium Total											2.4E-06					0.23
Sediment Total												2.4E-06					0.23

TABLE 7.23 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in MBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	16	mg/kg	6.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0091
					Iron	34	mg/kg	1.3E-04	mg/kg-day	NA	(mg/kg-day)	NA	7.7E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0011
					Manganese	62	mg/kg	2.4E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-03	mg/kg-day	1.4E-01	mg/kg-day	0.0099
					Mercury (inorganic)	0.12	mg/kg	4.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.009
					Selenium	1.5	mg/kg	5.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0067
				Organometals	Methyl mercury	0.19	mg/kg	7.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-06	mg/kg-day	1.0E-04	mg/kg-day	0.043
				PCBs	PCBs (total Aroclors)	0.13	mg/kg	4.9E-07	mg/kg-day	2.0E+00	(mg/kg-day)	9.8E-07	2.9E-06	mg/kg-day	2.0E-05	mg/kg-day	0.14
			Exp. Route Total									9.8E-07					0.22
		Exposure Point Total										9.8E-07					0.22
	Exposure Medium Total											9.8E-07					0.22
	Surface Water Total	Surface Water Total in MBC	Dermal	Metals	Arsenic	3.6	ug/l	6.9E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-08	4.0E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00013
					Thallium	0.56	ug/l	1.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	6.4E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00064
				Volatiles	Vinyl chloride	0.28	ug/l	4.2E-07	mg/kg-day	7.2E-01	(mg/kg-day)	3.0E-07	3.1E-08	mg/kg-day	3.0E-03	mg/kg-day	0.00001
			Exp. Route Total									3.1E-07					0.00078
		Exposure Point Total										3.1E-07					0.00078
	Exposure Medium Total											3.1E-07					0.00078
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	1.3E-07	mg/m3	NA	(mg/kg-day)	NA	7.3E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												1.3E-06					0.22
Total Receptor Risks												4E-06					0.5

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.24 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in MBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	16	mg/kg	5.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-04	mg/kg-day	4.0E-02	mg/kg-day	0.015
					Iron	34	mg/kg	1.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0018
					Manganese	62	mg/kg	1.9E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-03	mg/kg-day	1.4E-01	mg/kg-day	0.016
					Mercury (inorganic)	0.12	mg/kg	3.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.015
					Selenium	1.5	mg/kg	4.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-05	mg/kg-day	5.0E-03	mg/kg-day	0.011
				Organometals	Methyl mercury	0.19	mg/kg	5.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.9E-06	mg/kg-day	1.0E-04	mg/kg-day	0.069
				PCBs	PCBs (total Aroclors)	0.13	mg/kg	4.0E-07	mg/kg-day	2.0E+00	(mg/kg-day)	7.9E-07	4.6E-06	mg/kg-day	2.0E-05	mg/kg-day	0.23
			Exp. Route Total									7.9E-07					0.36
		Exposure Point Total										7.9E-07					0.36
	Exposure Medium Total											7.9E-07					0.36
Surface Water Total												7.9E-07					0.36
Total Receptor Risks												8E-07					0.4

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.25 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC	Ingestion	Metals	Antimony	1.1	mg/kg	7.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00016
					Arsenic	18	mg/kg	7.4E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-07	6.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0022
					Cadmium	3.5	mg/kg	2.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00022
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0033
					Copper	130	mg/kg	9.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.0E-06	mg/kg-day	4.0E-02	mg/kg-day	0.0002
					Iron	34000	mg/kg	2.4E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-03	mg/kg-day	7.0E-01	mg/kg-day	0.003
					Manganese	6600	mg/kg	4.7E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0029
					Mercury	21	mg/kg	1.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0044
					Nickel	50	mg/kg	3.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00015
					Thallium	7.6	mg/kg	5.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-07	mg/kg-day	1.0E-05	mg/kg-day	0.047
					Zinc	500	mg/kg	3.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-05	mg/kg-day	3.0E-01	mg/kg-day	0.0001
				PAHs	Benz[a]anthracene	0.94	mg/kg	6.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	4.9E-09	5.8E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	9.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	7.1E-08	8.5E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.4	mg/kg	1.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.3E-09	8.8E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.39	mg/kg	2.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.0E-08	2.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.78	mg/kg	5.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)	4.0E-09	4.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.014	mg/kg	9.7E-11	mg/kg-day	1.7E+01	(mg/kg-day)	1.7E-09	8.5E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000028
					Heptachlor epoxide	0.014	mg/kg	1.0E-10	mg/kg-day	9.1E+00	(mg/kg-day)	9.2E-10	8.9E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000068
				PCBs	PCBs (total Aroclors)	1.4	mg/kg	1.0E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.0E-08	8.9E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0044
			Exp. Route Total									2.4E-07					0.068
			Dermal	Metals	Antimony	1.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	18	mg/kg	5.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.0E-08	4.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0015
					Cadmium	3.5	mg/kg	3.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00012
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	34000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	6600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	21	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	50	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	7.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	500	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.94	mg/kg	1.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.0E-09	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	1.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-07	1.6E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.4	mg/kg	1.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-08	1.6E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.39	mg/kg	5.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	3.7E-08	4.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.78	mg/kg	1.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.4E-09	8.9E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.014	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.014	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.4	mg/kg	2.0E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.1E-08	1.8E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0089
			Exp. Route Total									3.2E-07					0.011
		Exposure Point Total										5.6E-07					0.079
	Exposure Medium Total											5.6E-07					0.079
Sediment Total												5.6E-07					0.079

TABLE 7.25 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in MBC	Ingestion	Metals	Arsenic	3.6	ug/l	3.2E-09	mg/kg-day	1.5E+00	(mg/kg-day)	4.7E-09	2.8E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000092
					Thallium	0.56	ug/l	5.0E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00044
				PAHs	Benzo[a]pyrene	0.74	ug/l	6.5E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.7E-09	5.7E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	4.7	ug/l	4.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	3.0E-08	3.6E-08	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	0.28	ug/l	2.4E-10	mg/kg-day	7.2E-01	(mg/kg-day)	1.7E-10	2.1E-09	mg/kg-day	3.0E-03	mg/kg-day	0.00000071
			Exp. Route Total									4.0E-08					0.00053
			Dermal	Metals	Arsenic	3.6	ug/l	1.3E-09	mg/kg-day	1.5E+00	(mg/kg-day)	2.0E-09	1.2E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000038
					Thallium	0.56	ug/l	2.1E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00018
				Volatiles	Vinyl chloride	0.28	ug/l	2.3E-09	mg/kg-day	7.2E-01	(mg/kg-day)	1.6E-09	2.0E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000067
			Exp. Route Total									3.6E-09					0.00023
		Exposure Point Total										4.3E-08					0.00075
	Exposure Medium Total											4.3E-08					0.00075
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	2.3E-08	mg/m3	NA	(mg/kg-day)	NA	2.1E-07	mg/m3	3.0E-04	mg/m3	0.00068
			Exp. Route Total									NA					0.00068
		Exposure Point Total										NA					0.00068
	Exposure Medium Total											NA					0.00068
Surface Water Total												4.3E-08					0.0014
Total Receptor Risks												6E-07					0.08

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.26 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC	Ingestion	Metals	Antimony	1.1	mg/kg	1.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00027
					Arsenic	18	mg/kg	1.8E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.7E-07	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0036
					Cadmium	3.5	mg/kg	6.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00036
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	2.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0055
					Copper	130	mg/kg	2.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00033
					Iron	34000	mg/kg	5.9E-04	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0049
					Manganese	6600	mg/kg	1.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	6.7E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0048
					Mercury	21	mg/kg	3.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0072
					Nickel	50	mg/kg	8.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00025
					Thallium	7.6	mg/kg	1.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.7E-07	mg/kg-day	1.0E-05	mg/kg-day	0.077
					Zinc	500	mg/kg	8.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00017
				PAHs	Benz[a]anthracene	0.94	mg/kg	4.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.2E-08	9.5E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	6.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.7E-07	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.4	mg/kg	6.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.9E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.39	mg/kg	1.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-07	3.9E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.78	mg/kg	3.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.6E-08	7.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.014	mg/kg	2.4E-10	mg/kg-day	1.7E+01	(mg/kg-day)	4.1E-09	1.4E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000047
					Heptachlor epoxide	0.014	mg/kg	2.5E-10	mg/kg-day	9.1E+00	(mg/kg-day)	2.3E-09	1.5E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00011
				PCBs	PCBs (total Aroclors)	1.4	mg/kg	2.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	5.0E-08	1.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0073
			Exp. Route Total									1.0E-06					0.11
			Dermal	Metals	Antimony	1.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	18	mg/kg	5.7E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.5E-08	3.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0011
					Cadmium	3.5	mg/kg	3.8E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000088
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	34000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	6600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	21	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	50	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	7.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	500	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.94	mg/kg	3.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.6E-08	7.7E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	5.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	3.8E-07	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.4	mg/kg	5.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.9E-08	1.2E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.39	mg/kg	1.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-07	3.2E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.78	mg/kg	2.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.1E-08	6.3E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.014	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.014	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.4	mg/kg	2.2E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.3E-08	1.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0063
			Exp. Route Total									7.0E-07					0.0075
		Exposure Point Total										1.7E-06					0.12
	Exposure Medium Total											1.7E-06					0.12
Sediment Total												1.7E-06					0.12

TABLE 7.26 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in MBC	Ingestion	Metals	Arsenic	3.6	ug/l	7.8E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-08	4.5E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00015
					Thallium	0.56	ug/l	1.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	7.1E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00071
				PAHs	Benzo[a]pyrene	0.74	ug/l	4.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	3.1E-08	9.3E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	4.7	ug/l	2.7E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.0E-07	5.9E-08	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	0.28	ug/l	7.1E-08	mg/kg-day	7.2E-01	(mg/kg-day)	5.1E-08	3.5E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000012
			Exp. Route Total									2.9E-07					0.00087
			Dermal	Metals	Arsenic	3.6	ug/l	2.2E-09	mg/kg-day	1.5E+00	(mg/kg-day)	3.3E-09	1.3E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000043
					Thallium	0.56	ug/l	3.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-09	mg/kg-day	1.0E-05	mg/kg-day	0.0002
				Volatiles	Vinyl chloride	0.28	ug/l	4.5E-07	mg/kg-day	7.2E-01	(mg/kg-day)	3.3E-07	2.2E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000074
			Exp. Route Total									3.3E-07					0.00025
		Exposure Point Total										6.3E-07					0.0011
	Exposure Medium Total											6.3E-07					0.0011
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	3.5E-08	mg/m3	NA	(mg/kg-day)	NA	2.1E-07	mg/m3	3.0E-04	mg/m3	0.00068
			Exp. Route Total									NA					0.00068
		Exposure Point Total										NA					0.00068
	Exposure Medium Total											NA					0.00068
Surface Water Total												6.3E-07					0.0018
Total Receptor Risks												2E-06					0.1

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.27 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC	Ingestion	Metals	Antimony	1.1	mg/kg	1.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00035
					Arsenic	18	mg/kg	1.6E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.4E-07	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0047
					Cadmium	3.5	mg/kg	5.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00047
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	2.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0072
					Copper	130	mg/kg	2.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00044
					Iron	34000	mg/kg	5.2E-04	mg/kg-day	NA	(mg/kg-day)	NA	4.5E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0064
					Manganese	6600	mg/kg	1.0E-04	mg/kg-day	NA	(mg/kg-day)	NA	8.8E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0063
					Mercury	21	mg/kg	3.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0095
					Nickel	50	mg/kg	7.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.7E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00033
					Thallium	7.6	mg/kg	1.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-06	mg/kg-day	1.0E-05	mg/kg-day	0.1
					Zinc	500	mg/kg	7.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	6.7E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00022
				PAHs	Benz[a]anthracene	0.94	mg/kg	1.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	2.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-07	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.4	mg/kg	2.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.6E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.39	mg/kg	5.9E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.3E-08	5.2E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.78	mg/kg	1.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.6E-09	1.0E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.014	mg/kg	2.1E-10	mg/kg-day	1.7E+01	(mg/kg-day)	3.6E-09	1.8E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000061
					Heptachlor epoxide	0.014	mg/kg	2.2E-10	mg/kg-day	9.1E+00	(mg/kg-day)	2.0E-09	1.9E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00015
				PCBs	PCBs (total Aroclors)	1.4	mg/kg	2.2E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.4E-08	1.9E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0096
			Exp. Route Total									5.2E-07					0.15
			Dermal	Metals	Antimony	1.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	18	mg/kg	1.1E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.7E-07	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0034
					Cadmium	3.5	mg/kg	7.7E-10	mg/kg-day	NA	(mg/kg-day)	NA	6.7E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00027
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	34000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	6600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	21	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	50	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	7.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	500	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.94	mg/kg	2.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.0E-08	2.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	3.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-07	3.4E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.4	mg/kg	4.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.9E-08	3.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.39	mg/kg	1.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.1E-08	9.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.78	mg/kg	2.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.6E-08	1.9E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.014	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.014	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.4	mg/kg	4.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	8.8E-08	3.9E-07	mg/kg-day	2.0E-05	mg/kg-day	0.019
			Exp. Route Total									6.9E-07					0.023
		Exposure Point Total										1.2E-06					0.17
	Exposure Medium Total											1.2E-06					0.17
Sediment Total												1.2E-06					0.17

TABLE 7.27 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in MBC	Ingestion	Metals	Arsenic	3.6	ug/l	6.8E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-08	6.0E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0002
					Thallium	0.56	ug/l	1.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	9.4E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00094
				PAHs	Benzo[a]pyrene	0.74	ug/l	1.4E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.0E-08	1.2E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	4.7	ug/l	9.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.5E-08	7.8E-08	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	0.28	ug/l	5.3E-10	mg/kg-day	7.2E-01	(mg/kg-day)	3.8E-10	4.6E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000015
			Exp. Route Total									8.6E-08					0.0011
			Dermal	Metals	Arsenic	3.6	ug/l	2.9E-09	mg/kg-day	1.5E+00	(mg/kg-day)	4.3E-09	2.5E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000083
					Thallium	0.56	ug/l	4.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00039
				Volatiles	Vinyl chloride	0.28	ug/l	4.9E-09	mg/kg-day	7.2E-01	(mg/kg-day)	3.6E-09	4.3E-08	mg/kg-day	3.0E-03	mg/kg-day	0.000014
			Exp. Route Total									7.8E-09					0.00049
		Exposure Point Total										9.4E-08					0.0016
	Exposure Medium Total											9.4E-08					0.0016
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	5.1E-08	mg/m3	NA	(mg/kg-day)	NA	4.4E-07	mg/m3	3.0E-04	mg/m3	0.0015
			Exp. Route Total									NA					0.0015
		Exposure Point Total										NA					0.0015
	Exposure Medium Total											NA					0.0015
Surface Water Total												9.4E-08					0.0031
Total Receptor Risks												1E-06					0.2

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.28 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC	Ingestion	Metals	Antimony	1.1	mg/kg	4.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00058
					Arsenic	18	mg/kg	4.0E-07	mg/kg-day	1.5E+00	(mg/kg-day)	5.9E-07	2.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0077
					Cadmium	3.5	mg/kg	1.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.7E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00077
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	6.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.012
					Copper	130	mg/kg	4.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00071
					Iron	34000	mg/kg	1.3E-03	mg/kg-day	NA	(mg/kg-day)	NA	7.4E-03	mg/kg-day	7.0E-01	mg/kg-day	0.011
					Manganese	6600	mg/kg	2.5E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-03	mg/kg-day	1.4E-01	mg/kg-day	0.01
					Mercury	21	mg/kg	8.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.016
					Nickel	50	mg/kg	1.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00055
					Thallium	7.6	mg/kg	2.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-06	mg/kg-day	1.0E-05	mg/kg-day	0.17
					Zinc	500	mg/kg	1.9E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-04	mg/kg-day	3.0E-01	mg/kg-day	0.00037
				PAHs	Benz[a]anthracene	0.94	mg/kg	9.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.0E-08	2.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	1.4E-07	mg/kg-day	7.3E+00	(mg/kg-day)	1.0E-06	3.0E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.4	mg/kg	1.4E-07	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-07	3.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.39	mg/kg	3.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.9E-07	8.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.78	mg/kg	7.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.7E-08	1.7E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.014	mg/kg	5.2E-10	mg/kg-day	1.7E+01	(mg/kg-day)	8.8E-09	3.0E-09	mg/kg-day	3.0E-05	mg/kg-day	0.0001
					Heptachlor epoxide	0.014	mg/kg	5.4E-10	mg/kg-day	9.1E+00	(mg/kg-day)	4.9E-09	3.2E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00024
				PCBs	PCBs (total Aroclors)	1.4	mg/kg	5.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.1E-07	3.2E-07	mg/kg-day	2.0E-05	mg/kg-day	0.016
			Exp. Route Total									2.3E-06					0.24
			Dermal	Metals	Antimony	1.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	18	mg/kg	1.2E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.8E-07	7.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0024
					Cadmium	3.5	mg/kg	8.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	34000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	6600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	21	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	50	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	7.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	500	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.94	mg/kg	7.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.6E-08	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	1.1E-07	mg/kg-day	7.3E+00	(mg/kg-day)	8.2E-07	2.4E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.4	mg/kg	1.2E-07	mg/kg-day	7.3E-01	(mg/kg-day)	8.5E-08	2.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.39	mg/kg	3.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.3E-07	6.9E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.78	mg/kg	6.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.6E-08	1.4E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.014	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.014	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.4	mg/kg	4.7E-08	mg/kg-day	2.0E+00	(mg/kg-day)	9.4E-08	2.7E-07	mg/kg-day	2.0E-05	mg/kg-day	0.014
			Exp. Route Total									1.5E-06					0.016
		Exposure Point Total										3.8E-06					0.26
	Exposure Medium Total											3.8E-06					0.26
Sediment Total												3.8E-06					0.26

TABLE 7.28 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in MBC	Ingestion	Metals	Arsenic	3.6	ug/l	1.7E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.5E-08	9.8E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00033
					Thallium	0.56	ug/l	2.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0015
				PAHs	Benzo[a]pyrene	0.74	ug/l	9.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.8E-08	2.0E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	4.7	ug/l	6.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.3E-07	1.3E-07	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	0.28	ug/l	7.2E-08	mg/kg-day	7.2E-01	(mg/kg-day)	5.2E-08	7.6E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000025
			Exp. Route Total									5.8E-07					0.0019
			Dermal	Metals	Arsenic	3.6	ug/l	4.8E-09	mg/kg-day	1.5E+00	(mg/kg-day)	7.1E-09	2.8E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000093
					Thallium	0.56	ug/l	7.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00044
				Volatiles	Vinyl chloride	0.28	ug/l	4.6E-07	mg/kg-day	7.2E-01	(mg/kg-day)	3.3E-07	4.8E-08	mg/kg-day	3.0E-03	mg/kg-day	0.000016
			Exp. Route Total									3.4E-07					0.00055
		Exposure Point Total										9.2E-07					0.0024
	Exposure Medium Total											9.2E-07					0.0024
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	7.6E-08	mg/m3	NA	(mg/kg-day)	NA	4.4E-07	mg/m3	3.0E-04	mg/m3	0.0015
			Exp. Route Total									NA					0.0015
		Exposure Point Total										NA					0.0015
	Exposure Medium Total											NA					0.0015
Surface Water Total												9.2E-07					0.0039
Total Receptor Risks												5E-06					0.3

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.29 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in MBC	Ingestion	Metals	Aluminum	15000	mg/kg	9.7E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.8E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0068
					Antimony	1.6	mg/kg	1.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	7.4E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0018
					Arsenic	20	mg/kg	7.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-07	5.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.018
					Cadmium	6.6	mg/kg	4.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-06	mg/kg-day	1.0E-03	mg/kg-day	0.003
					Chromium (VI)	3.8	mg/kg	2.5E-08	mg/kg-day	5.0E-01	(mg/kg-day)	1.2E-08	1.7E-06	mg/kg-day	3.0E-03	mg/kg-day	0.00058
					Cobalt	14	mg/kg	9.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.021
					Copper	160	mg/kg	1.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	7.2E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0018
					Iron	37000	mg/kg	2.4E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-02	mg/kg-day	7.0E-01	mg/kg-day	0.024
					Manganese	1200	mg/kg	7.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0037
					Mercury	70	mg/kg	4.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.1
					Nickel	43	mg/kg	2.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00096
					Thallium	1.4	mg/kg	8.7E-09	mg/kg-day	NA	(mg/kg-day)	NA	6.1E-07	mg/kg-day	1.0E-05	mg/kg-day	0.061
					Vanadium	39	mg/kg	2.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0035
					Zinc	840	mg/kg	5.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.8E-04	mg/kg-day	3.0E-01	mg/kg-day	0.0013
				PAHs	Benzo[a]pyrene	2.2	mg/kg	1.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.0E-07	9.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.35	mg/kg	2.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.6E-08	1.6E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.047	mg/kg	3.0E-10	mg/kg-day	1.7E+01	(mg/kg-day)	5.2E-09	2.1E-08	mg/kg-day	3.0E-05	mg/kg-day	0.00071
					Heptachlor	0.0047	mg/kg	3.1E-11	mg/kg-day	4.5E+00	(mg/kg-day)	1.4E-10	2.1E-09	mg/kg-day	5.0E-04	mg/kg-day	0.0000043
					Heptachlor epoxide	0.011	mg/kg	6.9E-11	mg/kg-day	9.1E+00	(mg/kg-day)	6.3E-10	4.8E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00037
				PCBs	PCBs (total Aroclors)	8.6	mg/kg	5.6E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.1E-07	3.9E-06	mg/kg-day	2.0E-05	mg/kg-day	0.2
				Volatiles	Trichloroethene	0.0012	mg/kg	7.7E-12	mg/kg-day	4.6E-02	(mg/kg-day)	3.6E-13	5.4E-10	mg/kg-day	5.0E-04	mg/kg-day	0.0000011
			Exp. Route Total									3.6E-07					0.45
			Dermal	Metals	Aluminum	15000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	1.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	20	mg/kg	1.2E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.8E-08	8.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0028
					Cadmium	6.6	mg/kg	1.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	9.4E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00038
					Chromium (VI)	3.8	mg/kg	NA	mg/kg-day	2.0E+01	(mg/kg-day)	NA	NA	mg/kg-day	7.5E-05	mg/kg-day	NA
					Cobalt	14	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	160	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	37000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1200	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	70	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	43	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	39	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	840	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	2.2	mg/kg	5.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.2E-08	4.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.35	mg/kg	9.2E-10	mg/kg-day	7.3E+00	(mg/kg-day)	6.7E-09	6.5E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.047	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.0047	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.011	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	8.6	mg/kg	2.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.9E-08	1.7E-06	mg/kg-day	2.0E-05	mg/kg-day	0.086
				Volatiles	Trichloroethene	0.0012	mg/kg	NA	mg/kg-day	4.6E-02	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
			Exp. Route Total									1.2E-07					0.089
		Exposure Point Total										4.8E-07					0.54
	Exposure Medium Total											4.8E-07					0.54
Sediment Total												4.8E-07					0.54

TABLE 7.29 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	1.3E-08	mg/m3	NA	(mg/kg-day)	NA	9.1E-07	mg/m3	3.0E-04	mg/m3	0.003
			Exp. Route Total									NA					0.003
		Exposure Point Total										NA					0.003
	Exposure Medium Total											NA					0.003
Surface Water Total												NA					0.003
Total Receptor Risks												5E-07					0.5

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose

TABLE 7.30 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Ingestion	Metals	Antimony	1.8	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00042
					Arsenic	12	mg/kg	7.8E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-07	6.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0023
					Cadmium	2.1	mg/kg	2.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	1.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0035
					Copper	120	mg/kg	1.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00028
					Iron	31000	mg/kg	3.3E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0041
					Manganese	380	mg/kg	4.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00025
					Mercury	13	mg/kg	1.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0039
					Nickel	39	mg/kg	4.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00018
					Thallium	3.4	mg/kg	3.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-07	mg/kg-day	1.0E-05	mg/kg-day	0.031
					Zinc	330	mg/kg	3.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-05	mg/kg-day	3.0E-01	mg/kg-day	0.0001
				PAHs	Benz[a]anthracene	1.4	mg/kg	1.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	1.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-07	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	2.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-08	1.8E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	5.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.2E-08	5.1E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	1.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.3E-09	8.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	1.1E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.8E-09	9.2E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000031
					Heptachlor epoxide	0.0071	mg/kg	7.5E-11	mg/kg-day	9.1E+00	(mg/kg-day)	6.9E-10	6.6E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000051
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	8.7E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.7E-08	7.6E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0038
			Exp. Route Total									3.2E-07					0.051
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	12	mg/kg	5.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.4E-08	4.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0016
					Cadmium	2.1	mg/kg	3.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	120	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	31000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	39	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.4	mg/kg	2.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.9E-08	2.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	2.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-07	2.5E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	3.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.8E-08	3.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	1.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	7.9E-08	9.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	1.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-08	1.6E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0071	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.5E-08	1.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0076
			Exp. Route Total									4.6E-07					0.0093
		Exposure Point Total										7.9E-07					0.06
	Exposure Medium Total											7.9E-07					0.06
Sediment Total												7.9E-07					0.06

TABLE 7.30 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in BCC	Ingestion	Metals	Antimony	0.47	mg/kg	1.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	9.6E-06	mg/kg-day	4.0E-04	mg/kg-day	0.024
					Copper	1.2	mg/kg	2.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00061
					Iron	13	mg/kg	3.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00037
					Manganese	0.69	mg/kg	1.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-05	mg/kg-day	1.4E-01	mg/kg-day	0.0001
					Mercury (inorganic)	0.12	mg/kg	2.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0084
					Selenium	0.95	mg/kg	2.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0039
				Organometals	Methyl mercury	0.39	mg/kg	9.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.9E-06	mg/kg-day	1.0E-04	mg/kg-day	0.079
				PCBs	PCBs (total Aroclors)	1.2	mg/kg	2.7E-06	mg/kg-day	2.0E+00	(mg/kg-day)	5.5E-06	2.4E-05	mg/kg-day	2.0E-05	mg/kg-day	1.2
			Exp. Route Total									5.5E-06					1.3
		Exposure Point Total										5.5E-06					1.3
	Exposure Medium Total											5.5E-06					1.3
	Surface Water Total	Surface Water Total in BCC	Dermal	Metals	Arsenic	3.3	ug/l	4.0E-09	mg/kg-day	1.5E+00	(mg/kg-day)	6.0E-09	3.5E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00012
					Thallium	0.48	ug/l	5.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00051
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									6.0E-09					0.00063
		Exposure Point Total										6.0E-09					0.00063
	Exposure Medium Total											6.0E-09					0.00063
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	8.2E-08	mg/m3	NA	(mg/kg-day)	NA	7.1E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												5.5E-06					1.3
Total Receptor Risks												6E-06					1

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.31 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Ingestion	Metals	Antimony	1.8	mg/kg	4.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00069
					Arsenic	12	mg/kg	1.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.9E-07	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0037
					Cadmium	2.1	mg/kg	5.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00032
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	3.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0058
					Copper	120	mg/kg	3.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00045
					Iron	31000	mg/kg	8.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0068
					Manganese	380	mg/kg	1.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00042
					Mercury	13	mg/kg	3.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0065
					Nickel	39	mg/kg	1.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0003
					Thallium	3.4	mg/kg	8.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-07	mg/kg-day	1.0E-05	mg/kg-day	0.052
					Zinc	330	mg/kg	8.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00016
				PAHs	Benz[a]anthracene	1.4	mg/kg	9.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.0E-08	2.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	1.0E-07	mg/kg-day	7.3E+00	(mg/kg-day)	7.3E-07	2.2E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	1.4E-07	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-07	3.0E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	3.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-07	8.3E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	6.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.8E-08	1.4E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	2.6E-10	mg/kg-day	1.7E+01	(mg/kg-day)	4.4E-09	1.5E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000051
					Heptachlor epoxide	0.0071	mg/kg	1.9E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.7E-09	1.1E-09	mg/kg-day	1.3E-05	mg/kg-day	0.000083
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	2.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.3E-08	1.2E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0062
			Exp. Route Total									1.6E-06					0.083
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	12	mg/kg	6.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)	9.0E-08	3.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0012
					Cadmium	2.1	mg/kg	3.4E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000079
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	120	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	31000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	39	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.4	mg/kg	7.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.6E-08	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	8.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	5.9E-07	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	1.1E-07	mg/kg-day	7.3E-01	(mg/kg-day)	8.2E-08	2.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	3.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.3E-07	6.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	5.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.9E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0071	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	1.9E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.7E-08	1.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0054
			Exp. Route Total									1.1E-06					0.0066
		Exposure Point Total										2.7E-06					0.09
	Exposure Medium Total											2.7E-06					0.09
Sediment Total												2.7E-06					0.09

TABLE 7.31 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in BCC	Ingestion	Metals	Antimony	0.47	mg/kg	1.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-05	mg/kg-day	4.0E-04	mg/kg-day	0.026
					Copper	1.2	mg/kg	4.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00067
					Iron	13	mg/kg	4.9E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00041
					Manganese	0.69	mg/kg	2.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00011
					Mercury (inorganic)	0.12	mg/kg	4.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0093
					Selenium	0.95	mg/kg	3.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0042
				Organometals	Methyl mercury	0.39	mg/kg	1.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	8.6E-06	mg/kg-day	1.0E-04	mg/kg-day	0.086
				PCBs	PCBs (total Aroclors)	1.2	mg/kg	4.5E-06	mg/kg-day	2.0E+00	(mg/kg-day)	9.0E-06	2.6E-05	mg/kg-day	2.0E-05	mg/kg-day	1.3
			Exp. Route Total									9.0E-06					1.4
		Exposure Point Total										9.0E-06					1.4
	Exposure Medium Total											9.0E-06					1.4
	Surface Water Total	Surface Water Total in BCC	Dermal	Metals	Arsenic	3.3	ug/l	6.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)	9.6E-09	3.7E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00012
					Thallium	0.48	ug/l	9.4E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00055
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									9.6E-09					0.00067
		Exposure Point Total										9.6E-09					0.00067
	Exposure Medium Total											9.6E-09					0.00067
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	1.2E-07	mg/m3	NA	(mg/kg-day)	NA	7.1E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												9.0E-06					1.4
Total Receptor Risks												1E-05					2

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.32 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in BCC	Ingestion	Metals	Antimony	0.47	mg/kg	1.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	4.0E-04	mg/kg-day	0.042
					Copper	1.2	mg/kg	3.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0011
					Iron	13	mg/kg	3.9E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00066
					Manganese	0.69	mg/kg	2.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00018
					Mercury (inorganic)	0.12	mg/kg	3.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.015
					Selenium	0.95	mg/kg	2.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0069
				Organometals	Methyl mercury	0.39	mg/kg	1.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-05	mg/kg-day	1.0E-04	mg/kg-day	0.14
				PCBs	PCBs (total Aroclors)	1.2	mg/kg	3.6E-06	mg/kg-day	2.0E+00	(mg/kg-day)	7.2E-06	4.2E-05	mg/kg-day	2.0E-05	mg/kg-day	2.1
			Exp. Route Total									7.2E-06					2.3
		Exposure Point Total										7.2E-06					2.3
	Exposure Medium Total											7.2E-06					2.3
Surface Water Total												7.2E-06					2.3
Total Receptor Risks												7E-06					2

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose

TABLE 7.33 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Ingestion	Metals	Antimony	1.8	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00042
					Arsenic	12	mg/kg	7.8E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-07	6.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0023
					Cadmium	2.1	mg/kg	2.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	1.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0035
					Copper	120	mg/kg	1.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00028
					Iron	31000	mg/kg	3.3E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0041
					Manganese	380	mg/kg	4.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00025
					Mercury	13	mg/kg	1.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0039
					Nickel	39	mg/kg	4.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00018
					Thallium	3.4	mg/kg	3.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-07	mg/kg-day	1.0E-05	mg/kg-day	0.031
					Zinc	330	mg/kg	3.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-05	mg/kg-day	3.0E-01	mg/kg-day	0.0001
				PAHs	Benz[a]anthracene	1.4	mg/kg	1.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	1.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-07	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	2.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-08	1.8E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	5.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.2E-08	5.1E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	1.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.3E-09	8.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	1.1E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.8E-09	9.2E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000031
					Heptachlor epoxide	0.0071	mg/kg	7.5E-11	mg/kg-day	9.1E+00	(mg/kg-day)	6.9E-10	6.6E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000051
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	8.7E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.7E-08	7.6E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0038
			Exp. Route Total									3.2E-07					0.051
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	12	mg/kg	5.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.4E-08	4.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0016
					Cadmium	2.1	mg/kg	3.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	120	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	31000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	39	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.4	mg/kg	2.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.9E-08	2.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	2.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-07	2.5E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	3.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.8E-08	3.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	1.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	7.9E-08	9.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	1.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-08	1.6E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0071	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.5E-08	1.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0076
			Exp. Route Total									4.6E-07					0.0093
		Exposure Point Total										7.9E-07					0.06
	Exposure Medium Total											7.9E-07					0.06
Sediment Total												7.9E-07					0.06

TABLE 7.33 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in BCC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	3.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0071
					Iron	18	mg/kg	4.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00051
					Manganese	13	mg/kg	3.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0019
					Mercury (inorganic)	0.052	mg/kg	1.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0035
					Selenium	0.91	mg/kg	2.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0037
				Organometals	Methyl mercury	0.26	mg/kg	6.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-06	mg/kg-day	1.0E-04	mg/kg-day	0.052
				PCBs	PCBs (total Aroclors)	0.011	mg/kg	2.7E-08	mg/kg-day	2.0E+00	(mg/kg-day)	5.3E-08	2.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.012
			Exp. Route Total									5.3E-08					0.081
		Exposure Point Total										5.3E-08					0.081
	Exposure Medium Total											5.3E-08					0.081
	Surface Water Total	Surface Water Total in BCC	Dermal	Metals	Arsenic	3.3	ug/l	4.0E-09	mg/kg-day	1.5E+00	(mg/kg-day)	6.0E-09	3.5E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00012
					Thallium	0.48	ug/l	5.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00051
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									6.0E-09					0.00063
		Exposure Point Total										6.0E-09					0.00063
	Exposure Medium Total											6.0E-09					0.00063
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	8.2E-08	mg/m3	NA	(mg/kg-day)	NA	7.1E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												5.9E-08					0.084
Total Receptor Risks												8E-07					0.1

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.34 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Ingestion	Metals	Antimony	1.8	mg/kg	4.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00069
					Arsenic	12	mg/kg	1.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.9E-07	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0037
					Cadmium	2.1	mg/kg	5.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00032
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	3.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0058
					Copper	120	mg/kg	3.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00045
					Iron	31000	mg/kg	8.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0068
					Manganese	380	mg/kg	1.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00042
					Mercury	13	mg/kg	3.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0065
					Nickel	39	mg/kg	1.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0003
					Thallium	3.4	mg/kg	8.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-07	mg/kg-day	1.0E-05	mg/kg-day	0.052
					Zinc	330	mg/kg	8.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00016
				PAHs	Benz[a]anthracene	1.4	mg/kg	9.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.0E-08	2.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	1.0E-07	mg/kg-day	7.3E+00	(mg/kg-day)	7.3E-07	2.2E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	1.4E-07	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-07	3.0E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	3.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-07	8.3E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	6.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.8E-08	1.4E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	2.6E-10	mg/kg-day	1.7E+01	(mg/kg-day)	4.4E-09	1.5E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000051
					Heptachlor epoxide	0.0071	mg/kg	1.9E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.7E-09	1.1E-09	mg/kg-day	1.3E-05	mg/kg-day	0.000083
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	2.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.3E-08	1.2E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0062
			Exp. Route Total									1.6E-06					0.083
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	12	mg/kg	6.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)	9.0E-08	3.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0012
					Cadmium	2.1	mg/kg	3.4E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000079
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	120	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	31000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	39	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.4	mg/kg	7.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.6E-08	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	8.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	5.9E-07	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	1.1E-07	mg/kg-day	7.3E-01	(mg/kg-day)	8.2E-08	2.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	3.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.3E-07	6.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	5.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.9E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0071	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	1.9E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.7E-08	1.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0054
			Exp. Route Total									1.1E-06					0.0066
		Exposure Point Total										2.7E-06					0.09
	Exposure Medium Total											2.7E-06					0.09
Sediment Total												2.7E-06					0.09

TABLE 7.34 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in BCC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	5.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0078
					Iron	18	mg/kg	6.7E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00056
					Manganese	13	mg/kg	5.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0021
					Mercury (inorganic)	0.052	mg/kg	2.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0039
					Selenium	0.91	mg/kg	3.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0041
				Organometals	Methyl mercury	0.26	mg/kg	9.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-06	mg/kg-day	1.0E-04	mg/kg-day	0.057
				PCBs	PCBs (total Aroclors)	0.011	mg/kg	4.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	8.8E-08	2.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.013
			Exp. Route Total									8.8E-08					0.088
		Exposure Point Total										8.8E-08					0.088
	Exposure Medium Total											8.8E-08					0.088
	Surface Water Total	Surface Water Total in BCC	Dermal	Metals	Arsenic	3.3	ug/l	6.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)	9.6E-09	3.7E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00012
					Thallium	0.48	ug/l	9.4E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00055
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									9.6E-09					0.00067
		Exposure Point Total										9.6E-09					0.00067
	Exposure Medium Total											9.6E-09					0.00067
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	1.2E-07	mg/m3	NA	(mg/kg-day)	NA	7.1E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												9.7E-08					0.091
Total Receptor Risks												3E-06					0.2

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.35 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in BCC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	4.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-04	mg/kg-day	4.0E-02	mg/kg-day	0.013
					Iron	18	mg/kg	5.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.3E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00091
					Manganese	13	mg/kg	4.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0034
					Mercury (inorganic)	0.052	mg/kg	1.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0063
					Selenium	0.91	mg/kg	2.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0066
				Organometals	Methyl mercury	0.26	mg/kg	7.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.2E-06	mg/kg-day	1.0E-04	mg/kg-day	0.092
				PCBs	PCBs (total Aroclors)	0.011	mg/kg	3.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	7.1E-08	4.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.021
			Exp. Route Total									7.1E-08					0.14
		Exposure Point Total										7.1E-08					0.14
	Exposure Medium Total											7.1E-08					0.14
Surface Water Total												7.1E-08					0.14
Total Receptor Risks												7E-08					0.1

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.36 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Ingestion	Metals	Antimony	1.8	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00042
					Arsenic	12	mg/kg	7.8E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-07	6.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0023
					Cadmium	2.1	mg/kg	2.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	1.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0035
					Copper	120	mg/kg	1.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00028
					Iron	31000	mg/kg	3.3E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0041
					Manganese	380	mg/kg	4.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00025
					Mercury	13	mg/kg	1.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0039
					Nickel	39	mg/kg	4.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00018
					Thallium	3.4	mg/kg	3.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-07	mg/kg-day	1.0E-05	mg/kg-day	0.031
					Zinc	330	mg/kg	3.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-05	mg/kg-day	3.0E-01	mg/kg-day	0.0001
				PAHs	Benz[a]anthracene	1.4	mg/kg	1.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	1.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-07	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	2.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-08	1.8E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	5.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.2E-08	5.1E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	1.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.3E-09	8.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	1.1E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.8E-09	9.2E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000031
					Heptachlor epoxide	0.0071	mg/kg	7.5E-11	mg/kg-day	9.1E+00	(mg/kg-day)	6.9E-10	6.6E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000051
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	8.7E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.7E-08	7.6E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0038
			Exp. Route Total									3.2E-07					0.051
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	12	mg/kg	5.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.4E-08	4.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0016
					Cadmium	2.1	mg/kg	3.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	120	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	31000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	39	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.4	mg/kg	2.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.9E-08	2.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	2.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-07	2.5E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	3.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.8E-08	3.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	1.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	7.9E-08	9.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	1.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-08	1.6E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0071	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.5E-08	1.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0076
			Exp. Route Total									4.6E-07					0.0093
		Exposure Point Total										7.9E-07					0.06
	Exposure Medium Total											7.9E-07					0.06
Sediment Total												7.9E-07					0.06

TABLE 7.36 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in BCC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	3.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0071
					Iron	18	mg/kg	4.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00051
					Manganese	13	mg/kg	3.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0019
					Mercury (inorganic)	0.093	mg/kg	2.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0063
					Selenium	0.91	mg/kg	2.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0037
				Organometals	Methyl mercury	0.23	mg/kg	5.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-06	mg/kg-day	1.0E-04	mg/kg-day	0.047
				PCBs	PCBs (total Aroclors)	0.15	mg/kg	3.6E-07	mg/kg-day	2.0E+00	(mg/kg-day)	7.1E-07	3.1E-06	mg/kg-day	2.0E-05	mg/kg-day	0.16
			Exp. Route Total									7.1E-07					0.22
		Exposure Point Total										7.1E-07					0.22
	Exposure Medium Total											7.1E-07					0.22
	Surface Water Total	Surface Water Total in BCC	Dermal	Metals	Arsenic	3.3	ug/l	4.0E-09	mg/kg-day	1.5E+00	(mg/kg-day)	6.0E-09	3.5E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00012
					Thallium	0.48	ug/l	5.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00051
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									6.0E-09					0.00063
		Exposure Point Total										6.0E-09					0.00063
	Exposure Medium Total											6.0E-09					0.00063
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	8.2E-08	mg/m3	NA	(mg/kg-day)	NA	7.1E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												7.2E-07					0.23
Total Receptor Risks												2E-06					0.3

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.37 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Ingestion	Metals	Antimony	1.8	mg/kg	4.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00069
					Arsenic	12	mg/kg	1.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.9E-07	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0037
					Cadmium	2.1	mg/kg	5.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00032
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	3.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0058
					Copper	120	mg/kg	3.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00045
					Iron	31000	mg/kg	8.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0068
					Manganese	380	mg/kg	1.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00042
					Mercury	13	mg/kg	3.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0065
					Nickel	39	mg/kg	1.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0003
					Thallium	3.4	mg/kg	8.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-07	mg/kg-day	1.0E-05	mg/kg-day	0.052
					Zinc	330	mg/kg	8.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00016
				PAHs	Benz[a]anthracene	1.4	mg/kg	9.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.0E-08	2.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	1.0E-07	mg/kg-day	7.3E+00	(mg/kg-day)	7.3E-07	2.2E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	1.4E-07	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-07	3.0E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	3.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-07	8.3E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	6.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.8E-08	1.4E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	2.6E-10	mg/kg-day	1.7E+01	(mg/kg-day)	4.4E-09	1.5E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000051
					Heptachlor epoxide	0.0071	mg/kg	1.9E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.7E-09	1.1E-09	mg/kg-day	1.3E-05	mg/kg-day	0.000083
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	2.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.3E-08	1.2E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0062
			Exp. Route Total									1.6E-06					0.083
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	12	mg/kg	6.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)	9.0E-08	3.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0012
					Cadmium	2.1	mg/kg	3.4E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000079
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	120	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	31000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	39	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.4	mg/kg	7.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.6E-08	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	8.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	5.9E-07	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	1.1E-07	mg/kg-day	7.3E-01	(mg/kg-day)	8.2E-08	2.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	3.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.3E-07	6.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	5.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.9E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0071	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	1.9E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.7E-08	1.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0054
			Exp. Route Total									1.1E-06					0.0066
		Exposure Point Total										2.7E-06					0.09
	Exposure Medium Total											2.7E-06					0.09
Sediment Total												2.7E-06					0.09

TABLE 7.37 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in BCC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	5.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0078
					Iron	18	mg/kg	6.7E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00056
					Manganese	13	mg/kg	5.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0021
					Mercury (inorganic)	0.093	mg/kg	3.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0069
					Selenium	0.91	mg/kg	3.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0041
				Organometals	Methyl mercury	0.23	mg/kg	8.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-06	mg/kg-day	1.0E-04	mg/kg-day	0.052
				PCBs	PCBs (total Aroclors)	0.15	mg/kg	5.9E-07	mg/kg-day	2.0E+00	(mg/kg-day)	1.2E-06	3.4E-06	mg/kg-day	2.0E-05	mg/kg-day	0.17
			Exp. Route Total									1.2E-06					0.24
		Exposure Point Total										1.2E-06					0.24
	Exposure Medium Total											1.2E-06					0.24
	Surface Water Total	Surface Water Total in BCC	Dermal	Metals	Arsenic	3.3	ug/l	6.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)	9.6E-09	3.7E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00012
					Thallium	0.48	ug/l	9.4E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00055
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									9.6E-09					0.00067
		Exposure Point Total										9.6E-09					0.00067
	Exposure Medium Total											9.6E-09					0.00067
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	1.2E-07	mg/m3	NA	(mg/kg-day)	NA	7.1E-07	mg/m3	3.0E-04	mg/m3	0.0024
			Exp. Route Total									NA					0.0024
		Exposure Point Total										NA					0.0024
	Exposure Medium Total											NA					0.0024
Surface Water Total												1.2E-06					0.25
Total Receptor Risks												4E-06					0.3

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.38 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in BCC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	4.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-04	mg/kg-day	4.0E-02	mg/kg-day	0.013
					Iron	18	mg/kg	5.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.3E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00091
					Manganese	13	mg/kg	4.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0034
					Mercury (inorganic)	0.093	mg/kg	2.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.011
					Selenium	0.91	mg/kg	2.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0066
				Organometals	Methyl mercury	0.23	mg/kg	7.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.4E-06	mg/kg-day	1.0E-04	mg/kg-day	0.084
				PCBs	PCBs (total Aroclors)	0.15	mg/kg	4.7E-07	mg/kg-day	2.0E+00	(mg/kg-day)	9.5E-07	5.5E-06	mg/kg-day	2.0E-05	mg/kg-day	0.28
			Exp. Route Total									9.5E-07					0.39
		Exposure Point Total										9.5E-07					0.39
	Exposure Medium Total											9.5E-07					0.39
Surface Water Total												9.5E-07					0.39
Total Receptor Risks												9E-07					0.4

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.39 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in BCC	Ingestion	Metals	Antimony	4.3	mg/kg	3.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00066
					Arsenic	17	mg/kg	7.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-07	6.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
					Cadmium	1.9	mg/kg	1.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00012
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	9.9	mg/kg	7.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
					Copper	110	mg/kg	7.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00016
					Iron	27000	mg/kg	1.9E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0024
					Manganese	380	mg/kg	2.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00017
					Mercury	8.4	mg/kg	5.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0017
					Nickel	37	mg/kg	2.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00011
					Thallium	3.4	mg/kg	2.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-07	mg/kg-day	1.0E-05	mg/kg-day	0.021
					Zinc	310	mg/kg	2.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000063
				PAHs	Benz[a]anthracene	1	mg/kg	7.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	5.2E-09	6.3E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.81	mg/kg	5.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.2E-08	5.0E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.1	mg/kg	8.0E-09	mg/kg-day	7.3E-01	(mg/kg-day)	5.9E-09	7.0E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.27	mg/kg	1.9E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-08	1.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	3.7E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.7E-09	3.2E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0063	mg/kg	4.5E-11	mg/kg-day	1.7E+01	(mg/kg-day)	7.6E-10	3.9E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000013
					Heptachlor epoxide	0.0051	mg/kg	3.6E-11	mg/kg-day	9.1E+00	(mg/kg-day)	3.3E-10	3.1E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000024
				PCBs	PCBs (total Aroclors)	0.59	mg/kg	4.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)	8.3E-09	3.7E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0018
			Exp. Route Total									1.8E-07					0.032
			Dermal	Metals	Antimony	4.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	17	mg/kg	5.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)	7.5E-08	4.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0015
					Cadmium	1.9	mg/kg	1.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000068
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	9.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	27000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	8.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	37	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	310	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1	mg/kg	1.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.7E-09	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.81	mg/kg	1.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	7.8E-08	9.3E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.1	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.27	mg/kg	3.5E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.6E-08	3.1E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	6.8E-09	mg/kg-day	7.3E-01	(mg/kg-day)	5.0E-09	6.0E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0063	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0051	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.59	mg/kg	8.3E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.7E-08	7.3E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0037
			Exp. Route Total									2.2E-07					0.0052
		Exposure Point Total										4.0E-07					0.038
	Exposure Medium Total											4.0E-07					0.038
Sediment Total												4.0E-07					0.038

TABLE 7.39 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	**Exposure Medium**	**Exposure Point**	**Exposure Route**	**Chemical Class**	**COPC**	**Value**	**Units**	**Value**	**Units**	**Value**	**Units**	**Cancer Risk**	**Value**	**Units**	**Value**	**Units**	**Hazard Quotient**
Surface Water	Surface Water Total	Surface Water Total in BCC	Ingestion	Metals	Arsenic	3.3	ug/l	2.9E-09	mg/kg-day	1.5E+00	(mg/kg-day)	4.4E-09	2.5E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000085
					Thallium	0.48	ug/l	4.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00037
				PAHs	Benzo[a]pyrene	0.086	ug/l	7.6E-11	mg/kg-day	7.3E+00	(mg/kg-day)	5.6E-10	6.7E-10	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.22	ug/l	1.9E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-09	1.7E-09	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									6.3E-09					0.00046
			Dermal	Metals	Arsenic	3.3	ug/l	1.2E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.8E-09	1.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000035
					Thallium	0.48	ug/l	1.8E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00016
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.8E-09					0.00019
		Exposure Point Total										8.2E-09					0.00065
	Exposure Medium Total											8.2E-09					0.00065
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	2.3E-08	mg/m3	NA	(mg/kg-day)	NA	2.0E-07	mg/m3	3.0E-04	mg/m3	0.00067
			Exp. Route Total									NA					0.00067
		Exposure Point Total										NA					0.00067
	Exposure Medium Total											NA					0.00067
Surface Water Total												8.2E-09					0.0013
Total Receptor Risks												4E-07					0.04

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.40 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in BCC	Ingestion	Metals	Antimony	4.3	mg/kg	7.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0011
					Arsenic	17	mg/kg	1.7E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.6E-07	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0034
					Cadmium	1.9	mg/kg	3.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	9.9	mg/kg	1.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0033
					Copper	110	mg/kg	1.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00027
					Iron	27000	mg/kg	4.8E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-03	mg/kg-day	7.0E-01	mg/kg-day	0.004
					Manganese	380	mg/kg	6.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00028
					Mercury	8.4	mg/kg	1.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0028
					Nickel	37	mg/kg	6.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00019
					Thallium	3.4	mg/kg	5.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-07	mg/kg-day	1.0E-05	mg/kg-day	0.034
					Zinc	310	mg/kg	5.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-05	mg/kg-day	3.0E-01	mg/kg-day	0.0001
				PAHs	Benz[a]anthracene	1	mg/kg	4.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.5E-08	1.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.81	mg/kg	3.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-07	8.2E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.1	mg/kg	5.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.9E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.27	mg/kg	1.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	9.2E-08	2.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	2.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.8E-08	5.3E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0063	mg/kg	1.1E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.9E-09	6.4E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000021
					Heptachlor epoxide	0.0051	mg/kg	8.8E-11	mg/kg-day	9.1E+00	(mg/kg-day)	8.0E-10	5.1E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000039
				PCBs	PCBs (total Aroclors)	0.59	mg/kg	1.0E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.1E-08	6.0E-08	mg/kg-day	2.0E-05	mg/kg-day	0.003
			Exp. Route Total									7.4E-07					0.053
			Dermal	Metals	Antimony	4.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	17	mg/kg	5.4E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.1E-08	3.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
					Cadmium	1.9	mg/kg	2.1E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000048
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	9.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	27000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	8.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	37	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	310	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1	mg/kg	3.8E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.8E-08	8.3E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.81	mg/kg	3.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.2E-07	6.6E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.1	mg/kg	4.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.1E-08	9.3E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.27	mg/kg	1.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)	7.4E-08	2.2E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	2.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-08	4.3E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0063	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0051	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.59	mg/kg	8.9E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.8E-08	5.2E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0026
			Exp. Route Total									4.7E-07					0.0037
		Exposure Point Total										1.2E-06					0.057
	Exposure Medium Total											1.2E-06					0.057
Sediment Total												1.2E-06					0.057

TABLE 7.40 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in BCC	Ingestion	Metals	Arsenic	3.3	ug/l	7.2E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-08	4.2E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00014
					Thallium	0.48	ug/l	1.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	6.1E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00061
				PAHs	Benzo[a]pyrene	0.086	ug/l	5.1E-10	mg/kg-day	7.3E+00	(mg/kg-day)	3.7E-09	1.1E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.22	ug/l	1.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	9.4E-09	2.8E-09	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									2.4E-08					0.00075
			Dermal	Metals	Arsenic	3.3	ug/l	2.0E-09	mg/kg-day	1.5E+00	(mg/kg-day)	3.0E-09	1.2E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000039
					Thallium	0.48	ug/l	3.0E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00017
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									3.0E-09					0.00021
		Exposure Point Total										2.7E-08					0.00096
	Exposure Medium Total											2.7E-08					0.00096
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	3.4E-08	mg/m3	NA	(mg/kg-day)	NA	2.0E-07	mg/m3	3.0E-04	mg/m3	0.00067
			Exp. Route Total									NA					0.00067
		Exposure Point Total										NA					0.00067
	Exposure Medium Total											NA					0.00067
Surface Water Total												2.7E-08					0.0016
Total Receptor Risks												1E-06					0.06

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.41 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in BCC	Ingestion	Metals	Antimony	4.3	mg/kg	6.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0014
					Arsenic	17	mg/kg	1.5E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.3E-07	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0044
					Cadmium	1.9	mg/kg	2.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00026
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	9.9	mg/kg	1.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0044
					Copper	110	mg/kg	1.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00035
					Iron	27000	mg/kg	4.2E-04	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0052
					Manganese	380	mg/kg	5.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00037
					Mercury	8.4	mg/kg	1.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0038
					Nickel	37	mg/kg	5.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00025
					Thallium	3.4	mg/kg	5.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.5E-07	mg/kg-day	1.0E-05	mg/kg-day	0.045
					Zinc	310	mg/kg	4.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00014
				PAHs	Benz[a]anthracene	1	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.81	mg/kg	1.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	9.1E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.1	mg/kg	1.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.3E-08	1.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.27	mg/kg	4.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	3.0E-08	3.6E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	8.0E-09	mg/kg-day	7.3E-01	(mg/kg-day)	5.8E-09	7.0E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0063	mg/kg	9.7E-11	mg/kg-day	1.7E+01	(mg/kg-day)	1.6E-09	8.5E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000028
					Heptachlor epoxide	0.0051	mg/kg	7.8E-11	mg/kg-day	9.1E+00	(mg/kg-day)	7.1E-10	6.8E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000052
				PCBs	PCBs (total Aroclors)	0.59	mg/kg	9.0E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.8E-08	7.9E-08	mg/kg-day	2.0E-05	mg/kg-day	0.004
			Exp. Route Total									4.0E-07					0.07
			Dermal	Metals	Antimony	4.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	17	mg/kg	1.1E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.6E-07	9.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0032
					Cadmium	1.9	mg/kg	4.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00015
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	9.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	27000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	8.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	37	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	310	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1	mg/kg	2.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.1E-08	2.5E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.81	mg/kg	2.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.7E-07	2.0E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.1	mg/kg	3.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.4E-08	2.8E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.27	mg/kg	7.6E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.6E-08	6.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	1.3E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0063	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0051	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.59	mg/kg	1.8E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.6E-08	1.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0079
			Exp. Route Total									4.8E-07					0.011
		Exposure Point Total										8.8E-07					0.081
	Exposure Medium Total											8.8E-07					0.081
Sediment Total												8.8E-07					0.081

TABLE 7.41 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in BCC	Ingestion	Metals	Arsenic	3.3	ug/l	6.3E-09	mg/kg-day	1.5E+00	(mg/kg-day)	9.5E-09	5.5E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00018
					Thallium	0.48	ug/l	9.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00081
				PAHs	Benzo[a]pyrene	0.086	ug/l	1.7E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.2E-09	1.4E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.22	ug/l	4.2E-10	mg/kg-day	7.3E+00	(mg/kg-day)	3.1E-09	3.7E-09	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.4E-08					0.00099
			Dermal	Metals	Arsenic	3.3	ug/l	2.6E-09	mg/kg-day	1.5E+00	(mg/kg-day)	4.0E-09	2.3E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000077
					Thallium	0.48	ug/l	3.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00034
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									4.0E-09					0.00042
		Exposure Point Total										1.8E-08					0.0014
	Exposure Medium Total											1.8E-08					0.0014
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	5.0E-08	mg/m3	NA	(mg/kg-day)	NA	4.3E-07	mg/m3	3.0E-04	mg/m3	0.0014
			Exp. Route Total									NA					0.0014
		Exposure Point Total										NA					0.0014
	Exposure Medium Total											NA					0.0014
Surface Water Total												1.8E-08					0.0029
Total Receptor Risks												9E-07					0.08

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.42 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in BCC	Ingestion	Metals	Antimony	4.3	mg/kg	1.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.4E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0024
					Arsenic	17	mg/kg	3.7E-07	mg/kg-day	1.5E+00	(mg/kg-day)	5.6E-07	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0073
					Cadmium	1.9	mg/kg	7.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00042
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	9.9	mg/kg	3.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0072
					Copper	110	mg/kg	4.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00058
					Iron	27000	mg/kg	1.0E-03	mg/kg-day	NA	(mg/kg-day)	NA	6.0E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0086
					Manganese	380	mg/kg	1.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	8.4E-05	mg/kg-day	1.4E-01	mg/kg-day	0.0006
					Mercury	8.4	mg/kg	3.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0062
					Nickel	37	mg/kg	1.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	8.0E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0004
					Thallium	3.4	mg/kg	1.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.4E-07	mg/kg-day	1.0E-05	mg/kg-day	0.074
					Zinc	310	mg/kg	1.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.7E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00022
				PAHs	Benz[a]anthracene	1	mg/kg	1.0E-07	mg/kg-day	7.3E-01	(mg/kg-day)	7.5E-08	2.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.81	mg/kg	8.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	6.0E-07	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.1	mg/kg	1.2E-07	mg/kg-day	7.3E-01	(mg/kg-day)	8.4E-08	2.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.27	mg/kg	2.7E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.0E-07	5.9E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	5.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.9E-08	1.1E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0063	mg/kg	2.4E-10	mg/kg-day	1.7E+01	(mg/kg-day)	4.0E-09	1.4E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000046
					Heptachlor epoxide	0.0051	mg/kg	1.9E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.7E-09	1.1E-09	mg/kg-day	1.3E-05	mg/kg-day	0.000086
				PCBs	PCBs (total Aroclors)	0.59	mg/kg	2.2E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.4E-08	1.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0065
			Exp. Route Total									1.6E-06					0.11
			Dermal	Metals	Antimony	4.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	17	mg/kg	1.2E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.7E-07	6.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0023
					Cadmium	1.9	mg/kg	4.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-09	mg/kg-day	2.5E-05	mg/kg-day	0.0001
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	9.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	27000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	8.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	37	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	310	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1	mg/kg	8.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.1E-08	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.81	mg/kg	6.7E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.9E-07	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.1	mg/kg	9.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.8E-08	2.0E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.27	mg/kg	2.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.6E-07	4.8E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	4.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.1E-08	9.2E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0063	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0051	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.59	mg/kg	1.9E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.9E-08	1.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0056
			Exp. Route Total									1.0E-06					0.008
		Exposure Point Total										2.6E-06					0.12
	Exposure Medium Total											2.6E-06					0.12
Sediment Total												2.6E-06					0.12

TABLE 7.42 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in BCC	Ingestion	Metals	Arsenic	3.3	ug/l	1.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.3E-08	9.0E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0003
					Thallium	0.48	ug/l	2.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0013
				PAHs	Benzo[a]pyrene	0.086	ug/l	1.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	8.0E-09	2.4E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.22	ug/l	2.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.0E-08	6.0E-09	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									5.2E-08					0.0016
			Dermal	Metals	Arsenic	3.3	ug/l	4.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)	6.6E-09	2.6E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000085
					Thallium	0.48	ug/l	6.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.8E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00038
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									6.6E-09					0.00046
		Exposure Point Total										5.8E-08					0.0021
	Exposure Medium Total											5.8E-08					0.0021
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	7.4E-08	mg/m3	NA	(mg/kg-day)	NA	4.3E-07	mg/m3	3.0E-04	mg/m3	0.0014
			Exp. Route Total									NA					0.0014
		Exposure Point Total										NA					0.0014
	Exposure Medium Total											NA					0.0014
Surface Water Total												5.8E-08					0.0035
Total Receptor Risks												3E-06					0.1

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.43 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in BCC	Ingestion	Metals	Aluminum	14000	mg/kg	9.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.6E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0066
					Antimony	1.9	mg/kg	1.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	8.6E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0021
					Arsenic	23	mg/kg	8.7E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.3E-07	6.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
					Cadmium	11	mg/kg	6.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0048
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	8.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
					Copper	210	mg/kg	1.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	9.4E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0024
					Iron	38000	mg/kg	2.5E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-02	mg/kg-day	7.0E-01	mg/kg-day	0.025
					Manganese	560	mg/kg	3.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0018
					Mercury	27	mg/kg	1.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-05	mg/kg-day	3.0E-04	mg/kg-day	0.04
					Nickel	58	mg/kg	3.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0013
					Thallium	2.8	mg/kg	1.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-06	mg/kg-day	1.0E-05	mg/kg-day	0.13
					Vanadium	48	mg/kg	3.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0043
					Zinc	710	mg/kg	4.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-04	mg/kg-day	3.0E-01	mg/kg-day	0.0011
				PAHs	Benzo[a]pyrene	1.2	mg/kg	8.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.9E-08	5.6E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.21	mg/kg	1.4E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.0E-08	9.6E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	1.7E-10	mg/kg-day	1.7E+01	(mg/kg-day)	2.9E-09	1.2E-08	mg/kg-day	3.0E-05	mg/kg-day	0.0004
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.02	mg/kg	1.3E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.2E-09	9.2E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00071
				PCBs	PCBs (total Aroclors)	2.5	mg/kg	1.6E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.2E-08	1.1E-06	mg/kg-day	2.0E-05	mg/kg-day	0.056
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									2.4E-07					0.31
			Dermal	Metals	Aluminum	14000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	23	mg/kg	1.4E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.1E-08	9.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0032
					Cadmium	11	mg/kg	2.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-08	mg/kg-day	2.5E-05	mg/kg-day	0.00061
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	210	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	38000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	560	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	27	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	58	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	48	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	710	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	1.2	mg/kg	3.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.4E-08	2.3E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.21	mg/kg	5.6E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.1E-09	3.9E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.02	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	2.5	mg/kg	7.0E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.4E-08	4.9E-07	mg/kg-day	2.0E-05	mg/kg-day	0.025
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									6.3E-08					0.028
		Exposure Point Total										3.0E-07					0.34
	Exposure Medium Total											3.0E-07					0.34
Sediment Total												3.0E-07					0.34

TABLE 7.43 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	1.3E-08	mg/m3	NA	(mg/kg-day)	NA	8.9E-07	mg/m3	3.0E-04	mg/m3	0.003
			Exp. Route Total									NA					0.003
		Exposure Point Total										NA					0.003
	Exposure Medium Total											NA					0.003
Surface Water Total												NA					0.003
Total Receptor Risks												3E-07					0.3

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.44 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Ingestion	Metals	Antimony	1.8	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00041
					Arsenic	15	mg/kg	9.5E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.4E-07	8.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0028
					Cadmium	1.8	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00017
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	1.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0041
					Copper	110	mg/kg	1.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00026
					Iron	36000	mg/kg	3.8E-04	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0047
					Manganese	510	mg/kg	5.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00034
					Mercury	4.6	mg/kg	4.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Nickel	45	mg/kg	4.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00021
					Thallium	1.7	mg/kg	1.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-07	mg/kg-day	1.0E-05	mg/kg-day	0.016
					Zinc	290	mg/kg	3.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000089
				PAHs	Benz[a]anthracene	0.6	mg/kg	6.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	4.6E-09	5.6E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	7.4E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.4E-08	6.4E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	9.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.0E-09	8.4E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	1.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-08	1.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	5.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)	4.0E-09	4.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	4.3E-11	mg/kg-day	1.7E+01	(mg/kg-day)	7.2E-10	3.7E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000012
					Heptachlor epoxide	0.0016	mg/kg	1.7E-11	mg/kg-day	9.1E+00	(mg/kg-day)	1.6E-10	1.5E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000011
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	4.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)	9.0E-09	3.9E-08	mg/kg-day	2.0E-05	mg/kg-day	0.002
			Exp. Route Total									2.3E-07					0.032
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	6.8E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-07	5.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
					Cadmium	1.8	mg/kg	2.7E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000096
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	510	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	4.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	45	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.6	mg/kg	1.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.6E-09	1.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	1.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.0E-07	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	1.8E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.3E-08	1.6E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	3.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.4E-08	2.9E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	1.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.4E-09	8.9E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	9.0E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.8E-08	7.8E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0039
			Exp. Route Total									2.7E-07					0.006
		Exposure Point Total										5.1E-07					0.038
	Exposure Medium Total											5.1E-07					0.038
Sediment Total												5.1E-07					0.038

TABLE 7.44 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in LBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	1.1	mg/kg	2.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00056
					Iron	9	mg/kg	2.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00026
					Manganese	0.59	mg/kg	1.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-05	mg/kg-day	1.4E-01	mg/kg-day	0.000086
					Mercury (inorganic)	0.14	mg/kg	3.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0096
					Selenium	0.75	mg/kg	1.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-05	mg/kg-day	5.0E-03	mg/kg-day	0.003
				Organometals	Methyl mercury	0.34	mg/kg	8.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.0E-06	mg/kg-day	1.0E-04	mg/kg-day	0.07
				PCBs	PCBs (total Aroclors)	0.64	mg/kg	1.5E-06	mg/kg-day	2.0E+00	(mg/kg-day)	3.0E-06	1.3E-05	mg/kg-day	2.0E-05	mg/kg-day	0.65
			Exp. Route Total									3.0E-06					0.74
		Exposure Point Total										3.0E-06					0.74
	Exposure Medium Total											3.0E-06					0.74
	Surface Water Total	Surface Water Total in LBC	Dermal	Metals	Arsenic	3.6	ug/l	4.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)	6.6E-09	3.9E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00013
					Thallium	5.5	ug/l	6.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0058
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									6.6E-09					0.0059
		Exposure Point Total										6.6E-09					0.0059
	Exposure Medium Total											6.6E-09					0.0059
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	1.1E-06	mg/m3	NA	(mg/kg-day)	NA	1.0E-05	mg/m3	3.0E-04	mg/m3	0.033
			Exp. Route Total									NA					0.033
		Exposure Point Total										NA					0.033
	Exposure Medium Total											NA					0.033
Surface Water Total												3.0E-06					0.78
Total Receptor Risks												4E-06					0.8

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.45 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Ingestion	Metals	Antimony	1.8	mg/kg	4.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00067
					Arsenic	15	mg/kg	2.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.5E-07	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0046
					Cadmium	1.8	mg/kg	4.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00027
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	3.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0067
					Copper	110	mg/kg	2.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00042
					Iron	36000	mg/kg	9.2E-04	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0077
					Manganese	510	mg/kg	1.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.7E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00055
					Mercury	4.6	mg/kg	1.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0023
					Nickel	45	mg/kg	1.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	6.8E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00034
					Thallium	1.7	mg/kg	4.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-07	mg/kg-day	1.0E-05	mg/kg-day	0.026
					Zinc	290	mg/kg	7.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00015
				PAHs	Benz[a]anthracene	0.6	mg/kg	4.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.1E-08	9.1E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	4.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	3.6E-07	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	6.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.6E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	1.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.6E-08	2.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	3.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.6E-08	7.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	1.0E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.8E-09	6.1E-10	mg/kg-day	3.0E-05	mg/kg-day	0.00002
					Heptachlor epoxide	0.0016	mg/kg	4.2E-11	mg/kg-day	9.1E+00	(mg/kg-day)	3.8E-10	2.4E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000019
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	1.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.2E-08	6.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0032
			Exp. Route Total									9.2E-07					0.053
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	7.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-07	4.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Cadmium	1.8	mg/kg	2.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000068
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	510	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	4.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	45	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.6	mg/kg	3.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.5E-08	7.4E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	4.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.9E-07	8.5E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	5.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.7E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	9.5E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.9E-08	2.0E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	2.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.1E-08	6.3E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	9.6E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.9E-08	5.6E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0028
			Exp. Route Total									5.7E-07					0.0043
		Exposure Point Total										1.5E-06					0.057
	Exposure Medium Total											1.5E-06					0.057
Sediment Total												1.5E-06					0.057

TABLE 7.45 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in LBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	1.1	mg/kg	4.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00061
					Iron	9	mg/kg	3.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00029
					Manganese	0.59	mg/kg	2.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-05	mg/kg-day	1.4E-01	mg/kg-day	0.000094
					Mercury (inorganic)	0.14	mg/kg	5.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.011
					Selenium	0.75	mg/kg	2.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0033
				Organometals	Methyl mercury	0.34	mg/kg	1.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	7.7E-06	mg/kg-day	1.0E-04	mg/kg-day	0.077
				PCBs	PCBs (total Aroclors)	0.64	mg/kg	2.5E-06	mg/kg-day	2.0E+00	(mg/kg-day)	4.9E-06	1.4E-05	mg/kg-day	2.0E-05	mg/kg-day	0.72
			Exp. Route Total									4.9E-06					0.81
		Exposure Point Total										4.9E-06					0.81
	Exposure Medium Total											4.9E-06					0.81
	Surface Water Total	Surface Water Total in LBC	Dermal	Metals	Arsenic	3.6	ug/l	7.1E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-08	4.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00014
					Thallium	5.5	ug/l	1.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.2E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0062
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.1E-08					0.0064
		Exposure Point Total										1.1E-08					0.0064
	Exposure Medium Total											1.1E-08					0.0064
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	1.7E-06	mg/m3	NA	(mg/kg-day)	NA	1.0E-05	mg/m3	3.0E-04	mg/m3	0.033
			Exp. Route Total									NA					0.033
		Exposure Point Total										NA					0.033
	Exposure Medium Total											NA					0.033
Surface Water Total												4.9E-06					0.85
Total Receptor Risks												6E-06					0.9

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.46 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in LBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	1.1	mg/kg	3.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00099
					Iron	9	mg/kg	2.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00046
					Manganese	0.59	mg/kg	1.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00015
					Mercury (inorganic)	0.14	mg/kg	4.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.017
					Selenium	0.75	mg/kg	2.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0054
				Organometals	Methyl mercury	0.34	mg/kg	1.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-05	mg/kg-day	1.0E-04	mg/kg-day	0.12
				PCBs	PCBs (total Aroclors)	0.64	mg/kg	2.0E-06	mg/kg-day	2.0E+00	(mg/kg-day)	4.0E-06	2.3E-05	mg/kg-day	2.0E-05	mg/kg-day	1.2
			Exp. Route Total									4.0E-06					1.3
		Exposure Point Total										4.0E-06					1.3
	Exposure Medium Total											4.0E-06					1.3
Surface Water Total												4.0E-06					1.3
Total Receptor Risks												4E-06					1

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.47 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Ingestion	Metals	Antimony	1.8	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00041
					Arsenic	15	mg/kg	9.5E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.4E-07	8.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0028
					Cadmium	1.8	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00017
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	1.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0041
					Copper	110	mg/kg	1.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00026
					Iron	36000	mg/kg	3.8E-04	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0047
					Manganese	510	mg/kg	5.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00034
					Mercury	4.6	mg/kg	4.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Nickel	45	mg/kg	4.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00021
					Thallium	1.7	mg/kg	1.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-07	mg/kg-day	1.0E-05	mg/kg-day	0.016
					Zinc	290	mg/kg	3.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000089
				PAHs	Benz[a]anthracene	0.6	mg/kg	6.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	4.6E-09	5.6E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	7.4E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.4E-08	6.4E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	9.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.0E-09	8.4E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	1.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-08	1.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	5.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)	4.0E-09	4.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	4.3E-11	mg/kg-day	1.7E+01	(mg/kg-day)	7.2E-10	3.7E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000012
					Heptachlor epoxide	0.0016	mg/kg	1.7E-11	mg/kg-day	9.1E+00	(mg/kg-day)	1.6E-10	1.5E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000011
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	4.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)	9.0E-09	3.9E-08	mg/kg-day	2.0E-05	mg/kg-day	0.002
			Exp. Route Total									2.3E-07					0.032
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	6.8E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-07	5.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
					Cadmium	1.8	mg/kg	2.7E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000096
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	510	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	4.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	45	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.6	mg/kg	1.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.6E-09	1.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	1.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.0E-07	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	1.8E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.3E-08	1.6E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	3.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.4E-08	2.9E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	1.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.4E-09	8.9E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	9.0E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.8E-08	7.8E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0039
			Exp. Route Total									2.7E-07					0.006
		Exposure Point Total										5.1E-07					0.038
	Exposure Medium Total											5.1E-07					0.038
Sediment Total												5.1E-07					0.038

TABLE 7.47 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in LBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	20	mg/kg	4.6E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-04	mg/kg-day	4.0E-02	mg/kg-day	0.01
					Iron	260	mg/kg	5.9E-04	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0074
					Manganese	6	mg/kg	1.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-04	mg/kg-day	1.4E-01	mg/kg-day	0.00087
					Mercury (inorganic)	0.079	mg/kg	1.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0054
					Selenium	1.5	mg/kg	3.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0061
				Organometals	Methyl mercury	0.24	mg/kg	5.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-06	mg/kg-day	1.0E-04	mg/kg-day	0.05
				PCBs	PCBs (total Aroclors)	0.019	mg/kg	4.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	9.0E-08	3.9E-07	mg/kg-day	2.0E-05	mg/kg-day	0.02
			Exp. Route Total									9.0E-08					0.099
		Exposure Point Total										9.0E-08					0.099
	Exposure Medium Total											9.0E-08					0.099
	Surface Water Total	Surface Water Total in LBC	Dermal	Metals	Arsenic	3.6	ug/l	4.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)	6.6E-09	3.9E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00013
					Thallium	5.5	ug/l	6.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0058
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									6.6E-09					0.0059
		Exposure Point Total										6.6E-09					0.0059
	Exposure Medium Total											6.6E-09					0.0059
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	1.1E-06	mg/m3	NA	(mg/kg-day)	NA	1.0E-05	mg/m3	3.0E-04	mg/m3	0.033
			Exp. Route Total									NA					0.033
		Exposure Point Total										NA					0.033
	Exposure Medium Total											NA					0.033
Surface Water Total												9.7E-08					0.14
Total Receptor Risks												6E-07					0.2

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.48 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Ingestion	Metals	Antimony	1.8	mg/kg	4.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00067
					Arsenic	15	mg/kg	2.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.5E-07	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0046
					Cadmium	1.8	mg/kg	4.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00027
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	3.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0067
					Copper	110	mg/kg	2.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00042
					Iron	36000	mg/kg	9.2E-04	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0077
					Manganese	510	mg/kg	1.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.7E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00055
					Mercury	4.6	mg/kg	1.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0023
					Nickel	45	mg/kg	1.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	6.8E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00034
					Thallium	1.7	mg/kg	4.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-07	mg/kg-day	1.0E-05	mg/kg-day	0.026
					Zinc	290	mg/kg	7.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00015
				PAHs	Benz[a]anthracene	0.6	mg/kg	4.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.1E-08	9.1E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	4.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	3.6E-07	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	6.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.6E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	1.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.6E-08	2.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	3.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.6E-08	7.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	1.0E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.8E-09	6.1E-10	mg/kg-day	3.0E-05	mg/kg-day	0.00002
					Heptachlor epoxide	0.0016	mg/kg	4.2E-11	mg/kg-day	9.1E+00	(mg/kg-day)	3.8E-10	2.4E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000019
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	1.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.2E-08	6.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0032
			Exp. Route Total									9.2E-07					0.053
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	7.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-07	4.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Cadmium	1.8	mg/kg	2.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000068
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	510	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	4.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	45	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.6	mg/kg	3.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.5E-08	7.4E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	4.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.9E-07	8.5E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	5.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.7E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	9.5E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.9E-08	2.0E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	2.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.1E-08	6.3E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	9.6E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.9E-08	5.6E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0028
			Exp. Route Total									5.7E-07					0.0043
		Exposure Point Total										1.5E-06					0.057
	Exposure Medium Total											1.5E-06					0.057
Sediment Total												1.5E-06					0.057

TABLE 7.48 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in LBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	20	mg/kg	7.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-04	mg/kg-day	4.0E-02	mg/kg-day	0.011
					Iron	260	mg/kg	9.7E-04	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0081
					Manganese	6	mg/kg	2.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-04	mg/kg-day	1.4E-01	mg/kg-day	0.00095
					Mercury (inorganic)	0.079	mg/kg	3.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0059
					Selenium	1.5	mg/kg	5.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0067
				Organometals	Methyl mercury	0.24	mg/kg	9.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-06	mg/kg-day	1.0E-04	mg/kg-day	0.054
				PCBs	PCBs (total Aroclors)	0.019	mg/kg	7.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.5E-07	4.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.022
			Exp. Route Total									1.5E-07					0.11
		Exposure Point Total										1.5E-07					0.11
	Exposure Medium Total											1.5E-07					0.11
	Surface Water Total	Surface Water Total in LBC	Dermal	Metals	Arsenic	3.6	ug/l	7.1E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-08	4.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00014
					Thallium	5.5	ug/l	1.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.2E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0062
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.1E-08					0.0064
		Exposure Point Total										1.1E-08					0.0064
	Exposure Medium Total											1.1E-08					0.0064
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	1.7E-06	mg/m3	NA	(mg/kg-day)	NA	1.0E-05	mg/m3	3.0E-04	mg/m3	0.033
			Exp. Route Total									NA					0.033
		Exposure Point Total										NA					0.033
	Exposure Medium Total											NA					0.033
Surface Water Total												1.6E-07					0.15
Total Receptor Risks												2E-06					0.2

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.49 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in LBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	20	mg/kg	6.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.1E-04	mg/kg-day	4.0E-02	mg/kg-day	0.018
					Iron	260	mg/kg	7.9E-04	mg/kg-day	NA	(mg/kg-day)	NA	9.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.013
					Manganese	6	mg/kg	1.9E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0015
					Mercury (inorganic)	0.079	mg/kg	2.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0095
					Selenium	1.5	mg/kg	4.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-05	mg/kg-day	5.0E-03	mg/kg-day	0.011
				Organometals	Methyl mercury	0.24	mg/kg	7.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.8E-06	mg/kg-day	1.0E-04	mg/kg-day	0.088
				PCBs	PCBs (total Aroclors)	0.019	mg/kg	6.0E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.2E-07	7.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.035
			Exp. Route Total									1.2E-07					0.18
		Exposure Point Total										1.2E-07					0.18
	Exposure Medium Total											1.2E-07					0.18
Surface Water Total												1.2E-07					0.18
Total Receptor Risks												1E-07					0.2

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.50 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Ingestion	Metals	Antimony	1.8	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00041
					Arsenic	15	mg/kg	9.5E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.4E-07	8.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0028
					Cadmium	1.8	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00017
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	1.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0041
					Copper	110	mg/kg	1.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00026
					Iron	36000	mg/kg	3.8E-04	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0047
					Manganese	510	mg/kg	5.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00034
					Mercury	4.6	mg/kg	4.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Nickel	45	mg/kg	4.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00021
					Thallium	1.7	mg/kg	1.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-07	mg/kg-day	1.0E-05	mg/kg-day	0.016
					Zinc	290	mg/kg	3.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000089
				PAHs	Benz[a]anthracene	0.6	mg/kg	6.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	4.6E-09	5.6E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	7.4E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.4E-08	6.4E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	9.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.0E-09	8.4E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	1.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-08	1.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	5.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)	4.0E-09	4.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	4.3E-11	mg/kg-day	1.7E+01	(mg/kg-day)	7.2E-10	3.7E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000012
					Heptachlor epoxide	0.0016	mg/kg	1.7E-11	mg/kg-day	9.1E+00	(mg/kg-day)	1.6E-10	1.5E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000011
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	4.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)	9.0E-09	3.9E-08	mg/kg-day	2.0E-05	mg/kg-day	0.002
			Exp. Route Total									2.3E-07					0.032
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	6.8E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-07	5.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
					Cadmium	1.8	mg/kg	2.7E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000096
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	510	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	4.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	45	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.6	mg/kg	1.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.6E-09	1.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	1.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.0E-07	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	1.8E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.3E-08	1.6E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	3.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.4E-08	2.9E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	1.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.4E-09	8.9E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	9.0E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.8E-08	7.8E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0039
			Exp. Route Total									2.7E-07					0.006
		Exposure Point Total										5.1E-07					0.038
	Exposure Medium Total											5.1E-07					0.038
Sediment Total												5.1E-07					0.038

TABLE 7.50 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in LBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	20	mg/kg	4.6E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-04	mg/kg-day	4.0E-02	mg/kg-day	0.01
					Iron	260	mg/kg	5.9E-04	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0074
					Manganese	6	mg/kg	1.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-04	mg/kg-day	1.4E-01	mg/kg-day	0.00087
					Mercury (inorganic)	0.022	mg/kg	5.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0015
					Selenium	1.5	mg/kg	3.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0061
				Organometals	Methyl mercury	0.2	mg/kg	4.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-06	mg/kg-day	1.0E-04	mg/kg-day	0.042
				PCBs	PCBs (total Aroclors)	0.33	mg/kg	7.6E-07	mg/kg-day	2.0E+00	(mg/kg-day)	1.5E-06	6.7E-06	mg/kg-day	2.0E-05	mg/kg-day	0.33
			Exp. Route Total									1.5E-06					0.4
		Exposure Point Total										1.5E-06					0.4
	Exposure Medium Total											1.5E-06					0.4
	Surface Water Total	Surface Water Total in LBC	Dermal	Metals	Arsenic	3.6	ug/l	4.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)	6.6E-09	3.9E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00013
					Thallium	5.5	ug/l	6.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0058
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									6.6E-09					0.0059
		Exposure Point Total										6.6E-09					0.0059
	Exposure Medium Total											6.6E-09					0.0059
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	1.1E-06	mg/m3	NA	(mg/kg-day)	NA	1.0E-05	mg/m3	3.0E-04	mg/m3	0.033
			Exp. Route Total									NA					0.033
		Exposure Point Total										NA					0.033
	Exposure Medium Total											NA					0.033
Surface Water Total												1.5E-06					0.44
Total Receptor Risks												2E-06					0.5

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.51 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Ingestion	Metals	Antimony	1.8	mg/kg	4.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00067
					Arsenic	15	mg/kg	2.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.5E-07	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0046
					Cadmium	1.8	mg/kg	4.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00027
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	3.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0067
					Copper	110	mg/kg	2.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00042
					Iron	36000	mg/kg	9.2E-04	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0077
					Manganese	510	mg/kg	1.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.7E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00055
					Mercury	4.6	mg/kg	1.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0023
					Nickel	45	mg/kg	1.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	6.8E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00034
					Thallium	1.7	mg/kg	4.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-07	mg/kg-day	1.0E-05	mg/kg-day	0.026
					Zinc	290	mg/kg	7.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00015
				PAHs	Benz[a]anthracene	0.6	mg/kg	4.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.1E-08	9.1E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	4.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	3.6E-07	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	6.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.6E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	1.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.6E-08	2.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	3.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.6E-08	7.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	1.0E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.8E-09	6.1E-10	mg/kg-day	3.0E-05	mg/kg-day	0.00002
					Heptachlor epoxide	0.0016	mg/kg	4.2E-11	mg/kg-day	9.1E+00	(mg/kg-day)	3.8E-10	2.4E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000019
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	1.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.2E-08	6.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0032
			Exp. Route Total									9.2E-07					0.053
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	7.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-07	4.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Cadmium	1.8	mg/kg	2.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000068
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	510	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	4.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	45	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.6	mg/kg	3.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.5E-08	7.4E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	4.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.9E-07	8.5E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	5.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.7E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	9.5E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.9E-08	2.0E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	2.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.1E-08	6.3E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	9.6E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.9E-08	5.6E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0028
			Exp. Route Total									5.7E-07					0.0043
		Exposure Point Total										1.5E-06					0.057
	Exposure Medium Total											1.5E-06					0.057
Sediment Total												1.5E-06					0.057

TABLE 7.51 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in LBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	20	mg/kg	7.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-04	mg/kg-day	4.0E-02	mg/kg-day	0.011
					Iron	260	mg/kg	9.7E-04	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0081
					Manganese	6	mg/kg	2.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-04	mg/kg-day	1.4E-01	mg/kg-day	0.00095
					Mercury (inorganic)	0.022	mg/kg	8.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0016
					Selenium	1.5	mg/kg	5.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0067
				Organometals	Methyl mercury	0.2	mg/kg	7.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-06	mg/kg-day	1.0E-04	mg/kg-day	0.046
				PCBs	PCBs (total Aroclors)	0.33	mg/kg	1.3E-06	mg/kg-day	2.0E+00	(mg/kg-day)	2.5E-06	7.3E-06	mg/kg-day	2.0E-05	mg/kg-day	0.36
			Exp. Route Total									2.5E-06					0.44
		Exposure Point Total										2.5E-06					0.44
	Exposure Medium Total											2.5E-06					0.44
	Surface Water Total	Surface Water Total in LBC	Dermal	Metals	Arsenic	3.6	ug/l	7.1E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-08	4.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00014
					Thallium	5.5	ug/l	1.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.2E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0062
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.1E-08					0.0064
		Exposure Point Total										1.1E-08					0.0064
	Exposure Medium Total											1.1E-08					0.0064
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	1.7E-06	mg/m3	NA	(mg/kg-day)	NA	1.0E-05	mg/m3	3.0E-04	mg/m3	0.033
			Exp. Route Total									NA					0.033
		Exposure Point Total										NA					0.033
	Exposure Medium Total											NA					0.033
Surface Water Total												2.5E-06					0.48
Total Receptor Risks												4E-06					0.5

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.52 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in LBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	20	mg/kg	6.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.1E-04	mg/kg-day	4.0E-02	mg/kg-day	0.018
					Iron	260	mg/kg	7.9E-04	mg/kg-day	NA	(mg/kg-day)	NA	9.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.013
					Manganese	6	mg/kg	1.9E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0015
					Mercury (inorganic)	0.022	mg/kg	6.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	7.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0026
					Selenium	1.5	mg/kg	4.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-05	mg/kg-day	5.0E-03	mg/kg-day	0.011
				Organometals	Methyl mercury	0.2	mg/kg	6.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.4E-06	mg/kg-day	1.0E-04	mg/kg-day	0.074
				PCBs	PCBs (total Aroclors)	0.33	mg/kg	1.0E-06	mg/kg-day	2.0E+00	(mg/kg-day)	2.0E-06	1.2E-05	mg/kg-day	2.0E-05	mg/kg-day	0.59
			Exp. Route Total									2.0E-06					0.71
		Exposure Point Total										2.0E-06					0.71
	Exposure Medium Total											2.0E-06					0.71
Surface Water Total												2.0E-06					0.71
Total Receptor Risks												2E-06					0.7

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.53 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in LBC	Ingestion	Metals	Antimony	2.5	mg/kg	1.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00039
					Arsenic	15	mg/kg	6.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)	9.5E-08	5.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0018
					Cadmium	1.8	mg/kg	1.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	9.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0027
					Copper	110	mg/kg	7.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.9E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00017
					Iron	36000	mg/kg	2.5E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0031
					Manganese	490	mg/kg	3.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00022
					Mercury	6.7	mg/kg	4.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Nickel	42	mg/kg	3.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00013
					Thallium	1.6	mg/kg	1.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	9.6E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0096
					Zinc	290	mg/kg	2.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000059
				PAHs	Benz[a]anthracene	0.61	mg/kg	4.3E-09	mg/kg-day	7.3E-01	(mg/kg-day)	3.1E-09	3.7E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.66	mg/kg	4.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	3.4E-08	4.1E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.86	mg/kg	6.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	4.4E-09	5.3E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.15	mg/kg	1.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	7.9E-09	9.4E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.49	mg/kg	3.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.5E-09	3.0E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0038	mg/kg	2.7E-11	mg/kg-day	1.7E+01	(mg/kg-day)	4.6E-10	2.4E-10	mg/kg-day	3.0E-05	mg/kg-day	0.0000079
					Heptachlor epoxide	0.001	mg/kg	7.1E-12	mg/kg-day	9.1E+00	(mg/kg-day)	6.5E-11	6.2E-11	mg/kg-day	1.3E-05	mg/kg-day	0.0000048
				PCBs	PCBs (total Aroclors)	0.52	mg/kg	3.6E-09	mg/kg-day	2.0E+00	(mg/kg-day)	7.3E-09	3.2E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0016
			Exp. Route Total									1.5E-07					0.021
			Dermal	Metals	Antimony	2.5	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	4.5E-08	mg/kg-day	1.5E+00	(mg/kg-day)	6.8E-08	4.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0013
					Cadmium	1.8	mg/kg	1.8E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000064
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	490	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	6.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	42	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.61	mg/kg	7.9E-09	mg/kg-day	7.3E-01	(mg/kg-day)	5.8E-09	6.9E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.66	mg/kg	8.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.3E-08	7.6E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.86	mg/kg	1.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.3E-09	9.9E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.15	mg/kg	2.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-08	1.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.49	mg/kg	6.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	4.7E-09	5.6E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0038	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.001	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.52	mg/kg	7.3E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.5E-08	6.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0032
			Exp. Route Total									1.8E-07					0.0046
		Exposure Point Total										3.3E-07					0.026
	Exposure Medium Total											3.3E-07					0.026
Sediment Total												3.3E-07					0.026

TABLE 7.53 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in LBC	Ingestion	Metals	Arsenic	3.6	ug/l	3.2E-09	mg/kg-day	1.5E+00	(mg/kg-day)	4.8E-09	2.8E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000094
					Thallium	5.5	ug/l	4.8E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0042
				PAHs	Benzo[a]pyrene	0.092	ug/l	8.1E-11	mg/kg-day	7.3E+00	(mg/kg-day)	5.9E-10	7.1E-10	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.13	ug/l	1.1E-10	mg/kg-day	7.3E+00	(mg/kg-day)	8.3E-10	1.0E-09	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									6.2E-09					0.0043
			Dermal	Metals	Arsenic	3.6	ug/l	1.3E-09	mg/kg-day	1.5E+00	(mg/kg-day)	2.0E-09	1.2E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000039
					Thallium	5.5	ug/l	2.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0018
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									2.0E-09					0.0018
		Exposure Point Total										8.3E-09					0.0061
	Exposure Medium Total											8.3E-09					0.0061
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	3.2E-07	mg/m3	NA	(mg/kg-day)	NA	2.8E-06	mg/m3	3.0E-04	mg/m3	0.0094
			Exp. Route Total									NA					0.0094
		Exposure Point Total										NA					0.0094
	Exposure Medium Total											NA					0.0094
Surface Water Total												8.3E-09					0.016
Total Receptor Risks												3E-07					0.04

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.54 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in LBC	Ingestion	Metals	Antimony	2.5	mg/kg	4.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00063
					Arsenic	15	mg/kg	1.6E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.3E-07	9.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
					Cadmium	1.8	mg/kg	3.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00018
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	2.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0044
					Copper	110	mg/kg	1.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00028
					Iron	36000	mg/kg	6.2E-04	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0052
					Manganese	490	mg/kg	8.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00035
					Mercury	6.7	mg/kg	1.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0023
					Nickel	42	mg/kg	7.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00021
					Thallium	1.6	mg/kg	2.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-07	mg/kg-day	1.0E-05	mg/kg-day	0.016
					Zinc	290	mg/kg	4.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000096
				PAHs	Benz[a]anthracene	0.61	mg/kg	2.8E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.1E-08	6.1E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.66	mg/kg	3.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.3E-07	6.7E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.86	mg/kg	4.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.0E-08	8.7E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.15	mg/kg	7.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.2E-08	1.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.49	mg/kg	2.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-08	4.9E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0038	mg/kg	6.6E-11	mg/kg-day	1.7E+01	(mg/kg-day)	1.1E-09	3.9E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000013
					Heptachlor epoxide	0.001	mg/kg	1.8E-11	mg/kg-day	9.1E+00	(mg/kg-day)	1.6E-10	1.0E-10	mg/kg-day	1.3E-05	mg/kg-day	0.0000079
				PCBs	PCBs (total Aroclors)	0.52	mg/kg	9.0E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.8E-08	5.2E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0026
			Exp. Route Total									6.0E-07					0.035
			Dermal	Metals	Antimony	2.5	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	4.8E-08	mg/kg-day	1.5E+00	(mg/kg-day)	7.3E-08	2.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00094
					Cadmium	1.8	mg/kg	2.0E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000046
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	490	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	6.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	42	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.61	mg/kg	2.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-08	5.0E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.66	mg/kg	2.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.8E-07	5.4E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.86	mg/kg	3.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.4E-08	7.1E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.15	mg/kg	5.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.2E-08	1.2E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.49	mg/kg	1.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-08	4.0E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0038	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.001	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.52	mg/kg	7.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.6E-08	4.5E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0023
			Exp. Route Total									3.7E-07					0.0033
		Exposure Point Total										9.7E-07					0.038
	Exposure Medium Total											9.7E-07					0.038
Sediment Total												9.7E-07					0.038

TABLE 7.54 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in LBC	Ingestion	Metals	Arsenic	3.6	ug/l	7.9E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-08	4.6E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00015
					Thallium	5.5	ug/l	1.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.9E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0069
				PAHs	Benzo[a]pyrene	0.092	ug/l	5.4E-10	mg/kg-day	7.3E+00	(mg/kg-day)	3.9E-09	1.2E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.13	ug/l	7.6E-10	mg/kg-day	7.3E+00	(mg/kg-day)	5.5E-09	1.6E-09	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									2.1E-08					0.0071
			Dermal	Metals	Arsenic	3.6	ug/l	2.2E-09	mg/kg-day	1.5E+00	(mg/kg-day)	3.4E-09	1.3E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000044
					Thallium	5.5	ug/l	3.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-08	mg/kg-day	1.0E-05	mg/kg-day	0.002
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									3.4E-09					0.002
		Exposure Point Total										2.5E-08					0.0091
	Exposure Medium Total											2.5E-08					0.0091
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	4.8E-07	mg/m3	NA	(mg/kg-day)	NA	2.8E-06	mg/m3	3.0E-04	mg/m3	0.0094
			Exp. Route Total									NA					0.0094
		Exposure Point Total										NA					0.0094
	Exposure Medium Total											NA					0.0094
Surface Water Total												2.5E-08					0.018
Total Receptor Risks												1E-06					0.06

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.55 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in LBC	Ingestion	Metals	Antimony	2.5	mg/kg	3.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00083
					Arsenic	15	mg/kg	1.4E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.1E-07	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
					Cadmium	1.8	mg/kg	2.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00024
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	2.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0058
					Copper	110	mg/kg	1.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00037
					Iron	36000	mg/kg	5.5E-04	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0068
					Manganese	490	mg/kg	7.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	6.6E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00047
					Mercury	6.7	mg/kg	1.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
					Nickel	42	mg/kg	6.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00028
					Thallium	1.6	mg/kg	2.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-07	mg/kg-day	1.0E-05	mg/kg-day	0.021
					Zinc	290	mg/kg	4.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.8E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00013
				PAHs	Benz[a]anthracene	0.61	mg/kg	9.3E-09	mg/kg-day	7.3E-01	(mg/kg-day)	6.8E-09	8.1E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.66	mg/kg	1.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)	7.4E-08	8.9E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.86	mg/kg	1.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.6E-09	1.2E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.15	mg/kg	2.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.7E-08	2.0E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.49	mg/kg	7.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)	5.5E-09	6.5E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0038	mg/kg	5.9E-11	mg/kg-day	1.7E+01	(mg/kg-day)	1.0E-09	5.1E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000017
					Heptachlor epoxide	0.001	mg/kg	1.5E-11	mg/kg-day	9.1E+00	(mg/kg-day)	1.4E-10	1.4E-10	mg/kg-day	1.3E-05	mg/kg-day	0.00001
				PCBs	PCBs (total Aroclors)	0.52	mg/kg	7.9E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.6E-08	6.9E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0035
			Exp. Route Total									3.4E-07					0.046
			Dermal	Metals	Antimony	2.5	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	9.8E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.5E-07	8.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0029
					Cadmium	1.8	mg/kg	4.0E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00014
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	490	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	6.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	42	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.61	mg/kg	1.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.3E-08	1.5E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.66	mg/kg	1.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-07	1.6E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.86	mg/kg	2.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.8E-08	2.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.15	mg/kg	4.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	3.2E-08	3.8E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.49	mg/kg	1.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0038	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.001	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.52	mg/kg	1.6E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.2E-08	1.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0069
			Exp. Route Total									3.9E-07					0.0099
		Exposure Point Total										7.2E-07					0.056
	Exposure Medium Total											7.2E-07					0.056
Sediment Total												7.2E-07					0.056

TABLE 7.55 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in LBC	Ingestion	Metals	Arsenic	3.6	ug/l	7.0E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-08	6.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0002
					Thallium	5.5	ug/l	1.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	9.2E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0092
				PAHs	Benzo[a]pyrene	0.092	ug/l	1.8E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-09	1.5E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.13	ug/l	2.5E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.8E-09	2.2E-09	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.4E-08					0.0094
			Dermal	Metals	Arsenic	3.6	ug/l	2.9E-09	mg/kg-day	1.5E+00	(mg/kg-day)	4.4E-09	2.5E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000085
					Thallium	5.5	ug/l	4.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.8E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0038
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									4.4E-09					0.0039
		Exposure Point Total										1.8E-08					0.013
	Exposure Medium Total											1.8E-08					0.013
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	7.0E-07	mg/m3	NA	(mg/kg-day)	NA	6.1E-06	mg/m3	3.0E-04	mg/m3	0.02
			Exp. Route Total									NA					0.02
		Exposure Point Total										NA					0.02
	Exposure Medium Total											NA					0.02
Surface Water Total												1.8E-08					0.034
Total Receptor Risks												7E-07					0.09

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.56 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in LBC	Ingestion	Metals	Antimony	2.5	mg/kg	9.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0014
					Arsenic	15	mg/kg	3.4E-07	mg/kg-day	1.5E+00	(mg/kg-day)	5.1E-07	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0066
					Cadmium	1.8	mg/kg	6.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-07	mg/kg-day	1.0E-03	mg/kg-day	0.0004
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	4.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0096
					Copper	110	mg/kg	4.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00061
					Iron	36000	mg/kg	1.3E-03	mg/kg-day	NA	(mg/kg-day)	NA	7.8E-03	mg/kg-day	7.0E-01	mg/kg-day	0.011
					Manganese	490	mg/kg	1.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-04	mg/kg-day	1.4E-01	mg/kg-day	0.00077
					Mercury	6.7	mg/kg	2.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0049
					Nickel	42	mg/kg	1.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	9.3E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00047
					Thallium	1.6	mg/kg	5.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-07	mg/kg-day	1.0E-05	mg/kg-day	0.034
					Zinc	290	mg/kg	1.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.2E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00021
				PAHs	Benz[a]anthracene	0.61	mg/kg	6.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.5E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.66	mg/kg	6.7E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.9E-07	1.5E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.86	mg/kg	8.8E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.4E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.15	mg/kg	1.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-07	3.3E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.49	mg/kg	5.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.6E-08	1.1E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0038	mg/kg	1.4E-10	mg/kg-day	1.7E+01	(mg/kg-day)	2.4E-09	8.4E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000028
					Heptachlor epoxide	0.001	mg/kg	3.8E-11	mg/kg-day	9.1E+00	(mg/kg-day)	3.5E-10	2.2E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000017
				PCBs	PCBs (total Aroclors)	0.52	mg/kg	1.9E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.9E-08	1.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0057
			Exp. Route Total									1.3E-06					0.076
			Dermal	Metals	Antimony	2.5	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	1.0E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.6E-07	6.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
					Cadmium	1.8	mg/kg	4.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000099
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	490	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	6.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	42	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.61	mg/kg	5.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.6E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.66	mg/kg	5.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.0E-07	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.86	mg/kg	7.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.2E-08	1.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.15	mg/kg	1.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	9.1E-08	2.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.49	mg/kg	4.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.9E-08	8.7E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0038	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.001	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.52	mg/kg	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.4E-08	9.9E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0049
			Exp. Route Total									8.0E-07					0.0071
		Exposure Point Total										2.1E-06					0.083
	Exposure Medium Total											2.1E-06					0.083
Sediment Total												2.1E-06					0.083

TABLE 7.56 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in LBC	Ingestion	Metals	Arsenic	3.6	ug/l	1.7E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.6E-08	1.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00033
					Thallium	5.5	ug/l	2.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-07	mg/kg-day	1.0E-05	mg/kg-day	0.015
				PAHs	Benzo[a]pyrene	0.092	ug/l	1.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	8.5E-09	2.5E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.13	ug/l	1.6E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.2E-08	3.5E-09	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									4.6E-08					0.015
			Dermal	Metals	Arsenic	3.6	ug/l	4.9E-09	mg/kg-day	1.5E+00	(mg/kg-day)	7.3E-09	2.8E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000094
					Thallium	5.5	ug/l	7.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0043
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									7.3E-09					0.0044
		Exposure Point Total										5.3E-08					0.02
	Exposure Medium Total											5.3E-08					0.02
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	1.0E-06	mg/m3	NA	(mg/kg-day)	NA	6.1E-06	mg/m3	3.0E-04	mg/m3	0.02
			Exp. Route Total									NA					0.02
		Exposure Point Total										NA					0.02
	Exposure Medium Total											NA					0.02
Surface Water Total												5.3E-08					0.04
Total Receptor Risks												2E-06					0.1

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.57 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in LBC	Ingestion	Metals	Aluminum	14000	mg/kg	9.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0065
					Antimony	1.1	mg/kg	7.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0012
					Arsenic	24	mg/kg	9.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.4E-07	6.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.022
					Cadmium	6.6	mg/kg	4.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-06	mg/kg-day	1.0E-03	mg/kg-day	0.003
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	1.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.024
					Copper	150	mg/kg	9.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0017
					Iron	45000	mg/kg	2.9E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-02	mg/kg-day	7.0E-01	mg/kg-day	0.029
					Manganese	640	mg/kg	4.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0021
					Mercury	12	mg/kg	7.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.018
					Nickel	56	mg/kg	3.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0013
					Thallium	2.3	mg/kg	1.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-06	mg/kg-day	1.0E-05	mg/kg-day	0.1
					Vanadium	47	mg/kg	3.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0042
					Zinc	410	mg/kg	2.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-04	mg/kg-day	3.0E-01	mg/kg-day	0.00062
				PAHs	Benzo[a]pyrene	1.4	mg/kg	9.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.8E-08	6.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.16	mg/kg	1.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	7.3E-09	7.0E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0089	mg/kg	5.8E-11	mg/kg-day	1.7E+01	(mg/kg-day)	9.8E-10	4.0E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00013
					Heptachlor	0.0011	mg/kg	7.3E-12	mg/kg-day	4.5E+00	(mg/kg-day)	3.3E-11	5.1E-10	mg/kg-day	5.0E-04	mg/kg-day	0.000001
					Heptachlor epoxide	0.0015	mg/kg	9.9E-12	mg/kg-day	9.1E+00	(mg/kg-day)	9.0E-11	6.9E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000053
				PCBs	PCBs (total Aroclors)	0.89	mg/kg	5.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.2E-08	4.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.02
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									2.3E-07					0.24
			Dermal	Metals	Aluminum	14000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	1.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	24	mg/kg	1.5E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.2E-08	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0034
					Cadmium	6.6	mg/kg	1.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	9.4E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00038
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	150	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	45000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	640	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	12	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	56	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	47	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	410	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	1.4	mg/kg	3.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-08	2.7E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.16	mg/kg	4.1E-10	mg/kg-day	7.3E+00	(mg/kg-day)	3.0E-09	2.9E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0089	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.0011	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.0015	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.89	mg/kg	2.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)	5.1E-09	1.8E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0089
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									5.8E-08					0.013
		Exposure Point Total										2.8E-07					0.25
	Exposure Medium Total											2.8E-07					0.25
Sediment Total												2.8E-07					0.25

TABLE 7.57 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	**Exposure Medium**	**Exposure Point**	**Exposure Route**	**Chemical Class**	**COPC**	**Value**	**Units**	**Value**	**Units**	**Value**	**Units**	**Cancer Risk**	**Value**	**Units**	**Value**	**Units**	**Hazard Quotient**
Surface Water	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	1.8E-07	mg/m3	NA	(mg/kg-day)	NA	1.2E-05	mg/m3	3.0E-04	mg/m3	0.042
			Exp. Route Total									NA					0.042
		Exposure Point Total										NA					0.042
	Exposure Medium Total											NA					0.042
Surface Water Total												NA					0.042
Total Receptor Risks												3E-07					0.3

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.58 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Nevertouch Marsh	Ingestion	Metals	Aluminum	17000	mg/kg	1.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	7.8E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0078
					Antimony	4.1	mg/kg	2.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-06	mg/kg-day	4.0E-04	mg/kg-day	0.0046
					Arsenic	67	mg/kg	2.6E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.9E-07	1.8E-05	mg/kg-day	3.0E-04	mg/kg-day	0.061
					Cadmium	31	mg/kg	2.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-05	mg/kg-day	1.0E-03	mg/kg-day	0.014
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	29	mg/kg	1.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.044
					Copper	550	mg/kg	3.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0062
					Iron	28000	mg/kg	1.8E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-02	mg/kg-day	7.0E-01	mg/kg-day	0.018
					Manganese	3300	mg/kg	2.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-03	mg/kg-day	1.4E-01	mg/kg-day	0.011
					Mercury	180	mg/kg	1.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	8.0E-05	mg/kg-day	3.0E-04	mg/kg-day	0.27
					Nickel	200	mg/kg	1.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	9.2E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0046
					Thallium	4	mg/kg	2.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-06	mg/kg-day	1.0E-05	mg/kg-day	0.18
					Vanadium	93	mg/kg	6.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0084
					Zinc	17000	mg/kg	1.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	7.6E-03	mg/kg-day	3.0E-01	mg/kg-day	0.025
				PAHs	Benzo[a]pyrene	0.14	mg/kg	9.3E-10	mg/kg-day	7.3E+00	(mg/kg-day)	6.8E-09	6.5E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.022	mg/kg	1.4E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.0E-09	1.0E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.26	mg/kg	1.7E-09	mg/kg-day	1.7E+01	(mg/kg-day)	2.8E-08	1.2E-07	mg/kg-day	3.0E-05	mg/kg-day	0.0039
					Heptachlor	0.21	mg/kg	1.4E-09	mg/kg-day	4.5E+00	(mg/kg-day)	6.2E-09	9.7E-08	mg/kg-day	5.0E-04	mg/kg-day	0.00019
					Heptachlor epoxide	0.29	mg/kg	1.9E-09	mg/kg-day	9.1E+00	(mg/kg-day)	1.7E-08	1.3E-07	mg/kg-day	1.3E-05	mg/kg-day	0.01
				PCBs	PCBs (total Aroclors)	11	mg/kg	7.0E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.4E-07	4.9E-06	mg/kg-day	2.0E-05	mg/kg-day	0.25
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									5.9E-07					0.91
			Dermal	Metals	Aluminum	17000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	4.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	67	mg/kg	4.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)	6.1E-08	2.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0096
					Cadmium	31	mg/kg	6.4E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0018
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	29	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	550	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	28000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	3300	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	180	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	200	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	93	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	17000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.14	mg/kg	3.8E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-09	2.7E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.022	mg/kg	5.8E-11	mg/kg-day	7.3E+00	(mg/kg-day)	4.3E-10	4.1E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.26	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.21	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.29	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	11	mg/kg	3.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	6.2E-08	2.2E-06	mg/kg-day	2.0E-05	mg/kg-day	0.11
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.3E-07					0.12
		Exposure Point Total										7.2E-07					1
	Exposure Medium Total											7.2E-07					1
Sediment Total												7.2E-07					1
Total Receptor Risks												7E-07					1

TABLE 7.58 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.59 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Eight Day Swamp	Ingestion	Metals	Aluminum	13000	mg/kg	8.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0059
					Antimony	2.7	mg/kg	1.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	4.0E-04	mg/kg-day	0.003
					Arsenic	41	mg/kg	1.6E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.4E-07	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.037
					Cadmium	16	mg/kg	1.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.1E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0071
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	1.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.035
					Copper	580	mg/kg	3.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0065
					Iron	21000	mg/kg	1.4E-04	mg/kg-day	NA	(mg/kg-day)	NA	9.5E-03	mg/kg-day	7.0E-01	mg/kg-day	0.014
					Manganese	2700	mg/kg	1.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-03	mg/kg-day	1.4E-01	mg/kg-day	0.0088
					Mercury	57	mg/kg	3.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-05	mg/kg-day	3.0E-04	mg/kg-day	0.085
					Nickel	180	mg/kg	1.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	8.2E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0041
					Thallium	5.9	mg/kg	3.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-06	mg/kg-day	1.0E-05	mg/kg-day	0.27
					Vanadium	75	mg/kg	4.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0068
					Zinc	1400	mg/kg	8.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	6.2E-04	mg/kg-day	3.0E-01	mg/kg-day	0.0021
				PAHs	Benzo[a]pyrene	0.18	mg/kg	1.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	8.5E-09	8.1E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.03	mg/kg	1.9E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-09	1.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.02	mg/kg	1.3E-10	mg/kg-day	1.7E+01	(mg/kg-day)	2.2E-09	9.2E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00031
					Heptachlor	0.012	mg/kg	7.6E-11	mg/kg-day	4.5E+00	(mg/kg-day)	3.4E-10	5.3E-09	mg/kg-day	5.0E-04	mg/kg-day	0.000011
					Heptachlor epoxide	0.016	mg/kg	1.0E-10	mg/kg-day	9.1E+00	(mg/kg-day)	9.3E-10	7.2E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00055
				PCBs	PCBs (total Aroclors)	5.1	mg/kg	3.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)	6.6E-08	2.3E-06	mg/kg-day	2.0E-05	mg/kg-day	0.11
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									3.2E-07					0.6
			Dermal	Metals	Aluminum	13000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	2.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	41	mg/kg	2.5E-08	mg/kg-day	1.5E+00	(mg/kg-day)	3.7E-08	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0058
					Cadmium	16	mg/kg	3.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0009
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	580	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	21000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	57	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	180	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	5.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	75	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	1400	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.18	mg/kg	4.8E-10	mg/kg-day	7.3E+00	(mg/kg-day)	3.5E-09	3.3E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.03	mg/kg	7.9E-11	mg/kg-day	7.3E+00	(mg/kg-day)	5.8E-10	5.6E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.02	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.012	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	5.1	mg/kg	1.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.9E-08	1.0E-06	mg/kg-day	2.0E-05	mg/kg-day	0.051
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									7.0E-08					0.057
		Exposure Point Total										3.9E-07					0.66
	Exposure Medium Total											3.9E-07					0.66
Sediment Total												3.9E-07					0.66
Total Receptor Risks												4E-07					0.7

TABLE 7.59 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.60 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Paterson Plank Marsh	Ingestion	Metals	Aluminum	11000	mg/kg	6.9E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0048
					Antimony	3.2	mg/kg	2.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-06	mg/kg-day	4.0E-04	mg/kg-day	0.0036
					Arsenic	40	mg/kg	1.5E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.3E-07	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.036
					Cadmium	8.8	mg/kg	5.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-06	mg/kg-day	1.0E-03	mg/kg-day	0.004
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	39	mg/kg	2.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	3.0E-04	mg/kg-day	0.058
					Copper	230	mg/kg	1.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0026
					Iron	25000	mg/kg	1.6E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-02	mg/kg-day	7.0E-01	mg/kg-day	0.016
					Manganese	6900	mg/kg	4.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-03	mg/kg-day	1.4E-01	mg/kg-day	0.022
					Mercury	44	mg/kg	2.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-05	mg/kg-day	3.0E-04	mg/kg-day	0.066
					Nickel	200	mg/kg	1.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	8.9E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0045
					Thallium	5.9	mg/kg	3.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-06	mg/kg-day	1.0E-05	mg/kg-day	0.26
					Vanadium	91	mg/kg	5.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0082
					Zinc	1300	mg/kg	8.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-04	mg/kg-day	3.0E-01	mg/kg-day	0.0019
				PAHs	Benzo[a]pyrene	0.42	mg/kg	2.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.0E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.085	mg/kg	5.5E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.0E-09	3.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.005	mg/kg	3.2E-11	mg/kg-day	1.7E+01	(mg/kg-day)	5.5E-10	2.3E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000075
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--
				PCBs	PCBs (total Aroclors)	3.3	mg/kg	2.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.3E-08	1.5E-06	mg/kg-day	2.0E-05	mg/kg-day	0.075
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									3.0E-07					0.57
			Dermal	Metals	Aluminum	11000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	3.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	40	mg/kg	2.4E-08	mg/kg-day	1.5E+00	(mg/kg-day)	3.6E-08	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0056
					Cadmium	8.8	mg/kg	1.8E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0005
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	39	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	230	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	25000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	6900	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	44	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	200	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	5.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	91	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	1300	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.42	mg/kg	1.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	8.1E-09	7.8E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.085	mg/kg	2.3E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.6E-09	1.6E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.005	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--
				PCBs	PCBs (total Aroclors)	3.3	mg/kg	9.4E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.9E-08	6.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.033
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									6.5E-08					0.039
		Exposure Point Total										3.6E-07					0.61
	Exposure Medium Total											3.6E-07					0.61
Sediment Total												3.6E-07					0.61
Total Receptor Risks												4E-07					0.6

TABLE 7.60 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.61 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Upper Peach Island Creek Marsh	Ingestion	Metals	Aluminum	16000	mg/kg	1.0E-04	mg/kg-day	NA	(mg/kg-day)	NA	7.3E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0073
					Antimony	17	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.6E-06	mg/kg-day	4.0E-04	mg/kg-day	0.019
					Arsenic	190	mg/kg	7.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-06	5.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.17
					Cadmium	30	mg/kg	2.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-05	mg/kg-day	1.0E-03	mg/kg-day	0.014
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	120	mg/kg	7.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-05	mg/kg-day	3.0E-04	mg/kg-day	0.18
					Copper	4100	mg/kg	2.6E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-03	mg/kg-day	4.0E-02	mg/kg-day	0.046
					Iron	30000	mg/kg	1.9E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-02	mg/kg-day	7.0E-01	mg/kg-day	0.019
					Manganese	3700	mg/kg	2.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-03	mg/kg-day	1.4E-01	mg/kg-day	0.012
					Mercury	320	mg/kg	2.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-04	mg/kg-day	3.0E-04	mg/kg-day	0.49
					Nickel	860	mg/kg	5.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-04	mg/kg-day	2.0E-02	mg/kg-day	0.019
					Thallium	6.6	mg/kg	4.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-06	mg/kg-day	1.0E-05	mg/kg-day	0.3
					Vanadium	160	mg/kg	1.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	7.2E-05	mg/kg-day	5.0E-03	mg/kg-day	0.014
					Zinc	510	mg/kg	3.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-04	mg/kg-day	3.0E-01	mg/kg-day	0.00076
				PAHs	Benzo[a]pyrene	0.55	mg/kg	3.5E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.6E-08	2.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.11	mg/kg	7.1E-10	mg/kg-day	7.3E+00	(mg/kg-day)	5.2E-09	5.0E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.045	mg/kg	2.9E-10	mg/kg-day	1.7E+01	(mg/kg-day)	4.9E-09	2.0E-08	mg/kg-day	3.0E-05	mg/kg-day	0.00068
					Heptachlor	0.021	mg/kg	1.4E-10	mg/kg-day	4.5E+00	(mg/kg-day)	6.1E-10	9.5E-09	mg/kg-day	5.0E-04	mg/kg-day	0.000019
					Heptachlor epoxide	0.0091	mg/kg	5.9E-11	mg/kg-day	9.1E+00	(mg/kg-day)	5.3E-10	4.1E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00032
				PCBs	PCBs (total Aroclors)	1.7	mg/kg	1.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.2E-08	7.8E-07	mg/kg-day	2.0E-05	mg/kg-day	0.039
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.2E-06					1.3
			Dermal	Metals	Aluminum	16000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	17	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	190	mg/kg	1.1E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.7E-07	8.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.027
					Cadmium	30	mg/kg	6.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0017
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	120	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	4100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	30000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	3700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	320	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	860	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	6.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	160	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	510	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.55	mg/kg	1.4E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-08	1.0E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.11	mg/kg	2.9E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-09	2.0E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.045	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.021	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.0091	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.7	mg/kg	4.9E-09	mg/kg-day	2.0E+00	(mg/kg-day)	9.8E-09	3.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.017
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.9E-07					0.046
		Exposure Point Total										1.3E-06					1.4
	Exposure Medium Total											1.3E-06					1.4
Sediment Total												1.3E-06					1.4
Total Receptor Risks												1E-06					1

TABLE 7.61 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

Upper Peach Island Creek is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

TABLE 7.62 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Walden Swamp	Ingestion	Metals	Aluminum	8500	mg/kg	5.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0039
					Antimony	5.5	mg/kg	3.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-06	mg/kg-day	4.0E-04	mg/kg-day	0.0062
					Arsenic	47	mg/kg	1.8E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.8E-07	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.043
					Cadmium	11	mg/kg	7.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0049
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	38	mg/kg	2.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	3.0E-04	mg/kg-day	0.057
					Copper	190	mg/kg	1.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	8.4E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0021
					Iron	24000	mg/kg	1.5E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-02	mg/kg-day	7.0E-01	mg/kg-day	0.015
					Manganese	13000	mg/kg	8.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-03	mg/kg-day	1.4E-01	mg/kg-day	0.041
					Mercury	74	mg/kg	4.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-05	mg/kg-day	3.0E-04	mg/kg-day	0.11
					Nickel	310	mg/kg	2.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-04	mg/kg-day	2.0E-02	mg/kg-day	0.007
					Thallium	5.7	mg/kg	3.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-06	mg/kg-day	1.0E-05	mg/kg-day	0.26
					Vanadium	130	mg/kg	8.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-05	mg/kg-day	5.0E-03	mg/kg-day	0.011
					Zinc	2100	mg/kg	1.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	9.4E-04	mg/kg-day	3.0E-01	mg/kg-day	0.0031
				PAHs	Benzo[a]pyrene	0.14	mg/kg	9.2E-10	mg/kg-day	7.3E+00	(mg/kg-day)	6.7E-09	6.4E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.031	mg/kg	2.0E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-09	1.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.018	mg/kg	1.2E-10	mg/kg-day	1.7E+01	(mg/kg-day)	2.0E-09	8.2E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00027
					Heptachlor	0.0058	mg/kg	3.8E-11	mg/kg-day	4.5E+00	(mg/kg-day)	1.7E-10	2.6E-09	mg/kg-day	5.0E-04	mg/kg-day	0.0000053
					Heptachlor epoxide	0.0033	mg/kg	2.1E-11	mg/kg-day	9.1E+00	(mg/kg-day)	2.0E-10	1.5E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00012
				PCBs	PCBs (total Aroclors)	4.5	mg/kg	2.9E-08	mg/kg-day	2.0E+00	(mg/kg-day)	5.9E-08	2.1E-06	mg/kg-day	2.0E-05	mg/kg-day	0.1
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									3.4E-07					0.67
			Dermal	Metals	Aluminum	8500	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	5.5	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	47	mg/kg	2.9E-08	mg/kg-day	1.5E+00	(mg/kg-day)	4.3E-08	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0068
					Cadmium	11	mg/kg	2.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-08	mg/kg-day	2.5E-05	mg/kg-day	0.00062
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	38	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	190	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	24000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	13000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	74	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	310	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	5.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	2100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.14	mg/kg	3.8E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-09	2.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.031	mg/kg	8.1E-11	mg/kg-day	7.3E+00	(mg/kg-day)	5.9E-10	5.7E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.018	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.0058	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.0033	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	4.5	mg/kg	1.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.6E-08	9.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.045
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									7.3E-08					0.053
		Exposure Point Total										4.2E-07					0.72
	Exposure Medium Total											4.2E-07					0.72
Sediment Total												4.2E-07					0.72
Total Receptor Risks												4E-07					0.7

TABLE 7.62 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.63 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Ackerman's East Marsh	Ingestion	Metals	Aluminum	18000	mg/kg	1.2E-04	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0081
					Antimony	4.8	mg/kg	3.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-06	mg/kg-day	4.0E-04	mg/kg-day	0.0054
					Arsenic	23	mg/kg	8.7E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.3E-07	6.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
					Cadmium	5	mg/kg	3.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0023
					Chromium (VI)	17	mg/kg	1.1E-07	mg/kg-day	5.0E-01	(mg/kg-day)	5.4E-08	7.5E-06	mg/kg-day	3.0E-03	mg/kg-day	0.0025
					Cobalt	27	mg/kg	1.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-05	mg/kg-day	3.0E-04	mg/kg-day	0.041
					Copper	90	mg/kg	5.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-05	mg/kg-day	4.0E-02	mg/kg-day	0.001
					Iron	28000	mg/kg	1.8E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-02	mg/kg-day	7.0E-01	mg/kg-day	0.018
					Manganese	2700	mg/kg	1.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-03	mg/kg-day	1.4E-01	mg/kg-day	0.0088
					Mercury	61	mg/kg	3.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-05	mg/kg-day	3.0E-04	mg/kg-day	0.092
					Nickel	68	mg/kg	4.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0015
					Thallium	--	--	--	--	--	--	--	--	--	--	--	--
					Vanadium	57	mg/kg	3.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0051
					Zinc	420	mg/kg	2.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-04	mg/kg-day	3.0E-01	mg/kg-day	0.00063
				PAHs	Benzo[a]pyrene	0.06	mg/kg	3.9E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-09	2.7E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.015	mg/kg	9.9E-11	mg/kg-day	7.3E+00	(mg/kg-day)	7.2E-10	6.9E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0044	mg/kg	2.8E-11	mg/kg-day	1.7E+01	(mg/kg-day)	4.8E-10	2.0E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000066
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--
				PCBs	PCBs (total Aroclors)	0.58	mg/kg	3.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)	7.5E-09	2.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.013
				Volatiles	Trichloroethene	0.033	mg/kg	2.1E-10	mg/kg-day	4.6E-02	(mg/kg-day)	9.8E-12	1.5E-08	mg/kg-day	5.0E-04	mg/kg-day	0.00003
			Exp. Route Total									2.0E-07					0.22
			Dermal	Metals	Aluminum	18000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	4.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	23	mg/kg	1.4E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.1E-08	9.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0032
					Cadmium	5	mg/kg	1.0E-10	mg/kg-day	NA	(mg/kg-day)	NA	7.1E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00028
					Chromium (VI)	17	mg/kg	NA	mg/kg-day	2.0E+01	(mg/kg-day)	NA	NA	mg/kg-day	7.5E-05	mg/kg-day	NA
					Cobalt	27	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	90	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	28000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	61	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	68	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	--	--	--	--	--	--	--	--	--	--	--	--
					Vanadium	57	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	420	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.06	mg/kg	1.6E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.2E-09	1.1E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.015	mg/kg	4.1E-11	mg/kg-day	7.3E+00	(mg/kg-day)	3.0E-10	2.8E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0044	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--
				PCBs	PCBs (total Aroclors)	0.58	mg/kg	1.7E-09	mg/kg-day	2.0E+00	(mg/kg-day)	3.3E-09	1.2E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0058
				Volatiles	Trichloroethene	0.033	mg/kg	NA	mg/kg-day	4.6E-02	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
			Exp. Route Total									2.5E-08					0.0093
		Exposure Point Total										2.2E-07					0.23
	Exposure Medium Total											2.2E-07					0.23
Sediment Total												2.2E-07					0.23
Total Receptor Risks												2E-07					0.2

TABLE 7.63 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.64 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Rutherford Marsh	Ingestion	Metals	Aluminum	13000	mg/kg	8.6E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.0E-03	mg/kg-day	1.0E+00	mg/kg-day	0.006
					Antimony	1.2	mg/kg	7.7E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0014
					Arsenic	16	mg/kg	6.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)	9.1E-08	4.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.014
					Cadmium	1.6	mg/kg	1.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	7.4E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00074
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	14	mg/kg	8.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.021
					Copper	140	mg/kg	9.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0016
					Iron	22000	mg/kg	1.4E-04	mg/kg-day	NA	(mg/kg-day)	NA	9.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.014
					Manganese	4600	mg/kg	3.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-03	mg/kg-day	1.4E-01	mg/kg-day	0.015
					Mercury	14	mg/kg	8.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.021
					Nickel	71	mg/kg	4.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0016
					Thallium	5.6	mg/kg	3.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-06	mg/kg-day	1.0E-05	mg/kg-day	0.25
					Vanadium	55	mg/kg	3.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0049
					Zinc	360	mg/kg	2.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-04	mg/kg-day	3.0E-01	mg/kg-day	0.00054
				PAHs	Benzo[a]pyrene	0.32	mg/kg	2.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.059	mg/kg	3.8E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-09	2.7E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0056	mg/kg	3.6E-11	mg/kg-day	1.7E+01	(mg/kg-day)	6.1E-10	2.5E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000084
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.0027	mg/kg	1.7E-11	mg/kg-day	9.1E+00	(mg/kg-day)	1.6E-10	1.2E-09	mg/kg-day	1.3E-05	mg/kg-day	0.000094
				PCBs	PCBs (total Aroclors)	0.5	mg/kg	3.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)	6.5E-09	2.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.011
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.2E-07					0.37
			Dermal	Metals	Aluminum	13000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	16	mg/kg	9.6E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.4E-08	6.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0022
					Cadmium	1.6	mg/kg	3.4E-11	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000094
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	14	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	140	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	22000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	4600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	14	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	71	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	5.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	55	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	360	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.32	mg/kg	8.5E-10	mg/kg-day	7.3E+00	(mg/kg-day)	6.2E-09	5.9E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.059	mg/kg	1.6E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-09	1.1E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0056	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.0027	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.5	mg/kg	1.4E-09	mg/kg-day	2.0E+00	(mg/kg-day)	2.9E-09	1.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.005
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									2.5E-08					0.0074
		Exposure Point Total										1.4E-07					0.37
	Exposure Medium Total											1.4E-07					0.37
Sediment Total												1.4E-07					0.37
Total Receptor Risks												1E-07					0.4

TABLE 7.64 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.65 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Tollgate Marsh	Ingestion	Metals	Aluminum	11000	mg/kg	6.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0048
					Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Arsenic	9.2	mg/kg	3.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	5.4E-08	2.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0083
					Cadmium	0.56	mg/kg	3.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00025
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	6.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.016
					Copper	66	mg/kg	4.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00075
					Iron	28000	mg/kg	1.8E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-02	mg/kg-day	7.0E-01	mg/kg-day	0.018
					Manganese	1100	mg/kg	7.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0035
					Mercury	13	mg/kg	8.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
					Nickel	38	mg/kg	2.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00085
					Thallium	2.4	mg/kg	1.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	1.0E-05	mg/kg-day	0.11
					Vanadium	29	mg/kg	1.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0026
					Zinc	170	mg/kg	1.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	7.7E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00026
				PAHs	Benzo[a]pyrene	0.27	mg/kg	1.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-08	1.2E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.062	mg/kg	4.0E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.9E-09	2.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0078	mg/kg	5.0E-11	mg/kg-day	1.7E+01	(mg/kg-day)	8.6E-10	3.5E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00012
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--
				PCBs	PCBs (total Aroclors)	0.44	mg/kg	2.9E-09	mg/kg-day	2.0E+00	(mg/kg-day)	5.7E-09	2.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.01
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									7.6E-08					0.19
			Dermal	Metals	Aluminum	11000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Arsenic	9.2	mg/kg	5.6E-09	mg/kg-day	1.5E+00	(mg/kg-day)	8.5E-09	3.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0013
					Cadmium	0.56	mg/kg	1.1E-11	mg/kg-day	NA	(mg/kg-day)	NA	8.0E-10	mg/kg-day	2.5E-05	mg/kg-day	0.000032
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	66	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	28000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	38	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	29	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	170	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.27	mg/kg	7.2E-10	mg/kg-day	7.3E+00	(mg/kg-day)	5.2E-09	5.0E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.062	mg/kg	1.6E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.2E-09	1.1E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0078	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--
				PCBs	PCBs (total Aroclors)	0.44	mg/kg	1.3E-09	mg/kg-day	2.0E+00	(mg/kg-day)	2.5E-09	8.8E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0044
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.7E-08					0.0058
		Exposure Point Total										9.3E-08					0.2
	Exposure Medium Total											9.3E-08					0.2
Sediment Total												9.3E-08					0.2
Total Receptor Risks												9E-08					0.2

TABLE 7.65 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.66 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Oritani Marsh	Ingestion	Metals	Aluminum	14000	mg/kg	8.9E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.2E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0062
					Antimony	3.2	mg/kg	2.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-06	mg/kg-day	4.0E-04	mg/kg-day	0.0036
					Arsenic	23	mg/kg	8.9E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.3E-07	6.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.021
					Cadmium	0.34	mg/kg	2.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00015
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	1.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.024
					Copper	67	mg/kg	4.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00076
					Iron	34000	mg/kg	2.2E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-02	mg/kg-day	7.0E-01	mg/kg-day	0.022
					Manganese	530	mg/kg	3.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0017
					Mercury	2.5	mg/kg	1.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0037
					Nickel	40	mg/kg	2.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00091
					Thallium	--	--	--	--	--	--	--	--	--	--	--	--
					Vanadium	63	mg/kg	4.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0057
					Zinc	160	mg/kg	1.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	7.4E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00025
				PAHs	Benzo[a]pyrene	0.2	mg/kg	1.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	9.4E-09	9.0E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	--	--	--	--	--	--	--	--	--	--	--	--
				Pesticides	Aldrin	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor	0.0012	mg/kg	7.7E-12	mg/kg-day	4.5E+00	(mg/kg-day)	3.5E-11	5.4E-10	mg/kg-day	5.0E-04	mg/kg-day	0.0000011
					Heptachlor epoxide	0.0023	mg/kg	1.5E-11	mg/kg-day	9.1E+00	(mg/kg-day)	1.4E-10	1.0E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00008
				PCBs	PCBs (total Aroclors)	0.016	mg/kg	1.0E-10	mg/kg-day	2.0E+00	(mg/kg-day)	2.0E-10	7.0E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00035
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.4E-07					0.091
			Dermal	Metals	Aluminum	14000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	3.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	23	mg/kg	1.4E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.1E-08	9.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0033
					Cadmium	0.34	mg/kg	6.8E-12	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-10	mg/kg-day	2.5E-05	mg/kg-day	0.000019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	67	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	34000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	530	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	2.5	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	40	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	--	--	--	--	--	--	--	--	--	--	--	--
					Vanadium	63	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	160	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.2	mg/kg	5.3E-10	mg/kg-day	7.3E+00	(mg/kg-day)	3.9E-09	3.7E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	--	--	--	--	--	--	--	--	--	--	--	--
				Pesticides	Aldrin	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor	0.0012	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.0023	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.016	mg/kg	4.4E-11	mg/kg-day	2.0E+00	(mg/kg-day)	8.9E-11	3.1E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00016
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									2.5E-08					0.0035
		Exposure Point Total										1.7E-07					0.094
	Exposure Medium Total											1.7E-07					0.094
Sediment Total												1.7E-07					0.094
Total Receptor Risks												2E-07					0.09

TABLE 7.66 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.67 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Berry's Creek Marsh	Ingestion	Metals	Aluminum	14000	mg/kg	8.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.1E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0061
					Antimony	2.2	mg/kg	1.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	9.8E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0024
					Arsenic	27	mg/kg	1.0E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.6E-07	7.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.024
					Cadmium	1.2	mg/kg	8.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.6E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00056
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	18	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.027
					Copper	130	mg/kg	8.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0014
					Iron	30000	mg/kg	1.9E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-02	mg/kg-day	7.0E-01	mg/kg-day	0.019
					Manganese	800	mg/kg	5.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0026
					Mercury	6.1	mg/kg	4.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0093
					Nickel	94	mg/kg	6.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0021
					Thallium	2.6	mg/kg	1.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	1.0E-05	mg/kg-day	0.12
					Vanadium	66	mg/kg	4.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-05	mg/kg-day	5.0E-03	mg/kg-day	0.006
					Zinc	390	mg/kg	2.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-04	mg/kg-day	3.0E-01	mg/kg-day	0.00059
				PAHs	Benzo[a]pyrene	0.3	mg/kg	1.9E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.077	mg/kg	5.0E-10	mg/kg-day	7.3E+00	(mg/kg-day)	3.6E-09	3.5E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.0015	mg/kg	9.7E-12	mg/kg-day	9.1E+00	(mg/kg-day)	8.8E-11	6.8E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000052
				PCBs	PCBs (total Aroclors)	0.14	mg/kg	8.8E-10	mg/kg-day	2.0E+00	(mg/kg-day)	1.8E-09	6.1E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0031
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.7E-07					0.22
			Dermal	Metals	Aluminum	14000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	2.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	27	mg/kg	1.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.4E-08	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0038
					Cadmium	1.2	mg/kg	2.5E-11	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000071
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	18	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	30000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	800	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	6.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	94	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	66	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	390	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.3	mg/kg	7.9E-10	mg/kg-day	7.3E+00	(mg/kg-day)	5.8E-09	5.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.077	mg/kg	2.0E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-09	1.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.0015	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.14	mg/kg	3.9E-10	mg/kg-day	2.0E+00	(mg/kg-day)	7.7E-10	2.7E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0014
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									3.3E-08					0.0052
		Exposure Point Total										2.1E-07					0.23
	Exposure Medium Total											2.1E-07					0.23
Sediment Total												2.1E-07					0.23
Total Receptor Risks												2E-07					0.2

TABLE 7.67 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.68 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Former ENCAP Restoration Area	Ingestion	Metals	Aluminum	8600	mg/kg	5.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0039
					Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Arsenic	15	mg/kg	5.8E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.7E-08	4.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.014
					Cadmium	--	--	--	--	--	--	--	--	--	--	--	--
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	6.8	mg/kg	4.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
					Copper	110	mg/kg	7.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0013
					Iron	14000	mg/kg	9.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.3E-03	mg/kg-day	7.0E-01	mg/kg-day	0.009
					Manganese	160	mg/kg	1.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	7.1E-05	mg/kg-day	1.4E-01	mg/kg-day	0.0005
					Mercury	3.7	mg/kg	2.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0056
					Nickel	42	mg/kg	2.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00096
					Thallium	--	--	--	--	--	--	--	--	--	--	--	--
					Vanadium	78	mg/kg	5.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0071
					Zinc	140	mg/kg	9.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00022
				PAHs	Benzo[a]pyrene	0.35	mg/kg	2.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.7E-08	1.6E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	--	--	--	--	--	--	--	--	--	--	--	--
				Pesticides	Aldrin	0.0016	mg/kg	1.0E-11	mg/kg-day	1.7E+01	(mg/kg-day)	1.8E-10	7.2E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000024
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.002	mg/kg	1.3E-11	mg/kg-day	9.1E+00	(mg/kg-day)	1.2E-10	9.0E-10	mg/kg-day	1.3E-05	mg/kg-day	0.00007
				PCBs	PCBs (total Aroclors)	0.2	mg/kg	1.3E-09	mg/kg-day	2.0E+00	(mg/kg-day)	2.6E-09	9.1E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0046
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.1E-07					0.057
			Dermal	Metals	Aluminum	8600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Arsenic	15	mg/kg	9.2E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.4E-08	6.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0021
					Cadmium	--	--	--	--	--	--	--	--	--	--	--	--
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	6.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	14000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	160	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	42	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	--	--	--	--	--	--	--	--	--	--	--	--
					Vanadium	78	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	140	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.35	mg/kg	9.3E-10	mg/kg-day	7.3E+00	(mg/kg-day)	6.8E-09	6.5E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	--	--	--	--	--	--	--	--	--	--	--	--
				Pesticides	Aldrin	0.0016	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.002	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.2	mg/kg	5.8E-10	mg/kg-day	2.0E+00	(mg/kg-day)	1.2E-09	4.0E-08	mg/kg-day	2.0E-05	mg/kg-day	0.002
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									2.2E-08					0.0042
		Exposure Point Total										1.3E-07					0.061
	Exposure Medium Total											1.3E-07					0.061
Sediment Total												1.3E-07					0.061
Total Receptor Risks												1E-07					0.06

TABLE 7.68 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.69 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Ingestion	Metals	Antimony	5.7	mg/kg	6.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0013
					Arsenic	34	mg/kg	2.1E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.2E-07	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0062
					Cadmium	3	mg/kg	3.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00028
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	2.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0074
					Copper	330	mg/kg	3.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00075
					Iron	29000	mg/kg	3.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0038
					Manganese	1700	mg/kg	1.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0011
					Mercury	3.3	mg/kg	3.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
					Nickel	110	mg/kg	1.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	9.8E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00049
					Thallium	1.9	mg/kg	2.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-07	mg/kg-day	1.0E-05	mg/kg-day	0.018
					Zinc	450	mg/kg	4.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00014
				PAHs	Benz[a]anthracene	1.3	mg/kg	1.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.9E-09	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	1.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	9.2E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	1.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	3.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.2E-08	2.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	8.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	5.9E-09	7.1E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	4.4E-11	mg/kg-day	1.7E+01	(mg/kg-day)	7.5E-10	3.8E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000013
					Heptachlor epoxide	0.026	mg/kg	2.8E-10	mg/kg-day	9.1E+00	(mg/kg-day)	2.5E-09	2.4E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00019
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.2E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.3E-08	1.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.005
			Exp. Route Total									4.9E-07					0.046
			Dermal	Metals	Antimony	5.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	1.5E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.3E-07	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0045
					Cadmium	3	mg/kg	4.6E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00016
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	2.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.8E-08	2.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	2.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.7E-07	2.0E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	3.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.2E-08	2.7E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	5.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.2E-08	5.0E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	1.3E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	2.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.6E-08	2.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.01
			Exp. Route Total									5.4E-07					0.015
		Exposure Point Total										1.0E-06					0.061
	Exposure Medium Total											1.0E-06					0.061
Sediment Total												1.0E-06					0.061

TABLE 7.69 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in Reference Sites	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	--	--	--	--	--	--	--	--	--	--	--	--
					Iron	--	--	--	--	--	--	--	--	--	--	--	--
					Manganese	--	--	--	--	--	--	--	--	--	--	--	--
					Mercury (inorganic)	0.045	mg/kg	1.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
					Selenium	0.82	mg/kg	1.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0033
				Organometals	Methyl mercury	0.26	mg/kg	6.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-06	mg/kg-day	1.0E-04	mg/kg-day	0.053
				PCBs	PCBs (total Aroclors)	0.66	mg/kg	1.5E-06	mg/kg-day	2.0E+00	(mg/kg-day)	3.1E-06	1.3E-05	mg/kg-day	2.0E-05	mg/kg-day	0.67
			Exp. Route Total									3.1E-06					0.73
		Exposure Point Total										3.1E-06					0.73
	Exposure Medium Total											3.1E-06					0.73
Surface Water Total												3.1E-06					0.73
Total Receptor Risks												4E-06					0.8

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.70 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Ingestion	Metals	Antimony	5.7	mg/kg	1.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.7E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0022
					Arsenic	34	mg/kg	5.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)	7.9E-07	3.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
					Cadmium	3	mg/kg	7.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00046
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	6.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.012
					Copper	330	mg/kg	8.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0012
					Iron	29000	mg/kg	7.6E-04	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0063
					Manganese	1700	mg/kg	4.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0018
					Mercury	3.3	mg/kg	8.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0017
					Nickel	110	mg/kg	2.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0008
					Thallium	1.9	mg/kg	5.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.03
					Zinc	450	mg/kg	1.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.9E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00023
				PAHs	Benz[a]anthracene	1.3	mg/kg	9.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.6E-08	2.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	8.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	6.1E-07	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	1.1E-07	mg/kg-day	7.3E-01	(mg/kg-day)	8.0E-08	2.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	2.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-07	4.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	5.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.9E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	1.1E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.8E-09	6.3E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000021
					Heptachlor epoxide	0.026	mg/kg	6.8E-10	mg/kg-day	9.1E+00	(mg/kg-day)	6.2E-09	4.0E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00031
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	2.8E-08	mg/kg-day	2.0E+00	(mg/kg-day)	5.7E-08	1.7E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0083
			Exp. Route Total									1.8E-06					0.075
			Dermal	Metals	Antimony	5.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	1.6E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.5E-07	9.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0032
					Cadmium	3	mg/kg	4.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	7.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.3E-08	1.6E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	6.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.9E-07	1.5E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	8.8E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.5E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	1.6E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.2E-07	3.6E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	4.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.2E-08	9.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	2.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.9E-08	1.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0072
			Exp. Route Total									1.1E-06					0.01
		Exposure Point Total										2.9E-06					0.086
	Exposure Medium Total											2.9E-06					0.086
Sediment Total												2.9E-06					0.086

TABLE 7.70 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in Reference Sites	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	--	--	--	--	--	--	--	--	--	--	--	--
					Iron	--	--	--	--	--	--	--	--	--	--	--	--
					Manganese	--	--	--	--	--	--	--	--	--	--	--	--
					Mercury (inorganic)	0.045	mg/kg	1.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0033
					Selenium	0.82	mg/kg	3.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0036
				Organometals	Methyl mercury	0.26	mg/kg	9.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-06	mg/kg-day	1.0E-04	mg/kg-day	0.058
				PCBs	PCBs (total Aroclors)	0.66	mg/kg	2.5E-06	mg/kg-day	2.0E+00	(mg/kg-day)	5.0E-06	1.5E-05	mg/kg-day	2.0E-05	mg/kg-day	0.73
			Exp. Route Total									5.0E-06					0.8
		Exposure Point Total										5.0E-06					0.8
	Exposure Medium Total											5.0E-06					0.8
Surface Water Total												5.0E-06					0.8
Total Receptor Risks												8E-06					0.9

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.71 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in Reference Sites	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	--	--	--	--	--	--	--	--	--	--	--	--
					Iron	--	--	--	--	--	--	--	--	--	--	--	--
					Manganese	--	--	--	--	--	--	--	--	--	--	--	--
					Mercury (inorganic)	0.045	mg/kg	1.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0054
					Selenium	0.82	mg/kg	2.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0059
				Organometals	Methyl mercury	0.26	mg/kg	8.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.4E-06	mg/kg-day	1.0E-04	mg/kg-day	0.094
				PCBs	PCBs (total Aroclors)	0.66	mg/kg	2.0E-06	mg/kg-day	2.0E+00	(mg/kg-day)	4.1E-06	2.4E-05	mg/kg-day	2.0E-05	mg/kg-day	1.2
			Exp. Route Total									4.1E-06					1.3
		Exposure Point Total										4.1E-06					1.3
	Exposure Medium Total											4.1E-06					1.3
Surface Water Total												4.1E-06					1.3
Total Receptor Risks												4E-06					1

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.72 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Ingestion	Metals	Antimony	5.7	mg/kg	6.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0013
					Arsenic	34	mg/kg	2.1E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.2E-07	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0062
					Cadmium	3	mg/kg	3.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00028
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	2.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0074
					Copper	330	mg/kg	3.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00075
					Iron	29000	mg/kg	3.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0038
					Manganese	1700	mg/kg	1.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0011
					Mercury	3.3	mg/kg	3.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
					Nickel	110	mg/kg	1.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	9.8E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00049
					Thallium	1.9	mg/kg	2.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-07	mg/kg-day	1.0E-05	mg/kg-day	0.018
					Zinc	450	mg/kg	4.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00014
				PAHs	Benz[a]anthracene	1.3	mg/kg	1.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.9E-09	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	1.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	9.2E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	1.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	3.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.2E-08	2.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	8.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	5.9E-09	7.1E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	4.4E-11	mg/kg-day	1.7E+01	(mg/kg-day)	7.5E-10	3.8E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000013
					Heptachlor epoxide	0.026	mg/kg	2.8E-10	mg/kg-day	9.1E+00	(mg/kg-day)	2.5E-09	2.4E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00019
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.2E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.3E-08	1.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.005
			Exp. Route Total									4.9E-07					0.046
			Dermal	Metals	Antimony	5.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	1.5E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.3E-07	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0045
					Cadmium	3	mg/kg	4.6E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00016
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	2.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.8E-08	2.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	2.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.7E-07	2.0E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	3.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.2E-08	2.7E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	5.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.2E-08	5.0E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	1.3E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	2.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.6E-08	2.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.01
			Exp. Route Total									5.4E-07					0.015
		Exposure Point Total										1.0E-06					0.061
	Exposure Medium Total											1.0E-06					0.061
Sediment Total												1.0E-06					0.061

TABLE 7.72 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in Reference Sites	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	--	--	--	--	--	--	--	--	--	--	--	--
					Iron	--	--	--	--	--	--	--	--	--	--	--	--
					Manganese	--	--	--	--	--	--	--	--	--	--	--	--
					Mercury (inorganic)	0.02	mg/kg	4.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Selenium	--	--	--	--	--	--	--	--	--	--	--	--
				Organometals	Methyl mercury	0.21	mg/kg	4.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-06	mg/kg-day	1.0E-04	mg/kg-day	0.042
				PCBs	PCBs (total Aroclors)	0.0059	mg/kg	1.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.7E-08	1.2E-07	mg/kg-day	2.0E-05	mg/kg-day	0.006
			Exp. Route Total									2.7E-08					0.049
		Exposure Point Total										2.7E-08					0.049
	Exposure Medium Total											2.7E-08					0.049
Surface Water Total												2.7E-08					0.049
Total Receptor Risks												1E-06					0.1

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.73 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Ingestion	Metals	Antimony	5.7	mg/kg	1.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.7E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0022
					Arsenic	34	mg/kg	5.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)	7.9E-07	3.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
					Cadmium	3	mg/kg	7.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00046
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	6.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.012
					Copper	330	mg/kg	8.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0012
					Iron	29000	mg/kg	7.6E-04	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0063
					Manganese	1700	mg/kg	4.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0018
					Mercury	3.3	mg/kg	8.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0017
					Nickel	110	mg/kg	2.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0008
					Thallium	1.9	mg/kg	5.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.03
					Zinc	450	mg/kg	1.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.9E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00023
				PAHs	Benz[a]anthracene	1.3	mg/kg	9.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.6E-08	2.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	8.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	6.1E-07	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	1.1E-07	mg/kg-day	7.3E-01	(mg/kg-day)	8.0E-08	2.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	2.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-07	4.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	5.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.9E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	1.1E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.8E-09	6.3E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000021
					Heptachlor epoxide	0.026	mg/kg	6.8E-10	mg/kg-day	9.1E+00	(mg/kg-day)	6.2E-09	4.0E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00031
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	2.8E-08	mg/kg-day	2.0E+00	(mg/kg-day)	5.7E-08	1.7E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0083
			Exp. Route Total									1.8E-06					0.075
			Dermal	Metals	Antimony	5.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	1.6E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.5E-07	9.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0032
					Cadmium	3	mg/kg	4.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	7.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.3E-08	1.6E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	6.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.9E-07	1.5E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	8.8E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.5E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	1.6E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.2E-07	3.6E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	4.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.2E-08	9.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	2.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.9E-08	1.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0072
			Exp. Route Total									1.1E-06					0.01
		Exposure Point Total										2.9E-06					0.086
	Exposure Medium Total											2.9E-06					0.086
Sediment Total												2.9E-06					0.086

TABLE 7.73 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in Reference Sites	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	--	--	--	--	--	--	--	--	--	--	--	--
					Iron	--	--	--	--	--	--	--	--	--	--	--	--
					Manganese	--	--	--	--	--	--	--	--	--	--	--	--
					Mercury (inorganic)	0.02	mg/kg	7.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0015
					Selenium	--	--	--	--	--	--	--	--	--	--	--	--
				Organometals	Methyl mercury	0.21	mg/kg	7.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-06	mg/kg-day	1.0E-04	mg/kg-day	0.046
				PCBs	PCBs (total Aroclors)	0.0059	mg/kg	2.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.5E-08	1.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0066
			Exp. Route Total									4.5E-08					0.054
		Exposure Point Total										4.5E-08					0.054
	Exposure Medium Total											4.5E-08					0.054
Surface Water Total												4.5E-08					0.054
Total Receptor Risks												3E-06					0.1

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.74 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in Reference Sites	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	--	--	--	--	--	--	--	--	--	--	--	--
					Iron	--	--	--	--	--	--	--	--	--	--	--	--
					Manganese	--	--	--	--	--	--	--	--	--	--	--	--
					Mercury (inorganic)	0.02	mg/kg	6.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	7.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0024
					Selenium	--	--	--	--	--	--	--	--	--	--	--	--
				Organometals	Methyl mercury	0.21	mg/kg	6.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.4E-06	mg/kg-day	1.0E-04	mg/kg-day	0.074
				PCBs	PCBs (total Aroclors)	0.0059	mg/kg	1.8E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.6E-08	2.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.011
			Exp. Route Total									3.6E-08					0.087
		Exposure Point Total										3.6E-08					0.087
	Exposure Medium Total											3.6E-08					0.087
Surface Water Total												3.6E-08					0.087
Total Receptor Risks												4E-08					0.09

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.75 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Ingestion	Metals	Antimony	5.7	mg/kg	6.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0013
					Arsenic	34	mg/kg	2.1E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.2E-07	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0062
					Cadmium	3	mg/kg	3.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00028
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	2.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0074
					Copper	330	mg/kg	3.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00075
					Iron	29000	mg/kg	3.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0038
					Manganese	1700	mg/kg	1.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0011
					Mercury	3.3	mg/kg	3.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
					Nickel	110	mg/kg	1.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	9.8E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00049
					Thallium	1.9	mg/kg	2.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-07	mg/kg-day	1.0E-05	mg/kg-day	0.018
					Zinc	450	mg/kg	4.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00014
				PAHs	Benz[a]anthracene	1.3	mg/kg	1.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.9E-09	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	1.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	9.2E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	1.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	3.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.2E-08	2.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	8.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	5.9E-09	7.1E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	4.4E-11	mg/kg-day	1.7E+01	(mg/kg-day)	7.5E-10	3.8E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000013
					Heptachlor epoxide	0.026	mg/kg	2.8E-10	mg/kg-day	9.1E+00	(mg/kg-day)	2.5E-09	2.4E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00019
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.2E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.3E-08	1.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.005
			Exp. Route Total									4.9E-07					0.046
			Dermal	Metals	Antimony	5.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	1.5E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.3E-07	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0045
					Cadmium	3	mg/kg	4.6E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00016
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	2.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.8E-08	2.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	2.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.7E-07	2.0E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	3.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.2E-08	2.7E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	5.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.2E-08	5.0E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	1.3E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	2.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.6E-08	2.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.01
			Exp. Route Total									5.4E-07					0.015
		Exposure Point Total										1.0E-06					0.061
	Exposure Medium Total											1.0E-06					0.061
Sediment Total												1.0E-06					0.061

TABLE 7.75 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in Reference Sites	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	--	--	--	--	--	--	--	--	--	--	--	--
					Iron	--	--	--	--	--	--	--	--	--	--	--	--
					Manganese	--	--	--	--	--	--	--	--	--	--	--	--
					Mercury (inorganic)	0.029	mg/kg	6.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
					Selenium	--	--	--	--	--	--	--	--	--	--	--	--
				Organometals	Methyl mercury	0.19	mg/kg	4.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.8E-06	mg/kg-day	1.0E-04	mg/kg-day	0.038
				PCBs	PCBs (total Aroclors)	0.13	mg/kg	3.0E-07	mg/kg-day	2.0E+00	(mg/kg-day)	6.0E-07	2.6E-06	mg/kg-day	2.0E-05	mg/kg-day	0.13
			Exp. Route Total									6.0E-07					0.17
		Exposure Point Total										6.0E-07					0.17
	Exposure Medium Total											6.0E-07					0.17
Surface Water Total												6.0E-07					0.17
Total Receptor Risks												2E-06					0.2

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.76 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Ingestion	Metals	Antimony	5.7	mg/kg	1.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.7E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0022
					Arsenic	34	mg/kg	5.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)	7.9E-07	3.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
					Cadmium	3	mg/kg	7.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00046
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	6.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.012
					Copper	330	mg/kg	8.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0012
					Iron	29000	mg/kg	7.6E-04	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0063
					Manganese	1700	mg/kg	4.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0018
					Mercury	3.3	mg/kg	8.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0017
					Nickel	110	mg/kg	2.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0008
					Thallium	1.9	mg/kg	5.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.03
					Zinc	450	mg/kg	1.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	6.9E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00023
				PAHs	Benz[a]anthracene	1.3	mg/kg	9.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.6E-08	2.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	8.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	6.1E-07	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	1.1E-07	mg/kg-day	7.3E-01	(mg/kg-day)	8.0E-08	2.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	2.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-07	4.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	5.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.9E-08	1.2E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	1.1E-10	mg/kg-day	1.7E+01	(mg/kg-day)	1.8E-09	6.3E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000021
					Heptachlor epoxide	0.026	mg/kg	6.8E-10	mg/kg-day	9.1E+00	(mg/kg-day)	6.2E-09	4.0E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00031
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	2.8E-08	mg/kg-day	2.0E+00	(mg/kg-day)	5.7E-08	1.7E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0083
			Exp. Route Total									1.8E-06					0.075
			Dermal	Metals	Antimony	5.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	1.6E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.5E-07	9.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0032
					Cadmium	3	mg/kg	4.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	7.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.3E-08	1.6E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	6.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.9E-07	1.5E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	8.8E-08	mg/kg-day	7.3E-01	(mg/kg-day)	6.5E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	1.6E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.2E-07	3.6E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	4.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.2E-08	9.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	2.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.9E-08	1.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0072
			Exp. Route Total									1.1E-06					0.01
		Exposure Point Total										2.9E-06					0.086
	Exposure Medium Total											2.9E-06					0.086
Sediment Total												2.9E-06					0.086

TABLE 7.76 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in Reference Sites	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	--	--	--	--	--	--	--	--	--	--	--	--
					Iron	--	--	--	--	--	--	--	--	--	--	--	--
					Manganese	--	--	--	--	--	--	--	--	--	--	--	--
					Mercury (inorganic)	0.029	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0022
					Selenium	--	--	--	--	--	--	--	--	--	--	--	--
				Organometals	Methyl mercury	0.19	mg/kg	7.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-06	mg/kg-day	1.0E-04	mg/kg-day	0.042
				PCBs	PCBs (total Aroclors)	0.13	mg/kg	4.9E-07	mg/kg-day	2.0E+00	(mg/kg-day)	9.8E-07	2.9E-06	mg/kg-day	2.0E-05	mg/kg-day	0.14
			Exp. Route Total									9.8E-07					0.19
		Exposure Point Total										9.8E-07					0.19
	Exposure Medium Total											9.8E-07					0.19
Surface Water Total												9.8E-07					0.19
Total Receptor Risks												4E-06					0.3

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.77 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in Reference Sites	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	--	--	--	--	--	--	--	--	--	--	--	--
					Iron	--	--	--	--	--	--	--	--	--	--	--	--
					Manganese	--	--	--	--	--	--	--	--	--	--	--	--
					Mercury (inorganic)	0.029	mg/kg	9.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0035
					Selenium	--	--	--	--	--	--	--	--	--	--	--	--
				Organometals	Methyl mercury	0.19	mg/kg	5.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.8E-06	mg/kg-day	1.0E-04	mg/kg-day	0.068
				PCBs	PCBs (total Aroclors)	0.13	mg/kg	4.0E-07	mg/kg-day	2.0E+00	(mg/kg-day)	7.9E-07	4.6E-06	mg/kg-day	2.0E-05	mg/kg-day	0.23
			Exp. Route Total									7.9E-07					0.3
		Exposure Point Total										7.9E-07					0.3
	Exposure Medium Total											7.9E-07					0.3
Surface Water Total												7.9E-07					0.3
Total Receptor Risks												8E-07					0.3

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.78 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites	Ingestion	Metals	Antimony	5.6	mg/kg	4.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00087
					Arsenic	34	mg/kg	1.4E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.1E-07	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0042
					Cadmium	3	mg/kg	2.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	1.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0049
					Copper	330	mg/kg	2.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0005
					Iron	29000	mg/kg	2.0E-04	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0026
					Manganese	1700	mg/kg	1.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-04	mg/kg-day	1.4E-01	mg/kg-day	0.00075
					Mercury	3.3	mg/kg	2.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00068
					Nickel	110	mg/kg	7.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00033
					Thallium	1.9	mg/kg	1.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-07	mg/kg-day	1.0E-05	mg/kg-day	0.012
					Zinc	450	mg/kg	3.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000093
				PAHs	Benz[a]anthracene	1.3	mg/kg	9.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	6.6E-09	7.9E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	8.4E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.1E-08	7.3E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	1.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.0E-09	9.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	2.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-08	1.8E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	5.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	3.9E-09	4.7E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0041	mg/kg	2.9E-11	mg/kg-day	1.7E+01	(mg/kg-day)	4.9E-10	2.5E-10	mg/kg-day	3.0E-05	mg/kg-day	0.0000085
					Heptachlor epoxide	0.026	mg/kg	1.9E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.7E-09	1.6E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00012
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	7.7E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.5E-08	6.7E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0034
			Exp. Route Total									3.3E-07					0.031
			Dermal	Metals	Antimony	5.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	1.0E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.5E-07	8.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
					Cadmium	3	mg/kg	3.1E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	1.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-08	1.5E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	1.6E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-07	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	2.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-08	1.8E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	3.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-08	3.3E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	1.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.3E-09	8.7E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0041	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.1E-08	1.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0067
			Exp. Route Total									3.6E-07					0.0098
		Exposure Point Total										6.9E-07					0.04
	Exposure Medium Total											6.9E-07					0.04
Sediment Total												6.9E-07					0.04
Total Receptor Risks												7E-07					0.04

TABLE 7.78 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.79 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites	Ingestion	Metals	Antimony	5.6	mg/kg	9.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0014
					Arsenic	34	mg/kg	3.5E-07	mg/kg-day	1.5E+00	(mg/kg-day)	5.3E-07	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0068
					Cadmium	3	mg/kg	5.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00031
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	4.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0081
					Copper	330	mg/kg	5.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00082
					Iron	29000	mg/kg	5.0E-04	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0042
					Manganese	1700	mg/kg	3.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0012
					Mercury	3.3	mg/kg	5.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0011
					Nickel	110	mg/kg	1.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00054
					Thallium	1.9	mg/kg	3.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.02
					Zinc	450	mg/kg	7.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00015
				PAHs	Benz[a]anthracene	1.3	mg/kg	6.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.4E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	5.6E-08	mg/kg-day	7.3E+00	(mg/kg-day)	4.1E-07	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	7.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.3E-08	1.6E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	1.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	9.9E-08	2.9E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	3.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.6E-08	7.7E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0041	mg/kg	7.2E-11	mg/kg-day	1.7E+01	(mg/kg-day)	1.2E-09	4.2E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000014
					Heptachlor epoxide	0.026	mg/kg	4.5E-10	mg/kg-day	9.1E+00	(mg/kg-day)	4.1E-09	2.7E-09	mg/kg-day	1.3E-05	mg/kg-day	0.0002
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.9E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.8E-08	1.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0055
			Exp. Route Total									1.2E-06					0.05
			Dermal	Metals	Antimony	5.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	1.1E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.6E-07	6.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0021
					Cadmium	3	mg/kg	3.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000076
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	4.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.6E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	4.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	3.3E-07	9.7E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	5.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.3E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	1.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.0E-08	2.4E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	2.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.1E-08	6.2E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0041	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.6E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.3E-08	9.6E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0048
			Exp. Route Total									7.0E-07					0.007
		Exposure Point Total										1.9E-06					0.057
	Exposure Medium Total											1.9E-06					0.057
Sediment Total												1.9E-06					0.057
Total Receptor Risks												2E-06					0.06

TABLE 7.79 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.80 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites	Ingestion	Metals	Antimony	5.6	mg/kg	8.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	7.5E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0019
					Arsenic	34	mg/kg	3.1E-07	mg/kg-day	1.5E+00	(mg/kg-day)	4.6E-07	2.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.009
					Cadmium	3	mg/kg	4.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00041
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	3.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.011
					Copper	330	mg/kg	5.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0011
					Iron	29000	mg/kg	4.4E-04	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0056
					Manganese	1700	mg/kg	2.6E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0016
					Mercury	3.3	mg/kg	5.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0015
					Nickel	110	mg/kg	1.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00071
					Thallium	1.9	mg/kg	3.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-07	mg/kg-day	1.0E-05	mg/kg-day	0.026
					Zinc	450	mg/kg	6.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	6.1E-05	mg/kg-day	3.0E-01	mg/kg-day	0.0002
				PAHs	Benz[a]anthracene	1.3	mg/kg	2.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-08	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	1.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-07	1.6E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	2.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-08	2.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	4.4E-09	mg/kg-day	7.3E+00	(mg/kg-day)	3.2E-08	3.9E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	1.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.5E-09	1.0E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0041	mg/kg	6.3E-11	mg/kg-day	1.7E+01	(mg/kg-day)	1.1E-09	5.5E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000018
					Heptachlor epoxide	0.026	mg/kg	4.0E-10	mg/kg-day	9.1E+00	(mg/kg-day)	3.6E-09	3.5E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00027
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.3E-08	1.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0073
			Exp. Route Total									7.1E-07					0.066
			Dermal	Metals	Antimony	5.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	2.2E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.3E-07	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0064
					Cadmium	3	mg/kg	6.6E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00023
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	3.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.7E-08	3.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	3.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.5E-07	3.0E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	4.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	3.2E-08	3.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	8.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.0E-08	7.2E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	2.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.6E-08	1.9E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0041	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	3.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)	6.6E-08	2.9E-07	mg/kg-day	2.0E-05	mg/kg-day	0.015
			Exp. Route Total									7.8E-07					0.021
		Exposure Point Total										1.5E-06					0.087
	Exposure Medium Total											1.5E-06					0.087
Sediment Total												1.5E-06					0.087
Total Receptor Risks												1E-06					0.09

TABLE 7.80 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.81 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites	Ingestion	Metals	Antimony	5.6	mg/kg	2.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	4.0E-04	mg/kg-day	0.0031
					Arsenic	34	mg/kg	7.6E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-06	4.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.015
					Cadmium	3	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.7E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00067
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	9.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.018
					Copper	330	mg/kg	1.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.1E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0018
					Iron	29000	mg/kg	1.1E-03	mg/kg-day	NA	(mg/kg-day)	NA	6.4E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0091
					Manganese	1700	mg/kg	6.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0027
					Mercury	3.3	mg/kg	1.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0024
					Nickel	110	mg/kg	4.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0012
					Thallium	1.9	mg/kg	7.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-07	mg/kg-day	1.0E-05	mg/kg-day	0.043
					Zinc	450	mg/kg	1.7E-05	mg/kg-day	NA	(mg/kg-day)	NA	9.9E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00033
				PAHs	Benz[a]anthracene	1.3	mg/kg	1.3E-07	mg/kg-day	7.3E-01	(mg/kg-day)	9.5E-08	2.8E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	1.2E-07	mg/kg-day	7.3E+00	(mg/kg-day)	8.8E-07	2.6E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	1.6E-07	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-07	3.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	2.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-07	6.3E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	7.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	5.7E-08	1.7E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0041	mg/kg	1.6E-10	mg/kg-day	1.7E+01	(mg/kg-day)	2.6E-09	9.0E-10	mg/kg-day	3.0E-05	mg/kg-day	0.00003
					Heptachlor epoxide	0.026	mg/kg	9.9E-10	mg/kg-day	9.1E+00	(mg/kg-day)	9.0E-09	5.8E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00044
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	4.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	8.2E-08	2.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.012
			Exp. Route Total									2.6E-06					0.11
			Dermal	Metals	Antimony	5.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	2.4E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.5E-07	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0046
					Cadmium	3	mg/kg	7.1E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00017
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	1.1E-07	mg/kg-day	7.3E-01	(mg/kg-day)	7.7E-08	2.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	9.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	7.1E-07	2.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	1.3E-07	mg/kg-day	7.3E-01	(mg/kg-day)	9.3E-08	2.8E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	2.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.7E-07	5.1E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	6.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	4.6E-08	1.4E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0041	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	3.6E-08	mg/kg-day	2.0E+00	(mg/kg-day)	7.1E-08	2.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.01
			Exp. Route Total									1.5E-06					0.015
		Exposure Point Total										4.1E-06					0.12
	Exposure Medium Total											4.1E-06					0.12
Sediment Total												4.1E-06					0.12
Total Receptor Risks												4E-06					0.1

TABLE 7.81 RME
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.82 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Ingestion	Metals	Antimony	1.3	mg/kg	2.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000034
					Arsenic	50	mg/kg	5.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.0E-08	3.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
					Cadmium	34	mg/kg	6.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00035
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	2.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00053
					Copper	350	mg/kg	6.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00009
					Iron	29000	mg/kg	5.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00043
					Manganese	2600	mg/kg	4.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00019
					Mercury	280	mg/kg	5.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0097
					Nickel	88	mg/kg	1.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.0E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000045
					Thallium	3.1	mg/kg	5.5E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0032
					Zinc	3100	mg/kg	5.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00011
				PAHs	Benz[a]anthracene	1.2	mg/kg	2.0E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-09	1.2E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	3.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.3E-08	1.8E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	4.0E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.9E-09	2.3E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	1.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	8.8E-09	7.0E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	2.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-09	1.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	4.7E-11	mg/kg-day	1.7E+01	(mg/kg-day)	8.0E-10	2.7E-10	mg/kg-day	3.0E-05	mg/kg-day	0.0000091
					Heptachlor epoxide	0.12	mg/kg	2.1E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.9E-09	1.2E-09	mg/kg-day	1.3E-05	mg/kg-day	0.000095
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.2E-08	6.3E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0032
			Exp. Route Total									1.4E-07					0.019
			Dermal	Metals	Antimony	1.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	50	mg/kg	1.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.9E-07	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0037
					Cadmium	34	mg/kg	4.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-08	mg/kg-day	2.5E-05	mg/kg-day	0.001
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	350	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	280	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	88	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	3100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.2	mg/kg	1.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	2.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-07	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	3.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.7E-08	2.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	1.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.2E-08	6.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	2.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.6E-08	1.3E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.12	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.1E-07	mg/kg-day	2.0E+00	(mg/kg-day)	2.2E-07	6.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.032
			Exp. Route Total									8.5E-07					0.036
		Exposure Point Total										1.0E-06					0.055
	Exposure Medium Total											1.0E-06					0.055
Sediment Total												1.0E-06					0.055

TABLE 7.82 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in UBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	1.8	mg/kg	7.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00012
		White Perch Fillet in UBC (continued)	Ingestion (continued)	Metals (continued)	Iron	16	mg/kg	7.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-05	mg/kg-day	7.0E-01	mg/kg-day	0.000058
					Manganese	0.5	mg/kg	2.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-06	mg/kg-day	1.4E-01	mg/kg-day	0.0000092
					Mercury (inorganic)	0.1	mg/kg	4.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00087
					Selenium	0.79	mg/kg	3.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-06	mg/kg-day	5.0E-03	mg/kg-day	0.0004
				Organometals	Methyl mercury	0.48	mg/kg	2.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	1.0E-04	mg/kg-day	0.012
				PCBs	PCBs (total Aroclors)	1.5	mg/kg	4.5E-07	mg/kg-day	2.0E+00	(mg/kg-day)	9.0E-07	2.6E-06	mg/kg-day	2.0E-05	mg/kg-day	0.13
			Exp. Route Total									9.0E-07					0.15
		Exposure Point Total										9.0E-07					0.15
	Exposure Medium Total											9.0E-07					0.15
	Surface Water Total	Surface Water Total in UBC	Dermal	Metals	Arsenic	4	ug/l	6.8E-10	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-09	3.9E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000013
					Thallium	0.44	ug/l	7.3E-11	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000043
				Volatiles	Vinyl chloride	0.25	ug/l	7.5E-10	mg/kg-day	7.2E-01	(mg/kg-day)	5.4E-10	4.4E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000015
			Exp. Route Total									1.6E-09					0.000057
		Exposure Point Total										1.6E-09					0.000057
	Exposure Medium Total											1.6E-09					0.000057
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	4.2E-08	mg/m3	NA	(mg/kg-day)	NA	2.5E-07	mg/m3	3.0E-04	mg/m3	0.00082
			Exp. Route Total									NA					0.00082
		Exposure Point Total										NA					0.00082
	Exposure Medium Total											NA					0.00082
Surface Water Total												9.0E-07					0.15
Total Receptor												2E-06					0.2

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.83 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Ingestion	Metals	Antimony	1.3	mg/kg	2.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000034
					Arsenic	50	mg/kg	5.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.0E-08	3.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
					Cadmium	34	mg/kg	6.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00035
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	2.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00053
					Copper	350	mg/kg	6.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00009
					Iron	29000	mg/kg	5.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00043
					Manganese	2600	mg/kg	4.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00019
					Mercury	280	mg/kg	5.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0097
					Nickel	88	mg/kg	1.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.0E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000045
					Thallium	3.1	mg/kg	5.5E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0032
					Zinc	3100	mg/kg	5.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00011
				PAHs	Benz[a]anthracene	1.2	mg/kg	2.0E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-09	1.2E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	3.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.3E-08	1.8E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	4.0E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.9E-09	2.3E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	1.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	8.8E-09	7.0E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	2.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-09	1.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	4.7E-11	mg/kg-day	1.7E+01	(mg/kg-day)	8.0E-10	2.7E-10	mg/kg-day	3.0E-05	mg/kg-day	0.0000091
					Heptachlor epoxide	0.12	mg/kg	2.1E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.9E-09	1.2E-09	mg/kg-day	1.3E-05	mg/kg-day	0.000095
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.2E-08	6.3E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0032
			Exp. Route Total									1.4E-07					0.019
			Dermal	Metals	Antimony	1.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	50	mg/kg	1.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.9E-07	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0037
					Cadmium	34	mg/kg	4.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-08	mg/kg-day	2.5E-05	mg/kg-day	0.001
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	350	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	280	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	88	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	3100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.2	mg/kg	1.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	2.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-07	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	3.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.7E-08	2.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	1.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.2E-08	6.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	2.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.6E-08	1.3E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.12	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.1E-07	mg/kg-day	2.0E+00	(mg/kg-day)	2.2E-07	6.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.032
			Exp. Route Total									8.5E-07					0.036
		Exposure Point Total										1.0E-06					0.055
	Exposure Medium Total											1.0E-06					0.055
Sediment Total												1.0E-06					0.055

TABLE 7.83 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in UBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	5.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00087
		Blue Crab Muscle in UBC (continued)	Ingestion (continued)	Metals (continued)	Iron	11	mg/kg	5.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-05	mg/kg-day	7.0E-01	mg/kg-day	0.000042
					Manganese	35	mg/kg	1.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	8.9E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00064
					Mercury (inorganic)	0.01	mg/kg	4.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000086
					Selenium	1	mg/kg	4.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00051
				Organometals	Methyl mercury	0.26	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.6E-07	mg/kg-day	1.0E-04	mg/kg-day	0.0066
				PCBs	PCBs (total Aroclors)	0.013	mg/kg	4.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)	8.9E-09	2.6E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0013
			Exp. Route Total									8.9E-09					0.01
		Exposure Point Total										8.9E-09					0.01
	Exposure Medium Total											8.9E-09					0.01
	Surface Water Total	Surface Water Total in UBC	Dermal	Metals	Arsenic	4	ug/l	6.8E-10	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-09	3.9E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000013
					Thallium	0.44	ug/l	7.3E-11	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000043
				Volatiles	Vinyl chloride	0.25	ug/l	7.5E-10	mg/kg-day	7.2E-01	(mg/kg-day)	5.4E-10	4.4E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000015
			Exp. Route Total									1.6E-09					0.000057
		Exposure Point Total										1.6E-09					0.000057
	Exposure Medium Total											1.6E-09					0.000057
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	4.2E-08	mg/m3	NA	(mg/kg-day)	NA	2.5E-07	mg/m3	3.0E-04	mg/m3	0.00082
			Exp. Route Total									NA					0.00082
		Exposure Point Total										NA					0.00082
	Exposure Medium Total											NA					0.00082
Surface Water Total												1.0E-08					0.011
Total Receptor												1E-06					0.07

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.84 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Ingestion	Metals	Antimony	1.3	mg/kg	2.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000034
					Arsenic	50	mg/kg	5.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.0E-08	3.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
					Cadmium	34	mg/kg	6.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00035
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	2.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00053
					Copper	350	mg/kg	6.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00009
					Iron	29000	mg/kg	5.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00043
					Manganese	2600	mg/kg	4.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00019
					Mercury	280	mg/kg	5.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0097
					Nickel	88	mg/kg	1.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.0E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000045
					Thallium	3.1	mg/kg	5.5E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0032
					Zinc	3100	mg/kg	5.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00011
				PAHs	Benz[a]anthracene	1.2	mg/kg	2.0E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-09	1.2E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	3.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.3E-08	1.8E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	4.0E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.9E-09	2.3E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	1.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	8.8E-09	7.0E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	2.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-09	1.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	4.7E-11	mg/kg-day	1.7E+01	(mg/kg-day)	8.0E-10	2.7E-10	mg/kg-day	3.0E-05	mg/kg-day	0.0000091
					Heptachlor epoxide	0.12	mg/kg	2.1E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.9E-09	1.2E-09	mg/kg-day	1.3E-05	mg/kg-day	0.000095
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.2E-08	6.3E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0032
			Exp. Route Total									1.4E-07					0.019
			Dermal	Metals	Antimony	1.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	50	mg/kg	1.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.9E-07	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0037
					Cadmium	34	mg/kg	4.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-08	mg/kg-day	2.5E-05	mg/kg-day	0.001
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	350	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	280	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	88	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	3100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.2	mg/kg	1.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.8	mg/kg	2.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-07	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2.3	mg/kg	3.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.7E-08	2.1E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.68	mg/kg	1.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.2E-08	6.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.3	mg/kg	2.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.6E-08	1.3E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.12	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	6.2	mg/kg	1.1E-07	mg/kg-day	2.0E+00	(mg/kg-day)	2.2E-07	6.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.032
			Exp. Route Total									8.5E-07					0.036
		Exposure Point Total										1.0E-06					0.055
	Exposure Medium Total											1.0E-06					0.055
Sediment Total												1.0E-06					0.055

TABLE 7.84 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in UBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	5.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00087
		Blue Crab Muscle & Hepatopancreas in UBC (continued)	Ingestion (continued)	Metals (continued)	Iron	11	mg/kg	5.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-05	mg/kg-day	7.0E-01	mg/kg-day	0.000042
					Manganese	35	mg/kg	1.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	8.9E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00064
					Mercury (inorganic)	0.013	mg/kg	5.9E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00011
					Selenium	1	mg/kg	4.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00051
				Organometals	Methyl mercury	0.25	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.4E-07	mg/kg-day	1.0E-04	mg/kg-day	0.0064
				PCBs	PCBs (total Aroclors)	0.18	mg/kg	6.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.3E-07	3.7E-07	mg/kg-day	2.0E-05	mg/kg-day	0.018
			Exp. Route Total									1.3E-07					0.027
		Exposure Point Total										1.3E-07					0.027
	Exposure Medium Total											1.3E-07					0.027
	Surface Water Total	Surface Water Total in UBC	Dermal	Metals	Arsenic	4	ug/l	6.8E-10	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-09	3.9E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000013
					Thallium	0.44	ug/l	7.3E-11	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000043
				Volatiles	Vinyl chloride	0.25	ug/l	7.5E-10	mg/kg-day	7.2E-01	(mg/kg-day)	5.4E-10	4.4E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000015
			Exp. Route Total									1.6E-09					0.000057
		Exposure Point Total										1.6E-09					0.000057
	Exposure Medium Total											1.6E-09					0.000057
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	4.2E-08	mg/m3	NA	(mg/kg-day)	NA	2.5E-07	mg/m3	3.0E-04	mg/m3	0.00082
			Exp. Route Total									NA					0.00082
		Exposure Point Total										NA					0.00082
	Exposure Medium Total											NA					0.00082
Surface Water Total												1.3E-07					0.028
Total Receptor												1E-06					0.08

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.85 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in UBC	Ingestion	Metals	Antimony	1.2	mg/kg	1.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	7.5E-09	mg/kg-day	4.0E-04	mg/kg-day	0.000019
					Arsenic	45	mg/kg	2.8E-08	mg/kg-day	1.5E+00	(mg/kg-day)	4.3E-08	1.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00055
					Cadmium	30	mg/kg	3.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	1.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	9.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0003
					Copper	330	mg/kg	3.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000051
					Iron	29000	mg/kg	3.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00026
					Manganese	2100	mg/kg	2.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-05	mg/kg-day	1.4E-01	mg/kg-day	0.000094
					Mercury	260	mg/kg	2.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0053
					Nickel	81	mg/kg	8.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000025
					Thallium	2.7	mg/kg	2.9E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0017
					Zinc	2700	mg/kg	2.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000056
				PAHs	Benz[a]anthracene	1	mg/kg	1.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.8E-10	6.2E-09	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.5	mg/kg	1.5E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-08	9.0E-09	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	1.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-09	9.2E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.53	mg/kg	5.7E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.1E-09	3.3E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.1	mg/kg	1.2E-09	mg/kg-day	7.3E-01	(mg/kg-day)	8.9E-10	7.1E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.041	mg/kg	4.3E-11	mg/kg-day	1.7E+01	(mg/kg-day)	7.3E-10	2.5E-10	mg/kg-day	3.0E-05	mg/kg-day	0.0000084
					Heptachlor epoxide	0.087	mg/kg	9.2E-11	mg/kg-day	9.1E+00	(mg/kg-day)	8.4E-10	5.4E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000041
				PCBs	PCBs (total Aroclors)	5.7	mg/kg	6.0E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.2E-08	3.5E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0018
			Exp. Route Total									7.5E-08					0.01
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	45	mg/kg	1.0E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.5E-07	5.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
					Cadmium	30	mg/kg	2.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-08	mg/kg-day	2.5E-05	mg/kg-day	0.00053
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	260	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	81	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	2700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1	mg/kg	9.9E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.2E-09	5.8E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.5	mg/kg	1.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.0E-07	8.4E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	8.5E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.53	mg/kg	5.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	3.8E-08	3.1E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.1	mg/kg	1.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.2E-09	6.6E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.041	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.087	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	5.7	mg/kg	6.0E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.2E-07	3.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.018
			Exp. Route Total									4.4E-07					0.02
		Exposure Point Total										5.2E-07					0.03
	Exposure Medium Total											5.2E-07					0.03
Sediment Total												5.2E-07					0.03

TABLE 7.85 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in UBC	Ingestion	Metals	Arsenic	4	ug/l	8.5E-10	mg/kg-day	1.5E+00	(mg/kg-day)	1.3E-09	5.0E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000017
					Thallium	0.44	ug/l	9.3E-11	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000054
		Surface Water Total in UBC (continued)	Ingestion (continued)	PAHs	Benzo[a]pyrene	0.66	ug/l	1.4E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.0E-09	8.1E-10	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	3	ug/l	6.3E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.6E-09	3.7E-09	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	0.25	ug/l	5.4E-11	mg/kg-day	7.2E-01	(mg/kg-day)	3.9E-11	3.1E-10	mg/kg-day	3.0E-03	mg/kg-day	0.0000001
			Exp. Route Total									7.0E-09					0.000071
			Dermal	Metals	Arsenic	4	ug/l	3.6E-10	mg/kg-day	1.5E+00	(mg/kg-day)	5.3E-10	2.1E-09	mg/kg-day	3.0E-04	mg/kg-day	0.0000069
					Thallium	0.44	ug/l	3.9E-11	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000023
				Volatiles	Vinyl chloride	0.25	ug/l	8.9E-10	mg/kg-day	7.2E-01	(mg/kg-day)	6.4E-10	5.2E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000017
			Exp. Route Total									1.2E-09					0.000031
		Exposure Point Total										8.1E-09					0.0001
	Exposure Medium Total											8.1E-09					0.0001
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	1.4E-08	mg/m3	NA	(mg/kg-day)	NA	8.4E-08	mg/m3	3.0E-04	mg/m3	0.00028
			Exp. Route Total									NA					0.00028
		Exposure Point Total										NA					0.00028
	Exposure Medium Total											NA					0.00028
Surface Water Total												8.1E-09					0.00038
Total Receptor												5E-07					0.03

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.86 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in UBC	Ingestion	Metals	Antimony	1.2	mg/kg	2.7E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00004
					Arsenic	45	mg/kg	6.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)	9.0E-08	3.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0012
					Cadmium	30	mg/kg	6.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00039
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	3.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00064
					Copper	330	mg/kg	7.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00011
					Iron	29000	mg/kg	6.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.8E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00054
					Manganese	2100	mg/kg	4.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-05	mg/kg-day	1.4E-01	mg/kg-day	0.0002
					Mercury	260	mg/kg	5.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.011
					Nickel	81	mg/kg	1.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-06	mg/kg-day	2.0E-02	mg/kg-day	0.000052
					Thallium	2.7	mg/kg	6.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0036
					Zinc	2700	mg/kg	6.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00012
				PAHs	Benz[a]anthracene	1	mg/kg	2.3E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.6E-09	1.3E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.5	mg/kg	3.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.4E-08	1.9E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	3.3E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.4E-09	1.9E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.53	mg/kg	1.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	8.7E-09	7.0E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.1	mg/kg	2.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.9E-09	1.5E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.041	mg/kg	9.1E-11	mg/kg-day	1.7E+01	(mg/kg-day)	1.5E-09	5.3E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000018
					Heptachlor epoxide	0.087	mg/kg	1.9E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.8E-09	1.1E-09	mg/kg-day	1.3E-05	mg/kg-day	0.000087
				PCBs	PCBs (total Aroclors)	5.7	mg/kg	1.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.5E-08	7.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0037
			Exp. Route Total									1.6E-07					0.022
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	45	mg/kg	2.1E-07	mg/kg-day	1.5E+00	(mg/kg-day)	3.2E-07	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0042
					Cadmium	30	mg/kg	4.8E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	15	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	260	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	81	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	2700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1	mg/kg	2.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-08	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.5	mg/kg	3.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.2E-07	1.8E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	3.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.3E-08	1.8E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.53	mg/kg	1.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.1E-08	6.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	1.1	mg/kg	2.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-08	1.4E-07	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.041	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.087	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	5.7	mg/kg	1.3E-07	mg/kg-day	2.0E+00	(mg/kg-day)	2.5E-07	7.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.037
			Exp. Route Total									9.3E-07					0.042
		Exposure Point Total										1.1E-06					0.064
	Exposure Medium Total											1.1E-06					0.064
Sediment Total												1.1E-06					0.064

TABLE 7.86 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in UBC	Ingestion	Metals	Arsenic	4	ug/l	1.8E-09	mg/kg-day	1.5E+00	(mg/kg-day)	2.7E-09	1.0E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000035
					Thallium	0.44	ug/l	2.0E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00011
		Surface Water Total in UBC (continued)	Ingestion (continued)	PAHs	Benzo[a]pyrene	0.66	ug/l	2.9E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-09	1.7E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	3	ug/l	1.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	9.8E-09	7.8E-09	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	0.25	ug/l	1.1E-10	mg/kg-day	7.2E-01	(mg/kg-day)	8.1E-11	6.6E-10	mg/kg-day	3.0E-03	mg/kg-day	0.00000022
			Exp. Route Total									1.5E-08					0.00015
			Dermal	Metals	Arsenic	4	ug/l	7.5E-10	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-09	4.4E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000015
					Thallium	0.44	ug/l	8.2E-11	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000048
				Volatiles	Vinyl chloride	0.25	ug/l	1.9E-09	mg/kg-day	7.2E-01	(mg/kg-day)	1.4E-09	1.1E-08	mg/kg-day	3.0E-03	mg/kg-day	0.0000037
			Exp. Route Total									2.5E-09					0.000066
		Exposure Point Total										1.7E-08					0.00022
	Exposure Medium Total											1.7E-08					0.00022
	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	3.0E-08	mg/m3	NA	(mg/kg-day)	NA	1.8E-07	mg/m3	3.0E-04	mg/m3	0.00059
			Exp. Route Total									NA					0.00059
		Exposure Point Total										NA					0.00059
	Exposure Medium Total											NA					0.00059
Surface Water Total												1.7E-08					0.00081
Total Receptor												1E-06					0.07

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.87 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in UBC	Ingestion	Metals	Aluminum	11000	mg/kg	5.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.8E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00038
					Antimony	2.5	mg/kg	1.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	8.4E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00021
					Arsenic	37	mg/kg	1.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.6E-08	7.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0025
					Cadmium	21	mg/kg	1.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	7.2E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00072
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	12	mg/kg	6.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Copper	390	mg/kg	1.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00033
					Iron	26000	mg/kg	1.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	8.9E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0013
					Manganese	780	mg/kg	3.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00019
					Mercury	200	mg/kg	1.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.023
					Nickel	72	mg/kg	3.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00012
					Thallium	2.4	mg/kg	1.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	8.4E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0084
					Vanadium	41	mg/kg	2.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00028
					Zinc	2100	mg/kg	1.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	7.1E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00024
				PAHs	Benzo[a]pyrene	1	mg/kg	5.1E-10	mg/kg-day	7.3E+00	(mg/kg-day)	3.7E-09	3.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.21	mg/kg	1.0E-10	mg/kg-day	7.3E+00	(mg/kg-day)	7.4E-10	7.1E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.063	mg/kg	3.1E-11	mg/kg-day	1.7E+01	(mg/kg-day)	5.2E-10	2.2E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000072
					Heptachlor	0.018	mg/kg	9.0E-12	mg/kg-day	4.5E+00	(mg/kg-day)	4.1E-11	6.3E-10	mg/kg-day	5.0E-04	mg/kg-day	0.0000013
					Heptachlor epoxide	0.077	mg/kg	3.8E-11	mg/kg-day	9.1E+00	(mg/kg-day)	3.4E-10	2.6E-09	mg/kg-day	1.3E-05	mg/kg-day	0.0002
				PCBs	PCBs (total Aroclors)	3.6	mg/kg	1.7E-09	mg/kg-day	2.0E+00	(mg/kg-day)	3.5E-09	1.2E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0061
				Volatiles	Trichloroethene	0.0015	mg/kg	7.4E-13	mg/kg-day	4.6E-02	(mg/kg-day)	3.4E-14	5.2E-11	mg/kg-day	5.0E-04	mg/kg-day	0.0000001
			Exp. Route Total									2.5E-08					0.046
			Dermal	Metals	Aluminum	11000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	2.5	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	37	mg/kg	5.6E-09	mg/kg-day	1.5E+00	(mg/kg-day)	8.5E-09	4.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0013
					Cadmium	21	mg/kg	1.1E-10	mg/kg-day	NA	(mg/kg-day)	NA	7.5E-09	mg/kg-day	2.5E-05	mg/kg-day	0.0003
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	12	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	390	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	26000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	780	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	200	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	72	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	41	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	2100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	1	mg/kg	6.9E-10	mg/kg-day	7.3E+00	(mg/kg-day)	5.1E-09	4.8E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.21	mg/kg	1.4E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.0E-09	9.6E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.063	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.018	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.077	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	3.6	mg/kg	2.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)	5.1E-09	1.8E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0089
				Volatiles	Trichloroethene	0.0015	mg/kg	NA	mg/kg-day	4.6E-02	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
			Exp. Route Total									2.0E-08					0.011
		Exposure Point Total										4.5E-08					0.056
	Exposure Medium Total											4.5E-08					0.056
Sediment Total												4.5E-08					0.056

TABLE 7.87 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Ambient Air	Ambient Air in UBC	Inhalation	Metals	Mercury Average	0.043	ug/m3	5.3E-09	mg/m3	NA	(mg/kg-day)	NA	3.7E-07	mg/m3	3.0E-04	mg/m3	0.0012
			Exp. Route Total									NA					0.0012
		Exposure Point Total										NA					0.0012
	Exposure Medium Total											NA					0.0012
Surface Water Total												NA					0.0012
Total Receptor												4E-08					0.06

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UBC = Upper Berry's Creek
-- = not detected

TABLE 7.88 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in UPIC	Ingestion	Metals	Aluminum	16000	mg/kg	7.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00055
					Antimony	2.2	mg/kg	1.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	7.6E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00019
					Arsenic	61	mg/kg	1.8E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.7E-08	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0042
					Cadmium	130	mg/kg	6.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0044
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	9.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0022
					Copper	2700	mg/kg	1.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	9.1E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0023
					Iron	34000	mg/kg	1.6E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0016
					Manganese	680	mg/kg	3.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00017
					Mercury	280	mg/kg	1.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.032
					Nickel	430	mg/kg	2.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00073
					Thallium	3.8	mg/kg	1.9E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-07	mg/kg-day	1.0E-05	mg/kg-day	0.013
					Vanadium	61	mg/kg	3.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00042
					Zinc	3500	mg/kg	1.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-04	mg/kg-day	3.0E-01	mg/kg-day	0.0004
				PAHs	Benzo[a]pyrene	1.2	mg/kg	5.9E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.3E-09	4.2E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.36	mg/kg	1.8E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-09	1.2E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.05	mg/kg	2.4E-11	mg/kg-day	1.7E+01	(mg/kg-day)	4.2E-10	1.7E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000057
					Heptachlor	0.029	mg/kg	1.4E-11	mg/kg-day	4.5E+00	(mg/kg-day)	6.4E-11	9.9E-10	mg/kg-day	5.0E-04	mg/kg-day	0.000002
					Heptachlor epoxide	0.11	mg/kg	5.4E-11	mg/kg-day	9.1E+00	(mg/kg-day)	4.9E-10	3.8E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00029
				PCBs	PCBs (total Aroclors)	11	mg/kg	5.3E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.1E-08	3.7E-07	mg/kg-day	2.0E-05	mg/kg-day	0.019
				Volatiles	Trichloroethene	27	mg/kg	1.3E-08	mg/kg-day	4.6E-02	(mg/kg-day)	6.1E-10	9.3E-07	mg/kg-day	5.0E-04	mg/kg-day	0.0019
			Exp. Route Total									4.5E-08					0.083
			Dermal	Metals	Aluminum	16000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	2.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	61	mg/kg	9.3E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.4E-08	6.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0022
					Cadmium	130	mg/kg	6.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0018
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	2700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	34000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	680	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	280	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	430	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	61	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	3500	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	1.2	mg/kg	8.0E-10	mg/kg-day	7.3E+00	(mg/kg-day)	5.9E-09	5.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.36	mg/kg	2.4E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.8E-09	1.7E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.05	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.029	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.11	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	11	mg/kg	7.7E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.5E-08	5.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.027
				Volatiles	Trichloroethene	27	mg/kg	NA	mg/kg-day	4.6E-02	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
			Exp. Route Total									3.7E-08					0.031
		Exposure Point Total										8.2E-08					0.11
	Exposure Medium Total											8.2E-08					0.11
Sediment Total												8.2E-08					0.11
Total Receptor												8E-08					0.1

TABLE 7.88 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
UPIC = Upper Peach Island Creek
-- = not detected

UPIC is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

TABLE 7.89 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Ingestion	Metals	Antimony	1.2	mg/kg	2.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00003
					Arsenic	19	mg/kg	2.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)	3.0E-08	1.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00038
					Cadmium	3.5	mg/kg	6.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000036
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	3.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00064
					Copper	130	mg/kg	2.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000033
					Iron	35000	mg/kg	6.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00051
					Manganese	8800	mg/kg	1.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	9.0E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00065
					Mercury	24	mg/kg	4.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00081
					Nickel	55	mg/kg	9.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000028
					Thallium	10	mg/kg	1.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.01
					Zinc	520	mg/kg	9.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000018
				PAHs	Benz[a]anthracene	1.1	mg/kg	1.9E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-09	1.1E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	2.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-08	1.1E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	2.7E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.0E-09	1.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	6.5E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.7E-09	3.8E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	1.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-09	8.4E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	8.1E-11	mg/kg-day	1.7E+01	(mg/kg-day)	1.4E-09	4.7E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000016
					Heptachlor epoxide	0.016	mg/kg	2.8E-11	mg/kg-day	9.1E+00	(mg/kg-day)	2.5E-10	1.6E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000012
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	2.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)	5.6E-09	1.6E-08	mg/kg-day	2.0E-05	mg/kg-day	0.00081
			Exp. Route Total									6.0E-08					0.014
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	19	mg/kg	7.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-07	4.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Cadmium	3.5	mg/kg	4.4E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-09	mg/kg-day	2.5E-05	mg/kg-day	0.0001
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	35000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	8800	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	55	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	10	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	520	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.1	mg/kg	1.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.3E-08	1.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	1.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-07	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	2.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.8E-08	1.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	6.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.4E-08	3.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	1.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.7E-09	7.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	2.8E-08	mg/kg-day	2.0E+00	(mg/kg-day)	5.6E-08	1.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0081
			Exp. Route Total									3.8E-07					0.0096
		Exposure Point Total										4.4E-07					0.024
	Exposure Medium Total											4.4E-07					0.024
Sediment Total												4.4E-07					0.024

TABLE 7.89 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in MBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	1.3	mg/kg	5.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000083
		White Perch Fillet in MBC (continued)	Ingestion (continued)	Metals (continued)	Iron	11	mg/kg	4.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-05	mg/kg-day	7.0E-01	mg/kg-day	0.000039
					Manganese	0.53	mg/kg	2.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-06	mg/kg-day	1.4E-01	mg/kg-day	0.0000097
					Mercury (inorganic)	0.21	mg/kg	9.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0018
					Selenium	0.84	mg/kg	3.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00043
				Organometals	Methyl mercury	0.41	mg/kg	1.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	1.0E-04	mg/kg-day	0.011
				PCBs	PCBs (total Aroclors)	1.2	mg/kg	3.6E-07	mg/kg-day	2.0E+00	(mg/kg-day)	7.1E-07	2.1E-06	mg/kg-day	2.0E-05	mg/kg-day	0.1
			Exp. Route Total									7.1E-07					0.12
		Exposure Point Total										7.1E-07					0.12
	Exposure Medium Total											7.1E-07					0.12
	Surface Water Total	Surface Water Total in MBC	Dermal	Metals	Arsenic	3.6	ug/l	6.0E-10	mg/kg-day	1.5E+00	(mg/kg-day)	9.0E-10	3.5E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000012
					Thallium	0.56	ug/l	9.5E-11	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000055
				Volatiles	Vinyl chloride	0.28	ug/l	8.2E-10	mg/kg-day	7.2E-01	(mg/kg-day)	5.9E-10	4.8E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000016
			Exp. Route Total									1.5E-09					0.000069
		Exposure Point Total										1.5E-09					0.000069
	Exposure Medium Total											1.5E-09					0.000069
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	2.6E-08	mg/m3	NA	(mg/kg-day)	NA	1.5E-07	mg/m3	3.0E-04	mg/m3	0.0005
			Exp. Route Total									NA					0.0005
		Exposure Point Total										NA					0.0005
	Exposure Medium Total											NA					0.0005
Surface Water Total												7.1E-07					0.12
Total Receptor												1E-06					0.1

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.90 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Ingestion	Metals	Antimony	1.2	mg/kg	2.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00003
					Arsenic	19	mg/kg	2.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)	3.0E-08	1.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00038
					Cadmium	3.5	mg/kg	6.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000036
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	3.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00064
					Copper	130	mg/kg	2.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000033
					Iron	35000	mg/kg	6.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00051
					Manganese	8800	mg/kg	1.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	9.0E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00065
					Mercury	24	mg/kg	4.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00081
					Nickel	55	mg/kg	9.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000028
					Thallium	10	mg/kg	1.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.01
					Zinc	520	mg/kg	9.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000018
				PAHs	Benz[a]anthracene	1.1	mg/kg	1.9E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-09	1.1E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	2.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-08	1.1E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	2.7E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.0E-09	1.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	6.5E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.7E-09	3.8E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	1.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-09	8.4E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	8.1E-11	mg/kg-day	1.7E+01	(mg/kg-day)	1.4E-09	4.7E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000016
					Heptachlor epoxide	0.016	mg/kg	2.8E-11	mg/kg-day	9.1E+00	(mg/kg-day)	2.5E-10	1.6E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000012
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	2.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)	5.6E-09	1.6E-08	mg/kg-day	2.0E-05	mg/kg-day	0.00081
			Exp. Route Total									6.0E-08					0.014
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	19	mg/kg	7.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-07	4.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Cadmium	3.5	mg/kg	4.4E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-09	mg/kg-day	2.5E-05	mg/kg-day	0.0001
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	35000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	8800	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	55	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	10	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	520	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.1	mg/kg	1.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.3E-08	1.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	1.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-07	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	2.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.8E-08	1.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	6.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.4E-08	3.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	1.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.7E-09	7.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	2.8E-08	mg/kg-day	2.0E+00	(mg/kg-day)	5.6E-08	1.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0081
			Exp. Route Total									3.8E-07					0.0096
		Exposure Point Total										4.4E-07					0.024
	Exposure Medium Total											4.4E-07					0.024
Sediment Total												4.4E-07					0.024

TABLE 7.90 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in MBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	16	mg/kg	7.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0011
		Blue Crab Muscle in MBC (continued)	Ingestion (continued)	Metals (continued)	Iron	34	mg/kg	1.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	8.9E-05	mg/kg-day	7.0E-01	mg/kg-day	0.00013
					Manganese	62	mg/kg	2.7E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0011
					Mercury (inorganic)	0.14	mg/kg	6.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0012
					Selenium	1.5	mg/kg	6.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00077
				Organometals	Methyl mercury	0.28	mg/kg	1.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.1E-07	mg/kg-day	1.0E-04	mg/kg-day	0.0071
				PCBs	PCBs (total Aroclors)	0.04	mg/kg	1.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.8E-08	8.2E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0041
			Exp. Route Total									2.8E-08					0.015
		Exposure Point Total										2.8E-08					0.015
	Exposure Medium Total											2.8E-08					0.015
	Surface Water Total	Surface Water Total in MBC	Dermal	Metals	Arsenic	3.6	ug/l	6.0E-10	mg/kg-day	1.5E+00	(mg/kg-day)	9.0E-10	3.5E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000012
					Thallium	0.56	ug/l	9.5E-11	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000055
				Volatiles	Vinyl chloride	0.28	ug/l	8.2E-10	mg/kg-day	7.2E-01	(mg/kg-day)	5.9E-10	4.8E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000016
			Exp. Route Total									1.5E-09					0.000069
		Exposure Point Total										1.5E-09					0.000069
	Exposure Medium Total											1.5E-09					0.000069
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	2.6E-08	mg/m3	NA	(mg/kg-day)	NA	1.5E-07	mg/m3	3.0E-04	mg/m3	0.0005
			Exp. Route Total									NA					0.0005
		Exposure Point Total										NA					0.0005
	Exposure Medium Total											NA					0.0005
Surface Water Total												3.0E-08					0.016
Total Receptor												5E-07					0.04

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.91 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Ingestion	Metals	Antimony	1.2	mg/kg	2.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00003
					Arsenic	19	mg/kg	2.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)	3.0E-08	1.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00038
					Cadmium	3.5	mg/kg	6.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000036
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	3.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00064
					Copper	130	mg/kg	2.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000033
					Iron	35000	mg/kg	6.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00051
					Manganese	8800	mg/kg	1.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	9.0E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00065
					Mercury	24	mg/kg	4.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00081
					Nickel	55	mg/kg	9.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.7E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000028
					Thallium	10	mg/kg	1.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.01
					Zinc	520	mg/kg	9.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000018
				PAHs	Benz[a]anthracene	1.1	mg/kg	1.9E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-09	1.1E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	2.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-08	1.1E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	2.7E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.0E-09	1.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	6.5E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.7E-09	3.8E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	1.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-09	8.4E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	8.1E-11	mg/kg-day	1.7E+01	(mg/kg-day)	1.4E-09	4.7E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000016
					Heptachlor epoxide	0.016	mg/kg	2.8E-11	mg/kg-day	9.1E+00	(mg/kg-day)	2.5E-10	1.6E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000012
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	2.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)	5.6E-09	1.6E-08	mg/kg-day	2.0E-05	mg/kg-day	0.00081
			Exp. Route Total									6.0E-08					0.014
			Dermal	Metals	Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	19	mg/kg	7.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-07	4.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Cadmium	3.5	mg/kg	4.4E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-09	mg/kg-day	2.5E-05	mg/kg-day	0.0001
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	19	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	35000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	8800	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	55	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	10	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	520	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.1	mg/kg	1.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.3E-08	1.0E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.1	mg/kg	1.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-07	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.5	mg/kg	2.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.8E-08	1.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.37	mg/kg	6.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.4E-08	3.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.82	mg/kg	1.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.7E-09	7.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.046	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.6	mg/kg	2.8E-08	mg/kg-day	2.0E+00	(mg/kg-day)	5.6E-08	1.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0081
			Exp. Route Total									3.8E-07					0.0096
		Exposure Point Total										4.4E-07					0.024
	Exposure Medium Total											4.4E-07					0.024
Sediment Total												4.4E-07					0.024

TABLE 7.91 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in MBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	16	mg/kg	7.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0011
		Blue Crab Muscle & Hepatopancreas in MBC (continued)	Ingestion (continued)	Metals (continued)	Iron	34	mg/kg	1.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	8.9E-05	mg/kg-day	7.0E-01	mg/kg-day	0.00013
					Manganese	62	mg/kg	2.7E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0011
					Mercury (inorganic)	0.12	mg/kg	5.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
					Selenium	1.5	mg/kg	6.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00077
				Organometals	Methyl mercury	0.19	mg/kg	8.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-07	mg/kg-day	1.0E-04	mg/kg-day	0.0049
				PCBs	PCBs (total Aroclors)	0.13	mg/kg	4.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	9.0E-08	2.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.013
			Exp. Route Total									9.0E-08					0.022
		Exposure Point Total										9.0E-08					0.022
	Exposure Medium Total											9.0E-08					0.022
	Surface Water Total	Surface Water Total in MBC	Dermal	Metals	Arsenic	3.6	ug/l	6.0E-10	mg/kg-day	1.5E+00	(mg/kg-day)	9.0E-10	3.5E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000012
					Thallium	0.56	ug/l	9.5E-11	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000055
				Volatiles	Vinyl chloride	0.28	ug/l	8.2E-10	mg/kg-day	7.2E-01	(mg/kg-day)	5.9E-10	4.8E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000016
			Exp. Route Total									1.5E-09					0.000069
		Exposure Point Total										1.5E-09					0.000069
	Exposure Medium Total											1.5E-09					0.000069
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	2.6E-08	mg/m3	NA	(mg/kg-day)	NA	1.5E-07	mg/m3	3.0E-04	mg/m3	0.0005
			Exp. Route Total									NA					0.0005
		Exposure Point Total										NA					0.0005
	Exposure Medium Total											NA					0.0005
Surface Water Total												9.2E-08					0.023
Total Receptor												5E-07					0.05

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.92 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC	Ingestion	Metals	Antimony	1.1	mg/kg	1.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-09	mg/kg-day	4.0E-04	mg/kg-day	0.000016
					Arsenic	18	mg/kg	1.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.7E-08	6.5E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00022
					Cadmium	3.5	mg/kg	3.7E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000022
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	1.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00033
					Copper	130	mg/kg	1.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.0E-07	mg/kg-day	4.0E-02	mg/kg-day	0.00002
					Iron	34000	mg/kg	3.6E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0003
					Manganese	6600	mg/kg	7.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00029
					Mercury	21	mg/kg	2.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00044
					Nickel	50	mg/kg	5.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000015
					Thallium	7.6	mg/kg	8.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0047
					Zinc	500	mg/kg	5.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-06	mg/kg-day	3.0E-01	mg/kg-day	0.00001
				PAHs	Benz[a]anthracene	0.94	mg/kg	1.0E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.3E-10	5.8E-09	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	1.4E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-08	8.5E-09	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.4	mg/kg	1.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-09	8.8E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.39	mg/kg	4.1E-10	mg/kg-day	7.3E+00	(mg/kg-day)	3.0E-09	2.4E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.78	mg/kg	8.2E-10	mg/kg-day	7.3E-01	(mg/kg-day)	6.0E-10	4.8E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.014	mg/kg	1.5E-11	mg/kg-day	1.7E+01	(mg/kg-day)	2.5E-10	8.5E-11	mg/kg-day	3.0E-05	mg/kg-day	0.0000028
					Heptachlor epoxide	0.014	mg/kg	1.5E-11	mg/kg-day	9.1E+00	(mg/kg-day)	1.4E-10	8.9E-11	mg/kg-day	1.3E-05	mg/kg-day	0.0000068
				PCBs	PCBs (total Aroclors)	1.4	mg/kg	1.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)	3.0E-09	8.9E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00044
			Exp. Route Total									3.6E-08					0.0068
			Dermal	Metals	Antimony	1.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	18	mg/kg	4.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)	6.0E-08	2.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00077
					Cadmium	3.5	mg/kg	2.7E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000062
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	34000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	6600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	21	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	50	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	7.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	500	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.94	mg/kg	9.3E-09	mg/kg-day	7.3E-01	(mg/kg-day)	6.8E-09	5.4E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	1.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	9.8E-08	7.9E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.4	mg/kg	1.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.0E-08	8.1E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.39	mg/kg	3.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-08	2.2E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.78	mg/kg	7.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	5.6E-09	4.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.014	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.014	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.4	mg/kg	1.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.0E-08	8.9E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0044
			Exp. Route Total									2.4E-07					0.0053
		Exposure Point Total										2.7E-07					0.012
	Exposure Medium Total											2.7E-07					0.012
Sediment Total												2.7E-07					0.012

TABLE 7.92 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in MBC	Ingestion	Metals	Arsenic	3.6	ug/l	7.6E-10	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-09	4.4E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000015
					Thallium	0.56	ug/l	1.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	7.0E-10	mg/kg-day	1.0E-05	mg/kg-day	0.00007
		Surface Water Total in MBC (continued)	Ingestion (continued)	PAHs	Benzo[a]pyrene	0.74	ug/l	1.6E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-09	9.1E-10	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	4.7	ug/l	9.9E-10	mg/kg-day	7.3E+00	(mg/kg-day)	7.3E-09	5.8E-09	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	0.28	ug/l	5.8E-11	mg/kg-day	7.2E-01	(mg/kg-day)	4.2E-11	3.4E-10	mg/kg-day	3.0E-03	mg/kg-day	0.00000011
			Exp. Route Total									9.6E-09					0.000084
			Dermal	Metals	Arsenic	3.6	ug/l	3.2E-10	mg/kg-day	1.5E+00	(mg/kg-day)	4.7E-10	1.8E-09	mg/kg-day	3.0E-04	mg/kg-day	0.0000061
					Thallium	0.56	ug/l	5.0E-11	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000029
				Volatiles	Vinyl chloride	0.28	ug/l	9.7E-10	mg/kg-day	7.2E-01	(mg/kg-day)	7.0E-10	5.7E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000019
			Exp. Route Total									1.2E-09					0.000037
		Exposure Point Total										1.1E-08					0.00012
	Exposure Medium Total											1.1E-08					0.00012
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	8.8E-09	mg/m3	NA	(mg/kg-day)	NA	5.1E-08	mg/m3	3.0E-04	mg/m3	0.00017
			Exp. Route Total									NA					0.00017
		Exposure Point Total										NA					0.00017
	Exposure Medium Total											NA					0.00017
Surface Water Total												1.1E-08					0.00029
Total Receptor												3E-07					0.01

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.93 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC	Ingestion	Metals	Antimony	1.1	mg/kg	2.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000034
					Arsenic	18	mg/kg	2.4E-08	mg/kg-day	1.5E+00	(mg/kg-day)	3.5E-08	1.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00046
					Cadmium	3.5	mg/kg	7.8E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000046
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	3.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00071
					Copper	130	mg/kg	2.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000042
					Iron	34000	mg/kg	7.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00063
					Manganese	6600	mg/kg	1.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	8.6E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00062
					Mercury	21	mg/kg	4.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00093
					Nickel	50	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000033
					Thallium	7.6	mg/kg	1.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	9.9E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0099
					Zinc	500	mg/kg	1.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000022
				PAHs	Benz[a]anthracene	0.94	mg/kg	2.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-09	1.2E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	3.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.2E-08	1.8E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.4	mg/kg	3.2E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.3E-09	1.9E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.39	mg/kg	8.7E-10	mg/kg-day	7.3E+00	(mg/kg-day)	6.3E-09	5.1E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.78	mg/kg	1.7E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.3E-09	1.0E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.014	mg/kg	3.1E-11	mg/kg-day	1.7E+01	(mg/kg-day)	5.2E-10	1.8E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000006
					Heptachlor epoxide	0.014	mg/kg	3.2E-11	mg/kg-day	9.1E+00	(mg/kg-day)	2.9E-10	1.9E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000014
				PCBs	PCBs (total Aroclors)	1.4	mg/kg	3.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)	6.4E-09	1.9E-08	mg/kg-day	2.0E-05	mg/kg-day	0.00094
			Exp. Route Total									7.6E-08					0.014
			Dermal	Metals	Antimony	1.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	18	mg/kg	8.4E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.3E-07	4.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0016
					Cadmium	3.5	mg/kg	5.6E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00013
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	34000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	6600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	21	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	50	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	7.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	500	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.94	mg/kg	2.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-08	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	2.8E-08	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-07	1.7E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.4	mg/kg	2.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.1E-08	1.7E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.39	mg/kg	8.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.9E-08	4.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.78	mg/kg	1.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-08	9.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.014	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.014	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.4	mg/kg	3.2E-08	mg/kg-day	2.0E+00	(mg/kg-day)	6.4E-08	1.9E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0094
			Exp. Route Total									5.0E-07					0.011
		Exposure Point Total										5.8E-07					0.026
	Exposure Medium Total											5.8E-07					0.026
Sediment Total												5.8E-07					0.026

TABLE 7.93 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in MBC	Ingestion	Metals	Arsenic	3.6	ug/l	1.6E-09	mg/kg-day	1.5E+00	(mg/kg-day)	2.4E-09	9.3E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000031
					Thallium	0.56	ug/l	2.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00015
		Surface Water Total in MBC (continued)	Ingestion (continued)	PAHs	Benzo[a]pyrene	0.74	ug/l	3.3E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.4E-09	1.9E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	4.7	ug/l	2.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-08	1.2E-08	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	0.28	ug/l	1.2E-10	mg/kg-day	7.2E-01	(mg/kg-day)	8.9E-11	7.2E-10	mg/kg-day	3.0E-03	mg/kg-day	0.00000024
			Exp. Route Total									2.0E-08					0.00018
			Dermal	Metals	Arsenic	3.6	ug/l	6.7E-10	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-09	3.9E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000013
					Thallium	0.56	ug/l	1.1E-10	mg/kg-day	NA	(mg/kg-day)	NA	6.1E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000061
				Volatiles	Vinyl chloride	0.28	ug/l	2.0E-09	mg/kg-day	7.2E-01	(mg/kg-day)	1.5E-09	1.2E-08	mg/kg-day	3.0E-03	mg/kg-day	0.000004
			Exp. Route Total									2.5E-09					0.000078
		Exposure Point Total										2.3E-08					0.00026
	Exposure Medium Total											2.3E-08					0.00026
	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	1.9E-08	mg/m3	NA	(mg/kg-day)	NA	1.1E-07	mg/m3	3.0E-04	mg/m3	0.00036
			Exp. Route Total									NA					0.00036
		Exposure Point Total										NA					0.00036
	Exposure Medium Total											NA					0.00036
Surface Water Total												2.3E-08					0.00062
Total Receptor												6E-07					0.03

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.94 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in MBC	Ingestion	Metals	Aluminum	15000	mg/kg	7.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00051
					Antimony	1.6	mg/kg	8.0E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.6E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00014
					Arsenic	20	mg/kg	5.8E-09	mg/kg-day	1.5E+00	(mg/kg-day)	8.7E-09	4.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Cadmium	6.6	mg/kg	3.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00023
					Chromium (VI)	3.8	mg/kg	1.9E-09	mg/kg-day	5.0E-01	(mg/kg-day)	9.4E-10	1.3E-07	mg/kg-day	3.0E-03	mg/kg-day	0.000044
					Cobalt	14	mg/kg	6.9E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0016
					Copper	160	mg/kg	7.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00014
					Iron	37000	mg/kg	1.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0018
					Manganese	1200	mg/kg	5.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00028
					Mercury	70	mg/kg	3.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0079
					Nickel	43	mg/kg	2.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-06	mg/kg-day	2.0E-02	mg/kg-day	0.000073
					Thallium	1.4	mg/kg	6.6E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0046
					Vanadium	39	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00027
					Zinc	840	mg/kg	4.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000095
				PAHs	Benzo[a]pyrene	2.2	mg/kg	1.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	7.8E-09	7.5E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.35	mg/kg	1.7E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.2E-09	1.2E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.047	mg/kg	2.3E-11	mg/kg-day	1.7E+01	(mg/kg-day)	3.9E-10	1.6E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000054
					Heptachlor	0.0047	mg/kg	2.3E-12	mg/kg-day	4.5E+00	(mg/kg-day)	1.0E-11	1.6E-10	mg/kg-day	5.0E-04	mg/kg-day	0.00000033
					Heptachlor epoxide	0.011	mg/kg	5.2E-12	mg/kg-day	9.1E+00	(mg/kg-day)	4.8E-11	3.7E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000028
				PCBs	PCBs (total Aroclors)	8.6	mg/kg	4.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)	8.5E-09	3.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.015
				Volatiles	Trichloroethene	0.0012	mg/kg	5.9E-13	mg/kg-day	4.6E-02	(mg/kg-day)	2.7E-14	4.1E-11	mg/kg-day	5.0E-04	mg/kg-day	0.000000082
			Exp. Route Total									2.8E-08					0.034
			Dermal	Metals	Aluminum	15000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	1.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	20	mg/kg	3.0E-09	mg/kg-day	1.5E+00	(mg/kg-day)	4.5E-09	2.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0007
					Cadmium	6.6	mg/kg	3.4E-11	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000094
					Chromium (VI)	3.8	mg/kg	NA	mg/kg-day	2.0E+01	(mg/kg-day)	NA	NA	mg/kg-day	7.5E-05	mg/kg-day	NA
					Cobalt	14	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	160	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	37000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1200	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	70	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	43	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	39	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	840	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	2.2	mg/kg	1.5E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-08	1.0E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.35	mg/kg	2.3E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.7E-09	1.6E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.047	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.0047	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.011	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	8.6	mg/kg	6.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.2E-08	4.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.022
				Volatiles	Trichloroethene	0.0012	mg/kg	NA	mg/kg-day	4.6E-02	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
			Exp. Route Total									2.9E-08					0.022
		Exposure Point Total										5.7E-08					0.056
	Exposure Medium Total											5.7E-08					0.056
Sediment Total												5.7E-08					0.056

TABLE 7.94 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Ambient Air	Ambient Air in MBC	Inhalation	Metals	Mercury Average	0.026	ug/m3	3.3E-09	mg/m3	NA	(mg/kg-day)	NA	2.3E-07	mg/m3	3.0E-04	mg/m3	0.00076
			Exp. Route Total									NA					0.00076
		Exposure Point Total										NA					0.00076
	Exposure Medium Total											NA					0.00076
Surface Water Total												NA					0.00076
Total Receptor												6E-08					0.06

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose

TABLE 7.95 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Ingestion	Metals	Antimony	1.8	mg/kg	3.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000047
					Arsenic	12	mg/kg	1.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.0E-08	7.6E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00025
					Cadmium	2.1	mg/kg	3.7E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000021
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	2.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00039
					Copper	120	mg/kg	2.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000031
					Iron	31000	mg/kg	5.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00046
					Manganese	380	mg/kg	6.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-06	mg/kg-day	1.4E-01	mg/kg-day	0.000028
					Mercury	13	mg/kg	2.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00044
					Nickel	39	mg/kg	6.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-07	mg/kg-day	2.0E-02	mg/kg-day	0.00002
					Thallium	3.4	mg/kg	6.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0035
					Zinc	330	mg/kg	5.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000011
				PAHs	Benz[a]anthracene	1.4	mg/kg	2.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-09	1.4E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	2.5E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.8E-08	1.5E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	3.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.6E-09	2.0E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	9.7E-10	mg/kg-day	7.3E+00	(mg/kg-day)	7.1E-09	5.7E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	1.7E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-09	9.7E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	1.8E-11	mg/kg-day	1.7E+01	(mg/kg-day)	3.0E-10	1.0E-10	mg/kg-day	3.0E-05	mg/kg-day	0.0000034
					Heptachlor epoxide	0.0071	mg/kg	1.3E-11	mg/kg-day	9.1E+00	(mg/kg-day)	1.1E-10	7.3E-11	mg/kg-day	1.3E-05	mg/kg-day	0.0000056
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	1.4E-09	mg/kg-day	2.0E+00	(mg/kg-day)	2.9E-09	8.4E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00042
			Exp. Route Total									5.4E-08					0.0056
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	12	mg/kg	4.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	7.0E-08	2.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0009
					Cadmium	2.1	mg/kg	2.6E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000061
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	120	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	31000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	39	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.4	mg/kg	2.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.6E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	2.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.7E-07	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	3.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.4E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	9.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.6E-08	5.2E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	9.0E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0071	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	1.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.9E-08	8.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0042
			Exp. Route Total									3.9E-07					0.0052
		Exposure Point Total										4.4E-07					0.011
	Exposure Medium Total											4.4E-07					0.011
Sediment Total												4.4E-07					0.011

TABLE 7.95 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in BCC	Ingestion	Metals	Antimony	0.47	mg/kg	2.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	4.0E-04	mg/kg-day	0.003
					Copper	1.2	mg/kg	5.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000077
		White Perch Fillet in BCC (continued)	Ingestion (continued)	Metals (continued)	Iron	13	mg/kg	5.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-05	mg/kg-day	7.0E-01	mg/kg-day	0.000047
					Manganese	0.69	mg/kg	3.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-06	mg/kg-day	1.4E-01	mg/kg-day	0.000013
					Mercury (inorganic)	0.12	mg/kg	5.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0011
					Selenium	0.95	mg/kg	4.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00049
				Organometals	Methyl mercury	0.39	mg/kg	1.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	9.9E-07	mg/kg-day	1.0E-04	mg/kg-day	0.0099
				PCBs	PCBs (total Aroclors)	1.2	mg/kg	3.6E-07	mg/kg-day	2.0E+00	(mg/kg-day)	7.2E-07	2.1E-06	mg/kg-day	2.0E-05	mg/kg-day	0.11
			Exp. Route Total									7.2E-07					0.12
		Exposure Point Total										7.2E-07					0.12
	Exposure Medium Total											7.2E-07					0.12
	Surface Water Total	Surface Water Total in BCC	Dermal	Metals	Arsenic	3.3	ug/l	5.5E-10	mg/kg-day	1.5E+00	(mg/kg-day)	8.3E-10	3.2E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000011
					Thallium	0.48	ug/l	8.1E-11	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000047
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									8.3E-10					0.000058
		Exposure Point Total										8.3E-10					0.000058
	Exposure Medium Total											8.3E-10					0.000058
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	2.5E-08	mg/m3	NA	(mg/kg-day)	NA	1.5E-07	mg/m3	3.0E-04	mg/m3	0.00049
			Exp. Route Total									NA					0.00049
		Exposure Point Total										NA					0.00049
	Exposure Medium Total											NA					0.00049
Surface Water Total												7.2E-07					0.12
Total Receptor												1E-06					0.1

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.96 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Ingestion	Metals	Antimony	1.8	mg/kg	3.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000047
					Arsenic	12	mg/kg	1.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.0E-08	7.6E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00025
					Cadmium	2.1	mg/kg	3.7E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000021
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	2.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00039
					Copper	120	mg/kg	2.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000031
					Iron	31000	mg/kg	5.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00046
					Manganese	380	mg/kg	6.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-06	mg/kg-day	1.4E-01	mg/kg-day	0.000028
					Mercury	13	mg/kg	2.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00044
					Nickel	39	mg/kg	6.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-07	mg/kg-day	2.0E-02	mg/kg-day	0.00002
					Thallium	3.4	mg/kg	6.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0035
					Zinc	330	mg/kg	5.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000011
				PAHs	Benz[a]anthracene	1.4	mg/kg	2.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-09	1.4E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	2.5E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.8E-08	1.5E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	3.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.6E-09	2.0E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	9.7E-10	mg/kg-day	7.3E+00	(mg/kg-day)	7.1E-09	5.7E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	1.7E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-09	9.7E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	1.8E-11	mg/kg-day	1.7E+01	(mg/kg-day)	3.0E-10	1.0E-10	mg/kg-day	3.0E-05	mg/kg-day	0.0000034
					Heptachlor epoxide	0.0071	mg/kg	1.3E-11	mg/kg-day	9.1E+00	(mg/kg-day)	1.1E-10	7.3E-11	mg/kg-day	1.3E-05	mg/kg-day	0.0000056
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	1.4E-09	mg/kg-day	2.0E+00	(mg/kg-day)	2.9E-09	8.4E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00042
			Exp. Route Total									5.4E-08					0.0056
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	12	mg/kg	4.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	7.0E-08	2.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0009
					Cadmium	2.1	mg/kg	2.6E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000061
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	120	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	31000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	39	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.4	mg/kg	2.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.6E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	2.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.7E-07	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	3.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.4E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	9.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.6E-08	5.2E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	9.0E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0071	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	1.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.9E-08	8.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0042
			Exp. Route Total									3.9E-07					0.0052
		Exposure Point Total										4.4E-07					0.011
	Exposure Medium Total											4.4E-07					0.011
Sediment Total												4.4E-07					0.011

TABLE 7.96 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in BCC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	6.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0009
		Blue Crab Muscle in BCC (continued)	Ingestion (continued)	Metals (continued)	Iron	18	mg/kg	7.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.5E-05	mg/kg-day	7.0E-01	mg/kg-day	0.000065
					Manganese	13	mg/kg	5.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00024
					Mercury (inorganic)	0.052	mg/kg	2.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00045
					Selenium	0.91	mg/kg	4.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00047
				Organometals	Methyl mercury	0.26	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.6E-07	mg/kg-day	1.0E-04	mg/kg-day	0.0066
				PCBs	PCBs (total Aroclors)	0.011	mg/kg	4.0E-09	mg/kg-day	2.0E+00	(mg/kg-day)	8.1E-09	2.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0012
			Exp. Route Total									8.1E-09					0.0099
		Exposure Point Total										8.1E-09					0.0099
	Exposure Medium Total											8.1E-09					0.0099
	Surface Water Total	Surface Water Total in BCC	Dermal	Metals	Arsenic	3.3	ug/l	5.5E-10	mg/kg-day	1.5E+00	(mg/kg-day)	8.3E-10	3.2E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000011
					Thallium	0.48	ug/l	8.1E-11	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000047
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									8.3E-10					0.000058
		Exposure Point Total										8.3E-10					0.000058
	Exposure Medium Total											8.3E-10					0.000058
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	2.5E-08	mg/m3	NA	(mg/kg-day)	NA	1.5E-07	mg/m3	3.0E-04	mg/m3	0.00049
			Exp. Route Total									NA					0.00049
		Exposure Point Total										NA					0.00049
	Exposure Medium Total											NA					0.00049
Surface Water Total												8.9E-09					0.01
Total Receptor												4E-07					0.02

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.97 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Ingestion	Metals	Antimony	1.8	mg/kg	3.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000047
					Arsenic	12	mg/kg	1.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.0E-08	7.6E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00025
					Cadmium	2.1	mg/kg	3.7E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000021
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	2.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00039
					Copper	120	mg/kg	2.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000031
					Iron	31000	mg/kg	5.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00046
					Manganese	380	mg/kg	6.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-06	mg/kg-day	1.4E-01	mg/kg-day	0.000028
					Mercury	13	mg/kg	2.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00044
					Nickel	39	mg/kg	6.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-07	mg/kg-day	2.0E-02	mg/kg-day	0.00002
					Thallium	3.4	mg/kg	6.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0035
					Zinc	330	mg/kg	5.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000011
				PAHs	Benz[a]anthracene	1.4	mg/kg	2.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-09	1.4E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	2.5E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.8E-08	1.5E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	3.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.6E-09	2.0E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	9.7E-10	mg/kg-day	7.3E+00	(mg/kg-day)	7.1E-09	5.7E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	1.7E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-09	9.7E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	1.8E-11	mg/kg-day	1.7E+01	(mg/kg-day)	3.0E-10	1.0E-10	mg/kg-day	3.0E-05	mg/kg-day	0.0000034
					Heptachlor epoxide	0.0071	mg/kg	1.3E-11	mg/kg-day	9.1E+00	(mg/kg-day)	1.1E-10	7.3E-11	mg/kg-day	1.3E-05	mg/kg-day	0.0000056
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	1.4E-09	mg/kg-day	2.0E+00	(mg/kg-day)	2.9E-09	8.4E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00042
			Exp. Route Total									5.4E-08					0.0056
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	12	mg/kg	4.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	7.0E-08	2.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0009
					Cadmium	2.1	mg/kg	2.6E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000061
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	120	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	31000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	39	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.4	mg/kg	2.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.6E-08	1.3E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.4	mg/kg	2.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.7E-07	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	2	mg/kg	3.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.4E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.55	mg/kg	9.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	6.6E-08	5.2E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.95	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	9.0E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.01	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0071	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.82	mg/kg	1.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.9E-08	8.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0042
			Exp. Route Total									3.9E-07					0.0052
		Exposure Point Total										4.4E-07					0.011
	Exposure Medium Total											4.4E-07					0.011
Sediment Total												4.4E-07					0.011

TABLE 7.97 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in BCC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	14	mg/kg	6.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0009
		Blue Crab Muscle & Hepatopancreas in BCC (continued)	Ingestion (continued)	Metals (continued)	Iron	18	mg/kg	7.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.5E-05	mg/kg-day	7.0E-01	mg/kg-day	0.000065
					Manganese	13	mg/kg	5.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00024
					Mercury (inorganic)	0.093	mg/kg	4.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0008
					Selenium	0.91	mg/kg	4.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00047
				Organometals	Methyl mercury	0.23	mg/kg	1.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.0E-07	mg/kg-day	1.0E-04	mg/kg-day	0.006
				PCBs	PCBs (total Aroclors)	0.15	mg/kg	5.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	1.1E-07	3.2E-07	mg/kg-day	2.0E-05	mg/kg-day	0.016
			Exp. Route Total									1.1E-07					0.024
		Exposure Point Total										1.1E-07					0.024
	Exposure Medium Total											1.1E-07					0.024
	Surface Water Total	Surface Water Total in BCC	Dermal	Metals	Arsenic	3.3	ug/l	5.5E-10	mg/kg-day	1.5E+00	(mg/kg-day)	8.3E-10	3.2E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000011
					Thallium	0.48	ug/l	8.1E-11	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000047
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									8.3E-10					0.000058
		Exposure Point Total										8.3E-10					0.000058
	Exposure Medium Total											8.3E-10					0.000058
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	2.5E-08	mg/m3	NA	(mg/kg-day)	NA	1.5E-07	mg/m3	3.0E-04	mg/m3	0.00049
			Exp. Route Total									NA					0.00049
		Exposure Point Total										NA					0.00049
	Exposure Medium Total											NA					0.00049
Surface Water Total												1.1E-07					0.025
Total Receptor												5E-07					0.04

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.98 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in BCC	Ingestion	Metals	Antimony	4.3	mg/kg	4.5E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000066
					Arsenic	17	mg/kg	1.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.6E-08	6.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0002
					Cadmium	1.9	mg/kg	2.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000012
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	9.9	mg/kg	1.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0002
					Copper	110	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-07	mg/kg-day	4.0E-02	mg/kg-day	0.000016
					Iron	27000	mg/kg	2.9E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00024
					Manganese	380	mg/kg	4.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-06	mg/kg-day	1.4E-01	mg/kg-day	0.000017
					Mercury	8.4	mg/kg	8.9E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00017
					Nickel	37	mg/kg	3.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000011
					Thallium	3.4	mg/kg	3.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0021
					Zinc	310	mg/kg	3.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-06	mg/kg-day	3.0E-01	mg/kg-day	0.0000063
				PAHs	Benz[a]anthracene	1	mg/kg	1.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.8E-10	6.3E-09	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.81	mg/kg	8.6E-10	mg/kg-day	7.3E+00	(mg/kg-day)	6.3E-09	5.0E-09	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.1	mg/kg	1.2E-09	mg/kg-day	7.3E-01	(mg/kg-day)	8.8E-10	7.0E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.27	mg/kg	2.8E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-09	1.7E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	5.5E-10	mg/kg-day	7.3E-01	(mg/kg-day)	4.0E-10	3.2E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0063	mg/kg	6.7E-12	mg/kg-day	1.7E+01	(mg/kg-day)	1.1E-10	3.9E-11	mg/kg-day	3.0E-05	mg/kg-day	0.0000013
					Heptachlor epoxide	0.0051	mg/kg	5.4E-12	mg/kg-day	9.1E+00	(mg/kg-day)	4.9E-11	3.1E-11	mg/kg-day	1.3E-05	mg/kg-day	0.0000024
				PCBs	PCBs (total Aroclors)	0.59	mg/kg	6.3E-10	mg/kg-day	2.0E+00	(mg/kg-day)	1.3E-09	3.7E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00018
			Exp. Route Total									2.8E-08					0.0032
			Dermal	Metals	Antimony	4.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	17	mg/kg	3.8E-08	mg/kg-day	1.5E+00	(mg/kg-day)	5.6E-08	2.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00073
					Cadmium	1.9	mg/kg	1.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	8.5E-10	mg/kg-day	2.5E-05	mg/kg-day	0.000034
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	9.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	27000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	8.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	37	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	310	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1	mg/kg	9.9E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.3E-09	5.8E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.81	mg/kg	8.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	5.8E-08	4.6E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.1	mg/kg	1.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	8.1E-09	6.5E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.27	mg/kg	2.6E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.9E-08	1.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	5.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	3.7E-09	3.0E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0063	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0051	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.59	mg/kg	6.3E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.3E-08	3.7E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0018
			Exp. Route Total									1.7E-07					0.0026
		Exposure Point Total										1.9E-07					0.0058
	Exposure Medium Total											1.9E-07					0.0058
Sediment Total												1.9E-07					0.0058

TABLE 7.98 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in BCC	Ingestion	Metals	Arsenic	3.3	ug/l	7.0E-10	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-09	4.1E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000014
					Thallium	0.48	ug/l	1.0E-10	mg/kg-day	NA	(mg/kg-day)	NA	6.0E-10	mg/kg-day	1.0E-05	mg/kg-day	0.00006
		Surface Water Total in BCC (continued)	Ingestion (continued)	PAHs	Benzo[a]pyrene	0.086	ug/l	1.8E-11	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-10	1.1E-10	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.22	ug/l	4.6E-11	mg/kg-day	7.3E+00	(mg/kg-day)	3.4E-10	2.7E-10	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.5E-09					0.000073
			Dermal	Metals	Arsenic	3.3	ug/l	2.9E-10	mg/kg-day	1.5E+00	(mg/kg-day)	4.4E-10	1.7E-09	mg/kg-day	3.0E-04	mg/kg-day	0.0000057
					Thallium	0.48	ug/l	4.3E-11	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000025
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									4.4E-10					0.000031
		Exposure Point Total										2.0E-09					0.0001
	Exposure Medium Total											2.0E-09					0.0001
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	8.6E-09	mg/m3	NA	(mg/kg-day)	NA	5.0E-08	mg/m3	3.0E-04	mg/m3	0.00017
			Exp. Route Total									NA					0.00017
		Exposure Point Total										NA					0.00017
	Exposure Medium Total											NA					0.00017
Surface Water Total												2.0E-09					0.00027
Total Receptor												2E-07					0.006

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.99 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in BCC	Ingestion	Metals	Antimony	4.3	mg/kg	9.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.6E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00014
					Arsenic	17	mg/kg	2.2E-08	mg/kg-day	1.5E+00	(mg/kg-day)	3.3E-08	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00043
					Cadmium	1.9	mg/kg	4.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000025
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	9.9	mg/kg	2.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00043
					Copper	110	mg/kg	2.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000034
					Iron	27000	mg/kg	6.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00051
					Manganese	380	mg/kg	8.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-06	mg/kg-day	1.4E-01	mg/kg-day	0.000036
					Mercury	8.4	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00037
					Nickel	37	mg/kg	8.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000024
					Thallium	3.4	mg/kg	7.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0044
					Zinc	310	mg/kg	6.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000013
				PAHs	Benz[a]anthracene	1	mg/kg	2.3E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-09	1.3E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.81	mg/kg	1.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-08	1.1E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.1	mg/kg	2.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.9E-09	1.5E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.27	mg/kg	6.0E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.4E-09	3.5E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	1.2E-09	mg/kg-day	7.3E-01	(mg/kg-day)	8.5E-10	6.8E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0063	mg/kg	1.4E-11	mg/kg-day	1.7E+01	(mg/kg-day)	2.4E-10	8.2E-11	mg/kg-day	3.0E-05	mg/kg-day	0.0000027
					Heptachlor epoxide	0.0051	mg/kg	1.1E-11	mg/kg-day	9.1E+00	(mg/kg-day)	1.0E-10	6.6E-11	mg/kg-day	1.3E-05	mg/kg-day	0.0000051
				PCBs	PCBs (total Aroclors)	0.59	mg/kg	1.3E-09	mg/kg-day	2.0E+00	(mg/kg-day)	2.6E-09	7.7E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00039
			Exp. Route Total									5.8E-08					0.0068
			Dermal	Metals	Antimony	4.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	17	mg/kg	7.9E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-07	4.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0015
					Cadmium	1.9	mg/kg	3.1E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000072
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	9.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	27000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	380	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	8.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	37	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	3.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	310	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1	mg/kg	2.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-08	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.81	mg/kg	1.7E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.2E-07	9.8E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.1	mg/kg	2.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-08	1.4E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.27	mg/kg	5.6E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.1E-08	3.2E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	1.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.9E-09	6.3E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0063	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0051	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.59	mg/kg	1.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.6E-08	7.7E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0039
			Exp. Route Total									3.5E-07					0.0055
		Exposure Point Total										4.1E-07					0.012
	Exposure Medium Total											4.1E-07					0.012
Sediment Total												4.1E-07					0.012

TABLE 7.99 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in BCC	Ingestion	Metals	Arsenic	3.3	ug/l	1.5E-09	mg/kg-day	1.5E+00	(mg/kg-day)	2.2E-09	8.6E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000029
					Thallium	0.48	ug/l	2.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00013
		Surface Water Total in BCC (continued)	Ingestion (continued)	PAHs	Benzo[a]pyrene	0.086	ug/l	3.9E-11	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-10	2.3E-10	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.22	ug/l	9.8E-11	mg/kg-day	7.3E+00	(mg/kg-day)	7.2E-10	5.7E-10	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									3.2E-09					0.00015
			Dermal	Metals	Arsenic	3.3	ug/l	6.2E-10	mg/kg-day	1.5E+00	(mg/kg-day)	9.2E-10	3.6E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000012
					Thallium	0.48	ug/l	9.0E-11	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-10	mg/kg-day	1.0E-05	mg/kg-day	0.000053
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									9.2E-10					0.000065
		Exposure Point Total										4.1E-09					0.00022
	Exposure Medium Total											4.1E-09					0.00022
	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	1.8E-08	mg/m3	NA	(mg/kg-day)	NA	1.1E-07	mg/m3	3.0E-04	mg/m3	0.00035
			Exp. Route Total									NA					0.00035
		Exposure Point Total										NA					0.00035
	Exposure Medium Total											NA					0.00035
Surface Water Total												4.1E-09					0.00057
Total Receptor												4E-07					0.01

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.100 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in BCC	Ingestion	Metals	Aluminum	14000	mg/kg	7.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.0E-04	mg/kg-day	1.0E+00	mg/kg-day	0.0005
					Antimony	1.9	mg/kg	9.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00016
					Arsenic	23	mg/kg	6.6E-09	mg/kg-day	1.5E+00	(mg/kg-day)	9.9E-09	4.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0015
					Cadmium	11	mg/kg	5.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00036
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	6.5E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0015
					Copper	210	mg/kg	1.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.1E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00018
					Iron	38000	mg/kg	1.9E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0019
					Manganese	560	mg/kg	2.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00014
					Mercury	27	mg/kg	1.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	9.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
					Nickel	58	mg/kg	2.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-06	mg/kg-day	2.0E-02	mg/kg-day	0.000099
					Thallium	2.8	mg/kg	1.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	9.6E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0096
					Vanadium	48	mg/kg	2.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00033
					Zinc	710	mg/kg	3.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000081
				PAHs	Benzo[a]pyrene	1.2	mg/kg	6.1E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.5E-09	4.3E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.21	mg/kg	1.0E-10	mg/kg-day	7.3E+00	(mg/kg-day)	7.6E-10	7.3E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	1.3E-11	mg/kg-day	1.7E+01	(mg/kg-day)	2.2E-10	9.1E-10	mg/kg-day	3.0E-05	mg/kg-day	0.00003
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.02	mg/kg	1.0E-11	mg/kg-day	9.1E+00	(mg/kg-day)	9.1E-11	7.0E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000054
				PCBs	PCBs (total Aroclors)	2.5	mg/kg	1.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)	2.4E-09	8.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0042
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.8E-08					0.024
			Dermal	Metals	Aluminum	14000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	23	mg/kg	3.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)	5.2E-09	2.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0008
					Cadmium	11	mg/kg	5.4E-11	mg/kg-day	NA	(mg/kg-day)	NA	3.8E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00015
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	210	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	38000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	560	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	27	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	58	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	48	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	710	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	1.2	mg/kg	8.3E-10	mg/kg-day	7.3E+00	(mg/kg-day)	6.0E-09	5.8E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.21	mg/kg	1.4E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.0E-09	9.8E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.027	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.02	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	2.5	mg/kg	1.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)	3.5E-09	1.2E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0061
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.6E-08					0.0071
		Exposure Point Total										3.4E-08					0.031
	Exposure Medium Total											3.4E-08					0.031
Sediment Total												3.4E-08					0.031

TABLE 7.100 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Ambient Air	Ambient Air in BCC	Inhalation	Metals	Mercury Average	0.025	ug/m3	3.2E-09	mg/m3	NA	(mg/kg-day)	NA	2.2E-07	mg/m3	3.0E-04	mg/m3	0.00074
			Exp. Route Total									NA					0.00074
		Exposure Point Total										NA					0.00074
	Exposure Medium Total											NA					0.00074
Surface Water Total												NA					0.00074
Total Receptor												3E-08					0.03

Notes:
BCC = Berry's Creek Canal
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.101 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Ingestion	Metals	Antimony	1.8	mg/kg	3.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000045
					Arsenic	15	mg/kg	1.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.4E-08	9.3E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00031
					Cadmium	1.8	mg/kg	3.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	2.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00046
					Copper	110	mg/kg	2.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000029
					Iron	36000	mg/kg	6.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00052
					Manganese	510	mg/kg	9.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-06	mg/kg-day	1.4E-01	mg/kg-day	0.000037
					Mercury	4.6	mg/kg	8.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00016
					Nickel	45	mg/kg	7.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000023
					Thallium	1.7	mg/kg	3.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0017
					Zinc	290	mg/kg	5.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-06	mg/kg-day	3.0E-01	mg/kg-day	0.0000099
				PAHs	Benz[a]anthracene	0.6	mg/kg	1.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.7E-10	6.2E-09	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	1.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	9.0E-09	7.2E-09	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	1.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-09	9.3E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	2.9E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-09	1.7E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	9.1E-10	mg/kg-day	7.3E-01	(mg/kg-day)	6.6E-10	5.3E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	7.1E-12	mg/kg-day	1.7E+01	(mg/kg-day)	1.2E-10	4.1E-11	mg/kg-day	3.0E-05	mg/kg-day	0.0000014
					Heptachlor epoxide	0.0016	mg/kg	2.8E-12	mg/kg-day	9.1E+00	(mg/kg-day)	2.6E-11	1.7E-11	mg/kg-day	1.3E-05	mg/kg-day	0.0000013
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	7.5E-10	mg/kg-day	2.0E+00	(mg/kg-day)	1.5E-09	4.4E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00022
			Exp. Route Total									3.9E-08					0.0036
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	5.7E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.5E-08	3.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0011
					Cadmium	1.8	mg/kg	2.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000053
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	510	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	4.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	45	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.6	mg/kg	9.8E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.2E-09	5.7E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	1.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.3E-08	6.6E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	8.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	2.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.0E-08	1.6E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	8.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	6.2E-09	4.9E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	7.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.5E-08	4.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0022
			Exp. Route Total									2.3E-07					0.0033
		Exposure Point Total										2.7E-07					0.0069
	Exposure Medium Total											2.7E-07					0.0069
Sediment Total												2.7E-07					0.0069

TABLE 7.101 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in LBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	1.1	mg/kg	4.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000071
		White Perch Fillet in LBC (continued)	Ingestion (continued)	Metals (continued)	Iron	9	mg/kg	4.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-05	mg/kg-day	7.0E-01	mg/kg-day	0.000033
					Manganese	0.59	mg/kg	2.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-06	mg/kg-day	1.4E-01	mg/kg-day	0.000011
					Mercury (inorganic)	0.14	mg/kg	6.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0012
					Selenium	0.75	mg/kg	3.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00038
				Organometals	Methyl mercury	0.34	mg/kg	1.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.8E-07	mg/kg-day	1.0E-04	mg/kg-day	0.0088
				PCBs	PCBs (total Aroclors)	0.64	mg/kg	2.0E-07	mg/kg-day	2.0E+00	(mg/kg-day)	4.0E-07	1.2E-06	mg/kg-day	2.0E-05	mg/kg-day	0.058
			Exp. Route Total									4.0E-07					0.068
		Exposure Point Total										4.0E-07					0.068
	Exposure Medium Total											4.0E-07					0.068
	Surface Water Total	Surface Water Total in LBC	Dermal	Metals	Arsenic	3.6	ug/l	6.1E-10	mg/kg-day	1.5E+00	(mg/kg-day)	9.2E-10	3.6E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000012
					Thallium	5.5	ug/l	9.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00054
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									9.2E-10					0.00055
		Exposure Point Total										9.2E-10					0.00055
	Exposure Medium Total											9.2E-10					0.00055
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	3.5E-07	mg/m3	NA	(mg/kg-day)	NA	2.0E-06	mg/m3	3.0E-04	mg/m3	0.0068
			Exp. Route Total									NA					0.0068
		Exposure Point Total										NA					0.0068
	Exposure Medium Total											NA					0.0068
Surface Water Total												4.0E-07					0.076
Total Receptor												7E-07					0.08

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.102 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Ingestion	Metals	Antimony	1.8	mg/kg	3.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000045
					Arsenic	15	mg/kg	1.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.4E-08	9.3E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00031
					Cadmium	1.8	mg/kg	3.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	2.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00046
					Copper	110	mg/kg	2.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000029
					Iron	36000	mg/kg	6.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00052
					Manganese	510	mg/kg	9.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-06	mg/kg-day	1.4E-01	mg/kg-day	0.000037
					Mercury	4.6	mg/kg	8.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00016
					Nickel	45	mg/kg	7.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000023
					Thallium	1.7	mg/kg	3.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0017
					Zinc	290	mg/kg	5.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-06	mg/kg-day	3.0E-01	mg/kg-day	0.0000099
				PAHs	Benz[a]anthracene	0.6	mg/kg	1.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.7E-10	6.2E-09	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	1.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	9.0E-09	7.2E-09	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	1.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-09	9.3E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	2.9E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-09	1.7E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	9.1E-10	mg/kg-day	7.3E-01	(mg/kg-day)	6.6E-10	5.3E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	7.1E-12	mg/kg-day	1.7E+01	(mg/kg-day)	1.2E-10	4.1E-11	mg/kg-day	3.0E-05	mg/kg-day	0.0000014
					Heptachlor epoxide	0.0016	mg/kg	2.8E-12	mg/kg-day	9.1E+00	(mg/kg-day)	2.6E-11	1.7E-11	mg/kg-day	1.3E-05	mg/kg-day	0.0000013
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	7.5E-10	mg/kg-day	2.0E+00	(mg/kg-day)	1.5E-09	4.4E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00022
			Exp. Route Total									3.9E-08					0.0036
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	5.7E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.5E-08	3.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0011
					Cadmium	1.8	mg/kg	2.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000053
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	510	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	4.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	45	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.6	mg/kg	9.8E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.2E-09	5.7E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	1.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.3E-08	6.6E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	8.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	2.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.0E-08	1.6E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	8.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	6.2E-09	4.9E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	7.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.5E-08	4.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0022
			Exp. Route Total									2.3E-07					0.0033
		Exposure Point Total										2.7E-07					0.0069
	Exposure Medium Total											2.7E-07					0.0069
Sediment Total												2.7E-07					0.0069

TABLE 7.102 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in LBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	20	mg/kg	8.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0013
		Blue Crab Muscle in LBC (continued)	Ingestion (continued)	Metals (continued)	Iron	260	mg/kg	1.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00094
					Manganese	6	mg/kg	2.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00011
					Mercury (inorganic)	0.079	mg/kg	3.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00068
					Selenium	1.5	mg/kg	6.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00077
				Organometals	Methyl mercury	0.24	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.3E-07	mg/kg-day	1.0E-04	mg/kg-day	0.0063
				PCBs	PCBs (total Aroclors)	0.019	mg/kg	6.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.4E-08	4.0E-08	mg/kg-day	2.0E-05	mg/kg-day	0.002
			Exp. Route Total									1.4E-08					0.012
		Exposure Point Total										1.4E-08					0.012
	Exposure Medium Total											1.4E-08					0.012
	Surface Water Total	Surface Water Total in LBC	Dermal	Metals	Arsenic	3.6	ug/l	6.1E-10	mg/kg-day	1.5E+00	(mg/kg-day)	9.2E-10	3.6E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000012
					Thallium	5.5	ug/l	9.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00054
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									9.2E-10					0.00055
		Exposure Point Total										9.2E-10					0.00055
	Exposure Medium Total											9.2E-10					0.00055
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	3.5E-07	mg/m3	NA	(mg/kg-day)	NA	2.0E-06	mg/m3	3.0E-04	mg/m3	0.0068
			Exp. Route Total									NA					0.0068
		Exposure Point Total										NA					0.0068
	Exposure Medium Total											NA					0.0068
Surface Water Total												1.5E-08					0.019
Total Receptor												3E-07					0.03

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.103 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Ingestion	Metals	Antimony	1.8	mg/kg	3.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000045
					Arsenic	15	mg/kg	1.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.4E-08	9.3E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00031
					Cadmium	1.8	mg/kg	3.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	2.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00046
					Copper	110	mg/kg	2.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000029
					Iron	36000	mg/kg	6.3E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00052
					Manganese	510	mg/kg	9.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-06	mg/kg-day	1.4E-01	mg/kg-day	0.000037
					Mercury	4.6	mg/kg	8.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00016
					Nickel	45	mg/kg	7.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000023
					Thallium	1.7	mg/kg	3.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0017
					Zinc	290	mg/kg	5.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-06	mg/kg-day	3.0E-01	mg/kg-day	0.0000099
				PAHs	Benz[a]anthracene	0.6	mg/kg	1.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.7E-10	6.2E-09	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	1.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	9.0E-09	7.2E-09	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	1.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-09	9.3E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	2.9E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-09	1.7E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	9.1E-10	mg/kg-day	7.3E-01	(mg/kg-day)	6.6E-10	5.3E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	7.1E-12	mg/kg-day	1.7E+01	(mg/kg-day)	1.2E-10	4.1E-11	mg/kg-day	3.0E-05	mg/kg-day	0.0000014
					Heptachlor epoxide	0.0016	mg/kg	2.8E-12	mg/kg-day	9.1E+00	(mg/kg-day)	2.6E-11	1.7E-11	mg/kg-day	1.3E-05	mg/kg-day	0.0000013
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	7.5E-10	mg/kg-day	2.0E+00	(mg/kg-day)	1.5E-09	4.4E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00022
			Exp. Route Total									3.9E-08					0.0036
			Dermal	Metals	Antimony	1.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	5.7E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.5E-08	3.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0011
					Cadmium	1.8	mg/kg	2.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000053
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	510	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	4.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	45	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.6	mg/kg	9.8E-09	mg/kg-day	7.3E-01	(mg/kg-day)	7.2E-09	5.7E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.7	mg/kg	1.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.3E-08	6.6E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.9	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	8.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.17	mg/kg	2.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.0E-08	1.6E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.52	mg/kg	8.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	6.2E-09	4.9E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.004	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.0016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.42	mg/kg	7.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.5E-08	4.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0022
			Exp. Route Total									2.3E-07					0.0033
		Exposure Point Total										2.7E-07					0.0069
	Exposure Medium Total											2.7E-07					0.0069
Sediment Total												2.7E-07					0.0069

TABLE 7.103 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in LBC	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	20	mg/kg	8.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.1E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0013
			Ingestion (continued)	Metals (continued)	Iron	260	mg/kg	1.1E-04	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00094
					Manganese	6	mg/kg	2.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00011
					Mercury (inorganic)	0.022	mg/kg	9.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.6E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00019
					Selenium	1.5	mg/kg	6.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00077
				Organometals	Methyl mercury	0.2	mg/kg	9.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-07	mg/kg-day	1.0E-04	mg/kg-day	0.0053
				PCBs	PCBs (total Aroclors)	0.33	mg/kg	1.2E-07	mg/kg-day	2.0E+00	(mg/kg-day)	2.3E-07	6.7E-07	mg/kg-day	2.0E-05	mg/kg-day	0.034
			Exp. Route Total									2.3E-07					0.042
		Exposure Point Total										2.3E-07					0.042
	Exposure Medium Total											2.3E-07					0.042
	Surface Water Total	Surface Water Total in LBC	Dermal	Metals	Arsenic	3.6	ug/l	6.1E-10	mg/kg-day	1.5E+00	(mg/kg-day)	9.2E-10	3.6E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000012
					Thallium	5.5	ug/l	9.2E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00054
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									9.2E-10					0.00055
		Exposure Point Total										9.2E-10					0.00055
	Exposure Medium Total											9.2E-10					0.00055
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	3.5E-07	mg/m3	NA	(mg/kg-day)	NA	2.0E-06	mg/m3	3.0E-04	mg/m3	0.0068
			Exp. Route Total									NA					0.0068
		Exposure Point Total										NA					0.0068
	Exposure Medium Total											NA					0.0068
Surface Water Total												2.3E-07					0.05
Total Receptor												5E-07					0.06

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.104 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in LBC	Ingestion	Metals	Antimony	2.5	mg/kg	2.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000039
					Arsenic	15	mg/kg	9.5E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.4E-08	5.5E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00018
					Cadmium	1.8	mg/kg	1.9E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	1.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00027
					Copper	110	mg/kg	1.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.9E-07	mg/kg-day	4.0E-02	mg/kg-day	0.000017
					Iron	36000	mg/kg	3.8E-05	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00031
					Manganese	490	mg/kg	5.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-06	mg/kg-day	1.4E-01	mg/kg-day	0.000022
					Mercury	6.7	mg/kg	7.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00014
					Nickel	42	mg/kg	4.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000013
					Thallium	1.6	mg/kg	1.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	9.6E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00096
					Zinc	290	mg/kg	3.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-06	mg/kg-day	3.0E-01	mg/kg-day	0.0000059
				PAHs	Benz[a]anthracene	0.61	mg/kg	6.4E-10	mg/kg-day	7.3E-01	(mg/kg-day)	4.7E-10	3.7E-09	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.66	mg/kg	7.0E-10	mg/kg-day	7.3E+00	(mg/kg-day)	5.1E-09	4.1E-09	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.86	mg/kg	9.1E-10	mg/kg-day	7.3E-01	(mg/kg-day)	6.7E-10	5.3E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.15	mg/kg	1.6E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.2E-09	9.4E-10	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.49	mg/kg	5.2E-10	mg/kg-day	7.3E-01	(mg/kg-day)	3.8E-10	3.0E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0038	mg/kg	4.1E-12	mg/kg-day	1.7E+01	(mg/kg-day)	6.9E-11	2.4E-11	mg/kg-day	3.0E-05	mg/kg-day	0.00000079
					Heptachlor epoxide	0.001	mg/kg	1.1E-12	mg/kg-day	9.1E+00	(mg/kg-day)	9.7E-12	6.2E-12	mg/kg-day	1.3E-05	mg/kg-day	0.00000048
				PCBs	PCBs (total Aroclors)	0.52	mg/kg	5.5E-10	mg/kg-day	2.0E+00	(mg/kg-day)	1.1E-09	3.2E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00016
			Exp. Route Total									2.3E-08					0.0021
			Dermal	Metals	Antimony	2.5	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	3.4E-08	mg/kg-day	1.5E+00	(mg/kg-day)	5.1E-08	2.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00066
					Cadmium	1.8	mg/kg	1.4E-10	mg/kg-day	NA	(mg/kg-day)	NA	8.0E-10	mg/kg-day	2.5E-05	mg/kg-day	0.000032
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	490	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	6.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	42	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.61	mg/kg	6.0E-09	mg/kg-day	7.3E-01	(mg/kg-day)	4.3E-09	3.5E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.66	mg/kg	6.5E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.8E-08	3.8E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.86	mg/kg	8.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)	6.2E-09	4.9E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.15	mg/kg	1.5E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-08	8.7E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.49	mg/kg	4.8E-09	mg/kg-day	7.3E-01	(mg/kg-day)	3.5E-09	2.8E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0038	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.001	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.52	mg/kg	5.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.1E-08	3.2E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0016
			Exp. Route Total									1.3E-07					0.0023
		Exposure Point Total										1.6E-07					0.0044
	Exposure Medium Total											1.6E-07					0.0044
Sediment Total												1.6E-07					0.0044

TABLE 7.104 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in LBC	Ingestion	Metals	Arsenic	3.6	ug/l	7.7E-10	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-09	4.5E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000015
					Thallium	5.5	ug/l	1.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	6.8E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00068
		Surface Water Total in LBC (continued)	Ingestion (continued)	PAHs	Benzo[a]pyrene	0.092	ug/l	1.9E-11	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-10	1.1E-10	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.13	ug/l	2.7E-11	mg/kg-day	7.3E+00	(mg/kg-day)	2.0E-10	1.6E-10	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.5E-09					0.00069
			Dermal	Metals	Arsenic	3.6	ug/l	3.2E-10	mg/kg-day	1.5E+00	(mg/kg-day)	4.8E-10	1.9E-09	mg/kg-day	3.0E-04	mg/kg-day	0.0000063
					Thallium	5.5	ug/l	4.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-09	mg/kg-day	1.0E-05	mg/kg-day	0.00028
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									4.8E-10					0.00029
		Exposure Point Total										2.0E-09					0.00098
	Exposure Medium Total											2.0E-09					0.00098
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	1.2E-07	mg/m3	NA	(mg/kg-day)	NA	7.0E-07	mg/m3	3.0E-04	mg/m3	0.0023
			Exp. Route Total									NA					0.0023
		Exposure Point Total										NA					0.0023
	Exposure Medium Total											NA					0.0023
Surface Water Total												2.0E-09					0.0033
Total Receptor												2E-07					0.008

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.105 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in LBC	Ingestion	Metals	Antimony	2.5	mg/kg	5.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000081
					Arsenic	15	mg/kg	2.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)	3.0E-08	1.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00039
					Cadmium	1.8	mg/kg	4.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000024
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	2.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00057
					Copper	110	mg/kg	2.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000036
					Iron	36000	mg/kg	8.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00066
					Manganese	490	mg/kg	1.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	6.4E-06	mg/kg-day	1.4E-01	mg/kg-day	0.000046
					Mercury	6.7	mg/kg	1.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	8.7E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00029
					Nickel	42	mg/kg	9.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000028
					Thallium	1.6	mg/kg	3.5E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-08	mg/kg-day	1.0E-05	mg/kg-day	0.002
					Zinc	290	mg/kg	6.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000012
				PAHs	Benz[a]anthracene	0.61	mg/kg	1.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	9.9E-10	7.9E-09	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.66	mg/kg	1.5E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-08	8.7E-09	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.86	mg/kg	1.9E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.4E-09	1.1E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.15	mg/kg	3.4E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.5E-09	2.0E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.49	mg/kg	1.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)	8.0E-10	6.4E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0038	mg/kg	8.6E-12	mg/kg-day	1.7E+01	(mg/kg-day)	1.5E-10	5.0E-11	mg/kg-day	3.0E-05	mg/kg-day	0.0000017
					Heptachlor epoxide	0.001	mg/kg	2.3E-12	mg/kg-day	9.1E+00	(mg/kg-day)	2.1E-11	1.3E-11	mg/kg-day	1.3E-05	mg/kg-day	0.000001
				PCBs	PCBs (total Aroclors)	0.52	mg/kg	1.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)	2.3E-09	6.7E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00034
			Exp. Route Total									4.9E-08					0.0045
			Dermal	Metals	Antimony	2.5	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	15	mg/kg	7.2E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-07	4.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Cadmium	1.8	mg/kg	2.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000067
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	36000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	490	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	6.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	42	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	290	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	0.61	mg/kg	1.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.2E-09	7.3E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	0.66	mg/kg	1.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.0E-07	8.0E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	0.86	mg/kg	1.8E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.3E-08	1.0E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.15	mg/kg	3.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.3E-08	1.8E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.49	mg/kg	1.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)	7.4E-09	5.9E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0038	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.001	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.52	mg/kg	1.2E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.3E-08	6.7E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0034
			Exp. Route Total									2.8E-07					0.0048
		Exposure Point Total										3.3E-07					0.0093
	Exposure Medium Total											3.3E-07					0.0093
Sediment Total												3.3E-07					0.0093

TABLE 7.105 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Surface Water Total	Surface Water Total in LBC	Ingestion	Metals	Arsenic	3.6	ug/l	1.6E-09	mg/kg-day	1.5E+00	(mg/kg-day)	2.4E-09	9.5E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000032
					Thallium	5.5	ug/l	2.5E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0014
		Surface Water Total in LBC (continued)	Ingestion (continued)	PAHs	Benzo[a]pyrene	0.092	ug/l	4.1E-11	mg/kg-day	7.3E+00	(mg/kg-day)	3.0E-10	2.4E-10	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.13	ug/l	5.8E-11	mg/kg-day	7.3E+00	(mg/kg-day)	4.2E-10	3.4E-10	mg/kg-day	NA	NA	NA
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									3.2E-09					0.0015
			Dermal	Metals	Arsenic	3.6	ug/l	6.8E-10	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-09	4.0E-09	mg/kg-day	3.0E-04	mg/kg-day	0.000013
					Thallium	5.5	ug/l	1.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	6.0E-09	mg/kg-day	1.0E-05	mg/kg-day	0.0006
				Volatiles	Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.0E-09					0.00061
		Exposure Point Total										4.2E-09					0.0021
	Exposure Medium Total											4.2E-09					0.0021
	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	2.5E-07	mg/m3	NA	(mg/kg-day)	NA	1.5E-06	mg/m3	3.0E-04	mg/m3	0.0049
			Exp. Route Total									NA					0.0049
		Exposure Point Total										NA					0.0049
	Exposure Medium Total											NA					0.0049
Surface Water Total												4.2E-09					0.007
Total Receptor												3E-07					0.02

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.106 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in LBC	Ingestion	Metals	Aluminum	14000	mg/kg	7.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00049
					Antimony	1.1	mg/kg	5.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000093
					Arsenic	24	mg/kg	7.0E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-08	4.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0016
					Cadmium	6.6	mg/kg	3.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00023
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	7.7E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0018
					Copper	150	mg/kg	7.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00013
					Iron	45000	mg/kg	2.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0022
					Manganese	640	mg/kg	3.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00016
					Mercury	12	mg/kg	5.9E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Nickel	56	mg/kg	2.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-06	mg/kg-day	2.0E-02	mg/kg-day	0.000096
					Thallium	2.3	mg/kg	1.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	7.9E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0079
					Vanadium	47	mg/kg	2.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00032
					Zinc	410	mg/kg	2.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000047
				PAHs	Benzo[a]pyrene	1.4	mg/kg	7.0E-10	mg/kg-day	7.3E+00	(mg/kg-day)	5.1E-09	4.9E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.16	mg/kg	7.6E-11	mg/kg-day	7.3E+00	(mg/kg-day)	5.5E-10	5.3E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0089	mg/kg	4.4E-12	mg/kg-day	1.7E+01	(mg/kg-day)	7.4E-11	3.1E-10	mg/kg-day	3.0E-05	mg/kg-day	0.00001
					Heptachlor	0.0011	mg/kg	5.5E-13	mg/kg-day	4.5E+00	(mg/kg-day)	2.5E-12	3.9E-11	mg/kg-day	5.0E-04	mg/kg-day	0.000000077
					Heptachlor epoxide	0.0015	mg/kg	7.5E-13	mg/kg-day	9.1E+00	(mg/kg-day)	6.8E-12	5.3E-11	mg/kg-day	1.3E-05	mg/kg-day	0.000004
				PCBs	PCBs (total Aroclors)	0.89	mg/kg	4.4E-10	mg/kg-day	2.0E+00	(mg/kg-day)	8.7E-10	3.1E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0015
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.7E-08					0.018
			Dermal	Metals	Aluminum	14000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	1.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	24	mg/kg	3.7E-09	mg/kg-day	1.5E+00	(mg/kg-day)	5.5E-09	2.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00085
					Cadmium	6.6	mg/kg	3.3E-11	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000094
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	150	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	45000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	640	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	12	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	56	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	47	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	410	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	1.4	mg/kg	9.5E-10	mg/kg-day	7.3E+00	(mg/kg-day)	6.9E-09	6.7E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.16	mg/kg	1.0E-10	mg/kg-day	7.3E+00	(mg/kg-day)	7.5E-10	7.2E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0089	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.0011	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.0015	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.89	mg/kg	6.4E-10	mg/kg-day	2.0E+00	(mg/kg-day)	1.3E-09	4.5E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0022
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.4E-08					0.0032
		Exposure Point Total										3.2E-08					0.021
	Exposure Medium Total											3.2E-08					0.021
Sediment Total												3.2E-08					0.021

TABLE 7.106 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Ambient Air	Ambient Air in LBC	Inhalation	Metals	Mercury Average	0.36	ug/m3	4.5E-08	mg/m3	NA	(mg/kg-day)	NA	3.1E-06	mg/m3	3.0E-04	mg/m3	0.01
			Exp. Route Total									NA					0.01
		Exposure Point Total										NA					0.01
	Exposure Medium Total											NA					0.01
Surface Water Total												NA					0.01
Total Receptor												3E-08					0.03

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.107 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Nevertouch Marsh	Ingestion	Metals	Aluminum	17000	mg/kg	8.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00059
					Antimony	4.1	mg/kg	2.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00035
					Arsenic	67	mg/kg	2.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)	3.0E-08	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0046
					Cadmium	31	mg/kg	1.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	1.0E-03	mg/kg-day	0.0011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	29	mg/kg	1.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0033
					Copper	550	mg/kg	2.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00047
					Iron	28000	mg/kg	1.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	9.5E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0014
					Manganese	3300	mg/kg	1.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0008
					Mercury	180	mg/kg	8.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
					Nickel	200	mg/kg	1.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	7.0E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00035
					Thallium	4	mg/kg	2.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-07	mg/kg-day	1.0E-05	mg/kg-day	0.014
					Vanadium	93	mg/kg	4.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00064
					Zinc	17000	mg/kg	8.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-04	mg/kg-day	3.0E-01	mg/kg-day	0.0019
				PAHs	Benzo[a]pyrene	0.14	mg/kg	7.1E-11	mg/kg-day	7.3E+00	(mg/kg-day)	5.2E-10	4.9E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.022	mg/kg	1.1E-11	mg/kg-day	7.3E+00	(mg/kg-day)	7.9E-11	7.5E-10	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.26	mg/kg	1.3E-10	mg/kg-day	1.7E+01	(mg/kg-day)	2.1E-09	8.8E-09	mg/kg-day	3.0E-05	mg/kg-day	0.00029
					Heptachlor	0.21	mg/kg	1.0E-10	mg/kg-day	4.5E+00	(mg/kg-day)	4.7E-10	7.3E-09	mg/kg-day	5.0E-04	mg/kg-day	0.000015
					Heptachlor epoxide	0.29	mg/kg	1.4E-10	mg/kg-day	9.1E+00	(mg/kg-day)	1.3E-09	9.9E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00076
				PCBs	PCBs (total Aroclors)	11	mg/kg	5.3E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.1E-08	3.7E-07	mg/kg-day	2.0E-05	mg/kg-day	0.019
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									4.5E-08					0.069
			Dermal	Metals	Aluminum	17000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	4.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	67	mg/kg	1.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.5E-08	7.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0024
					Cadmium	31	mg/kg	1.6E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-08	mg/kg-day	2.5E-05	mg/kg-day	0.00044
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	29	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	550	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	28000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	3300	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	180	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	200	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	93	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	17000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.14	mg/kg	9.6E-11	mg/kg-day	7.3E+00	(mg/kg-day)	7.0E-10	6.7E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.022	mg/kg	1.5E-11	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-10	1.0E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.26	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.21	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.29	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	11	mg/kg	7.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)	1.6E-08	5.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.027
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									3.2E-08					0.03
		Exposure Point Total										7.6E-08					0.099
	Exposure Medium Total											7.6E-08					0.099
Sediment Total												7.6E-08					0.099
Total Receptor												8E-08					0.1

TABLE 7.107 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.108 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Eight Day Swamp	Ingestion	Metals	Aluminum	13000	mg/kg	6.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00044
					Antimony	2.7	mg/kg	1.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	9.1E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00023
					Arsenic	41	mg/kg	1.2E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.8E-08	8.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0028
					Cadmium	16	mg/kg	7.7E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.4E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00054
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	1.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0027
					Copper	580	mg/kg	2.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-05	mg/kg-day	4.0E-02	mg/kg-day	0.00049
					Iron	21000	mg/kg	1.0E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.2E-04	mg/kg-day	7.0E-01	mg/kg-day	0.001
					Manganese	2700	mg/kg	1.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	9.3E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00066
					Mercury	57	mg/kg	2.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0065
					Nickel	180	mg/kg	8.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.2E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00031
					Thallium	5.9	mg/kg	2.9E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.02
					Vanadium	75	mg/kg	3.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.6E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00051
					Zinc	1400	mg/kg	6.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00016
				PAHs	Benzo[a]pyrene	0.18	mg/kg	8.8E-11	mg/kg-day	7.3E+00	(mg/kg-day)	6.4E-10	6.2E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.03	mg/kg	1.5E-11	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-10	1.0E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.02	mg/kg	9.9E-12	mg/kg-day	1.7E+01	(mg/kg-day)	1.7E-10	7.0E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000023
					Heptachlor	0.012	mg/kg	5.7E-12	mg/kg-day	4.5E+00	(mg/kg-day)	2.6E-11	4.0E-10	mg/kg-day	5.0E-04	mg/kg-day	0.0000008
					Heptachlor epoxide	0.016	mg/kg	7.8E-12	mg/kg-day	9.1E+00	(mg/kg-day)	7.1E-11	5.4E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000042
				PCBs	PCBs (total Aroclors)	5.1	mg/kg	2.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)	5.0E-09	1.7E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0087
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									2.4E-08					0.045
			Dermal	Metals	Aluminum	13000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	2.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	41	mg/kg	6.2E-09	mg/kg-day	1.5E+00	(mg/kg-day)	9.3E-09	4.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0015
					Cadmium	16	mg/kg	8.0E-11	mg/kg-day	NA	(mg/kg-day)	NA	5.6E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00022
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	580	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	21000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	57	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	180	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	5.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	75	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	1400	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.18	mg/kg	1.2E-10	mg/kg-day	7.3E+00	(mg/kg-day)	8.7E-10	8.3E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.03	mg/kg	2.0E-11	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-10	1.4E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.02	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.012	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.016	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	5.1	mg/kg	3.6E-09	mg/kg-day	2.0E+00	(mg/kg-day)	7.2E-09	2.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.013
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.8E-08					0.014
		Exposure Point Total										4.1E-08					0.06
	Exposure Medium Total											4.1E-08					0.06
Sediment Total												4.1E-08					0.06
Total Receptor												4E-08					0.06

TABLE 7.108 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.109 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Paterson Plank Marsh	Ingestion	Metals	Aluminum	11000	mg/kg	5.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00037
					Antimony	3.2	mg/kg	1.5E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00027
					Arsenic	40	mg/kg	1.2E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.7E-08	8.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0027
					Cadmium	8.8	mg/kg	4.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-07	mg/kg-day	1.0E-03	mg/kg-day	0.0003
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	39	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0044
					Copper	230	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	8.0E-06	mg/kg-day	4.0E-02	mg/kg-day	0.0002
					Iron	25000	mg/kg	1.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	8.5E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0012
					Manganese	6900	mg/kg	3.4E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0017
					Mercury	44	mg/kg	2.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
					Nickel	200	mg/kg	9.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.7E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00034
					Thallium	5.9	mg/kg	2.9E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.02
					Vanadium	91	mg/kg	4.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00062
					Zinc	1300	mg/kg	6.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00015
				PAHs	Benzo[a]pyrene	0.42	mg/kg	2.1E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-09	1.4E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.085	mg/kg	4.2E-11	mg/kg-day	7.3E+00	(mg/kg-day)	3.0E-10	2.9E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.005	mg/kg	2.4E-12	mg/kg-day	1.7E+01	(mg/kg-day)	4.2E-11	1.7E-10	mg/kg-day	3.0E-05	mg/kg-day	0.0000057
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--
				PCBs	PCBs (total Aroclors)	3.3	mg/kg	1.6E-09	mg/kg-day	2.0E+00	(mg/kg-day)	3.2E-09	1.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0057
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									2.2E-08					0.043
			Dermal	Metals	Aluminum	11000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	3.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	40	mg/kg	6.0E-09	mg/kg-day	1.5E+00	(mg/kg-day)	9.1E-09	4.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
					Cadmium	8.8	mg/kg	4.5E-11	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00013
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	39	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	230	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	25000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	6900	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	44	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	200	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	5.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	91	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	1300	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.42	mg/kg	2.8E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.0E-09	1.9E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.085	mg/kg	5.6E-11	mg/kg-day	7.3E+00	(mg/kg-day)	4.1E-10	3.9E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.005	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--
				PCBs	PCBs (total Aroclors)	3.3	mg/kg	2.4E-09	mg/kg-day	2.0E+00	(mg/kg-day)	4.7E-09	1.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0082
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.6E-08					0.0098
		Exposure Point Total										3.9E-08					0.053
	Exposure Medium Total											3.9E-08					0.053
Sediment Total												3.9E-08					0.053
Total Receptor												4E-08					0.05

TABLE 7.109 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.110 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Upper Peach Island Creek Marsh	Ingestion	Metals	Aluminum	16000	mg/kg	7.9E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00055
					Antimony	17	mg/kg	8.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-07	mg/kg-day	4.0E-04	mg/kg-day	0.0014
					Arsenic	190	mg/kg	5.5E-08	mg/kg-day	1.5E+00	(mg/kg-day)	8.3E-08	3.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.013
					Cadmium	30	mg/kg	1.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-06	mg/kg-day	1.0E-03	mg/kg-day	0.001
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	120	mg/kg	5.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.014
					Copper	4100	mg/kg	2.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0035
					Iron	30000	mg/kg	1.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0015
					Manganese	3700	mg/kg	1.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0009
					Mercury	320	mg/kg	1.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.037
					Nickel	860	mg/kg	4.2E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0015
					Thallium	6.6	mg/kg	3.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-07	mg/kg-day	1.0E-05	mg/kg-day	0.023
					Vanadium	160	mg/kg	7.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-06	mg/kg-day	5.0E-03	mg/kg-day	0.0011
					Zinc	510	mg/kg	2.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000058
				PAHs	Benzo[a]pyrene	0.55	mg/kg	2.7E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.0E-09	1.9E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.11	mg/kg	5.4E-11	mg/kg-day	7.3E+00	(mg/kg-day)	3.9E-10	3.8E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.045	mg/kg	2.2E-11	mg/kg-day	1.7E+01	(mg/kg-day)	3.7E-10	1.5E-09	mg/kg-day	3.0E-05	mg/kg-day	0.000051
					Heptachlor	0.021	mg/kg	1.0E-11	mg/kg-day	4.5E+00	(mg/kg-day)	4.6E-11	7.2E-10	mg/kg-day	5.0E-04	mg/kg-day	0.0000014
					Heptachlor epoxide	0.0091	mg/kg	4.5E-12	mg/kg-day	9.1E+00	(mg/kg-day)	4.1E-11	3.1E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000024
				PCBs	PCBs (total Aroclors)	1.7	mg/kg	8.4E-10	mg/kg-day	2.0E+00	(mg/kg-day)	1.7E-09	5.9E-08	mg/kg-day	2.0E-05	mg/kg-day	0.003
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									8.7E-08					0.1
			Dermal	Metals	Aluminum	16000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	17	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	190	mg/kg	2.9E-08	mg/kg-day	1.5E+00	(mg/kg-day)	4.3E-08	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0067
					Cadmium	30	mg/kg	1.5E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-08	mg/kg-day	2.5E-05	mg/kg-day	0.00043
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	120	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	4100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	30000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	3700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	320	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	860	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	6.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	160	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	510	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.55	mg/kg	3.6E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.6E-09	2.5E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.11	mg/kg	7.3E-11	mg/kg-day	7.3E+00	(mg/kg-day)	5.3E-10	5.1E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.045	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.021	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.0091	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.7	mg/kg	1.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)	2.5E-09	8.6E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0043
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									4.9E-08					0.011
		Exposure Point Total										1.4E-07					0.11
	Exposure Medium Total											1.4E-07					0.11
Sediment Total												1.4E-07					0.11
Total Receptor												1E-07					0.1

TABLE 7.110 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

Upper Peach Island Creek is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

TABLE 7.111 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Walden Swamp	Ingestion	Metals	Aluminum	8500	mg/kg	4.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00029
					Antimony	5.5	mg/kg	2.7E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00047
					Arsenic	47	mg/kg	1.4E-08	mg/kg-day	1.5E+00	(mg/kg-day)	2.1E-08	9.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0032
					Cadmium	11	mg/kg	5.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00037
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	38	mg/kg	1.9E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0043
					Copper	190	mg/kg	9.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	6.4E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00016
					Iron	24000	mg/kg	1.2E-05	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0012
					Manganese	13000	mg/kg	6.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0031
					Mercury	74	mg/kg	3.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0085
					Nickel	310	mg/kg	1.5E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00053
					Thallium	5.7	mg/kg	2.8E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-07	mg/kg-day	1.0E-05	mg/kg-day	0.019
					Vanadium	130	mg/kg	6.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00086
					Zinc	2100	mg/kg	1.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	7.2E-05	mg/kg-day	3.0E-01	mg/kg-day	0.00024
				PAHs	Benzo[a]pyrene	0.14	mg/kg	7.0E-11	mg/kg-day	7.3E+00	(mg/kg-day)	5.1E-10	4.9E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.031	mg/kg	1.5E-11	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-10	1.1E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.018	mg/kg	8.9E-12	mg/kg-day	1.7E+01	(mg/kg-day)	1.5E-10	6.2E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000021
					Heptachlor	0.0058	mg/kg	2.9E-12	mg/kg-day	4.5E+00	(mg/kg-day)	1.3E-11	2.0E-10	mg/kg-day	5.0E-04	mg/kg-day	0.0000004
					Heptachlor epoxide	0.0033	mg/kg	1.6E-12	mg/kg-day	9.1E+00	(mg/kg-day)	1.5E-11	1.1E-10	mg/kg-day	1.3E-05	mg/kg-day	0.0000088
				PCBs	PCBs (total Aroclors)	4.5	mg/kg	2.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)	4.4E-09	1.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0078
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									2.6E-08					0.05
			Dermal	Metals	Aluminum	8500	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	5.5	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	47	mg/kg	7.2E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-08	5.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0017
					Cadmium	11	mg/kg	5.6E-11	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00016
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	38	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	190	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	24000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	13000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	74	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	310	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	5.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	2100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.14	mg/kg	9.4E-11	mg/kg-day	7.3E+00	(mg/kg-day)	6.9E-10	6.6E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.031	mg/kg	2.0E-11	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-10	1.4E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.018	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	0.0058	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.0033	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	4.5	mg/kg	3.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)	6.5E-09	2.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.011
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.8E-08					0.013
		Exposure Point Total										4.4E-08					0.064
	Exposure Medium Total											4.4E-08					0.064
Sediment Total												4.4E-08					0.064
Total Receptor												4E-08					0.06

TABLE 7.111 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.112 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Ackerman's East Marsh	Ingestion	Metals	Aluminum	18000	mg/kg	8.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	6.1E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00061
					Antimony	4.8	mg/kg	2.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00041
					Arsenic	23	mg/kg	6.6E-09	mg/kg-day	1.5E+00	(mg/kg-day)	9.9E-09	4.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0015
					Cadmium	5	mg/kg	2.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.7E-07	mg/kg-day	1.0E-03	mg/kg-day	0.00017
					Chromium (VI)	17	mg/kg	8.1E-09	mg/kg-day	5.0E-01	(mg/kg-day)	4.1E-09	5.7E-07	mg/kg-day	3.0E-03	mg/kg-day	0.00019
					Cobalt	27	mg/kg	1.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	9.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0031
					Copper	90	mg/kg	4.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000077
					Iron	28000	mg/kg	1.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	9.5E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0014
					Manganese	2700	mg/kg	1.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	9.3E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00067
					Mercury	61	mg/kg	3.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.007
					Nickel	68	mg/kg	3.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00012
					Thallium	--	--	--	--	--	--	--	--	--	--	--	--
					Vanadium	57	mg/kg	2.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00039
					Zinc	420	mg/kg	2.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000048
				PAHs	Benzo[a]pyrene	0.06	mg/kg	2.9E-11	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-10	2.1E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.015	mg/kg	7.5E-12	mg/kg-day	7.3E+00	(mg/kg-day)	5.5E-11	5.2E-10	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0044	mg/kg	2.2E-12	mg/kg-day	1.7E+01	(mg/kg-day)	3.7E-11	1.5E-10	mg/kg-day	3.0E-05	mg/kg-day	0.000005
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--
				PCBs	PCBs (total Aroclors)	0.58	mg/kg	2.8E-10	mg/kg-day	2.0E+00	(mg/kg-day)	5.7E-10	2.0E-08	mg/kg-day	2.0E-05	mg/kg-day	0.001
				Volatiles	Trichloroethene	0.033	mg/kg	1.6E-11	mg/kg-day	4.6E-02	(mg/kg-day)	7.4E-13	1.1E-09	mg/kg-day	5.0E-04	mg/kg-day	0.0000023
			Exp. Route Total									1.5E-08					0.017
			Dermal	Metals	Aluminum	18000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	4.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	23	mg/kg	3.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)	5.2E-09	2.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0008
					Cadmium	5	mg/kg	2.5E-11	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000071
					Chromium (VI)	17	mg/kg	NA	mg/kg-day	2.0E+01	(mg/kg-day)	NA	NA	mg/kg-day	7.5E-05	mg/kg-day	NA
					Cobalt	27	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	90	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	28000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	2700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	61	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	68	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	--	--	--	--	--	--	--	--	--	--	--	--
					Vanadium	57	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	420	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.06	mg/kg	4.0E-11	mg/kg-day	7.3E+00	(mg/kg-day)	2.9E-10	2.8E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.015	mg/kg	1.0E-11	mg/kg-day	7.3E+00	(mg/kg-day)	7.4E-11	7.1E-10	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0044	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--
				PCBs	PCBs (total Aroclors)	0.58	mg/kg	4.2E-10	mg/kg-day	2.0E+00	(mg/kg-day)	8.3E-10	2.9E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0015
				Volatiles	Trichloroethene	0.033	mg/kg	NA	mg/kg-day	4.6E-02	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
			Exp. Route Total									6.4E-09					0.0023
		Exposure Point Total										2.1E-08					0.019
	Exposure Medium Total											2.1E-08					0.019
Sediment Total												2.1E-08					0.019
Total Receptor												2E-08					0.02

TABLE 7.112 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.113 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Rutherford Marsh	Ingestion	Metals	Aluminum	13000	mg/kg	6.5E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00046
					Antimony	1.2	mg/kg	5.9E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.1E-08	mg/kg-day	4.0E-04	mg/kg-day	0.0001
					Arsenic	16	mg/kg	4.6E-09	mg/kg-day	1.5E+00	(mg/kg-day)	6.9E-09	3.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0011
					Cadmium	1.6	mg/kg	8.0E-10	mg/kg-day	NA	(mg/kg-day)	NA	5.6E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000056
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	14	mg/kg	6.8E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0016
					Copper	140	mg/kg	7.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00012
					Iron	22000	mg/kg	1.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	7.4E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0011
					Manganese	4600	mg/kg	2.3E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.6E-04	mg/kg-day	1.4E-01	mg/kg-day	0.0011
					Mercury	14	mg/kg	6.8E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0016
					Nickel	71	mg/kg	3.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.4E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00012
					Thallium	5.6	mg/kg	2.7E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-07	mg/kg-day	1.0E-05	mg/kg-day	0.019
					Vanadium	55	mg/kg	2.7E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00037
					Zinc	360	mg/kg	1.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000041
				PAHs	Benzo[a]pyrene	0.32	mg/kg	1.6E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-09	1.1E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.059	mg/kg	2.9E-11	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-10	2.0E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0056	mg/kg	2.7E-12	mg/kg-day	1.7E+01	(mg/kg-day)	4.7E-11	1.9E-10	mg/kg-day	3.0E-05	mg/kg-day	0.0000064
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.0027	mg/kg	1.3E-12	mg/kg-day	9.1E+00	(mg/kg-day)	1.2E-11	9.2E-11	mg/kg-day	1.3E-05	mg/kg-day	0.0000071
				PCBs	PCBs (total Aroclors)	0.5	mg/kg	2.5E-10	mg/kg-day	2.0E+00	(mg/kg-day)	4.9E-10	1.7E-08	mg/kg-day	2.0E-05	mg/kg-day	0.00086
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									8.8E-09					0.028
			Dermal	Metals	Aluminum	13000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	1.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	16	mg/kg	2.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)	3.6E-09	1.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00056
					Cadmium	1.6	mg/kg	8.4E-12	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-10	mg/kg-day	2.5E-05	mg/kg-day	0.000023
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	14	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	140	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	22000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	4600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	14	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	71	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	5.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	55	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	360	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.32	mg/kg	2.1E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-09	1.5E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.059	mg/kg	3.9E-11	mg/kg-day	7.3E+00	(mg/kg-day)	2.9E-10	2.7E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0056	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.0027	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.5	mg/kg	3.6E-10	mg/kg-day	2.0E+00	(mg/kg-day)	7.2E-10	2.5E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0013
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									6.2E-09					0.0018
		Exposure Point Total										1.5E-08					0.03
	Exposure Medium Total											1.5E-08					0.03
Sediment Total												1.5E-08					0.03
Total Receptor												1E-08					0.03

TABLE 7.113 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.114 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Tollgate Marsh	Ingestion	Metals	Aluminum	11000	mg/kg	5.1E-06	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00036
					Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Arsenic	9.2	mg/kg	2.7E-09	mg/kg-day	1.5E+00	(mg/kg-day)	4.1E-09	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00063
					Cadmium	0.56	mg/kg	2.7E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	5.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0012
					Copper	66	mg/kg	3.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000056
					Iron	28000	mg/kg	1.4E-05	mg/kg-day	NA	(mg/kg-day)	NA	9.7E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0014
					Manganese	1100	mg/kg	5.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.7E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00027
					Mercury	13	mg/kg	6.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0015
					Nickel	38	mg/kg	1.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-06	mg/kg-day	2.0E-02	mg/kg-day	0.000065
					Thallium	2.4	mg/kg	1.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	8.1E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0081
					Vanadium	29	mg/kg	1.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	9.9E-07	mg/kg-day	5.0E-03	mg/kg-day	0.0002
					Zinc	170	mg/kg	8.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.8E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000019
				PAHs	Benzo[a]pyrene	0.27	mg/kg	1.3E-10	mg/kg-day	7.3E+00	(mg/kg-day)	9.6E-10	9.2E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.062	mg/kg	3.0E-11	mg/kg-day	7.3E+00	(mg/kg-day)	2.2E-10	2.1E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0078	mg/kg	3.8E-12	mg/kg-day	1.7E+01	(mg/kg-day)	6.5E-11	2.7E-10	mg/kg-day	3.0E-05	mg/kg-day	0.0000089
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--
				PCBs	PCBs (total Aroclors)	0.44	mg/kg	2.2E-10	mg/kg-day	2.0E+00	(mg/kg-day)	4.3E-10	1.5E-08	mg/kg-day	2.0E-05	mg/kg-day	0.00076
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									5.7E-09					0.015
			Dermal	Metals	Aluminum	11000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Arsenic	9.2	mg/kg	1.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)	2.1E-09	9.9E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00033
					Cadmium	0.56	mg/kg	2.8E-12	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-10	mg/kg-day	2.5E-05	mg/kg-day	0.000008
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	11	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	66	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	28000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1100	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	13	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	38	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.4	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	29	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	170	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.27	mg/kg	1.8E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-09	1.3E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.062	mg/kg	4.1E-11	mg/kg-day	7.3E+00	(mg/kg-day)	3.0E-10	2.9E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0078	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--
				PCBs	PCBs (total Aroclors)	0.44	mg/kg	3.1E-10	mg/kg-day	2.0E+00	(mg/kg-day)	6.3E-10	2.2E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0011
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									4.3E-09					0.0014
		Exposure Point Total										1.0E-08					0.016
	Exposure Medium Total											1.0E-08					0.016
Sediment Total												1.0E-08					0.016
Total Receptor												1E-08					0.02

TABLE 7.114 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.115 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Oritani Marsh	Ingestion	Metals	Aluminum	14000	mg/kg	6.7E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00047
					Antimony	3.2	mg/kg	1.6E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-07	mg/kg-day	4.0E-04	mg/kg-day	0.00027
					Arsenic	23	mg/kg	6.8E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.0E-08	4.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0016
					Cadmium	0.34	mg/kg	1.6E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	7.9E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0018
					Copper	67	mg/kg	3.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000058
					Iron	34000	mg/kg	1.7E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0017
					Manganese	530	mg/kg	2.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00013
					Mercury	2.5	mg/kg	1.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	8.4E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00028
					Nickel	40	mg/kg	2.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-06	mg/kg-day	2.0E-02	mg/kg-day	0.000069
					Thallium	--	--	--	--	--	--	--	--	--	--	--	--
					Vanadium	63	mg/kg	3.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00043
					Zinc	160	mg/kg	8.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.6E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000019
				PAHs	Benzo[a]pyrene	0.2	mg/kg	9.8E-11	mg/kg-day	7.3E+00	(mg/kg-day)	7.1E-10	6.8E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	--	--	--	--	--	--	--	--	--	--	--	--
				Pesticides	Aldrin	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor	0.0012	mg/kg	5.9E-13	mg/kg-day	4.5E+00	(mg/kg-day)	2.6E-12	4.1E-11	mg/kg-day	5.0E-04	mg/kg-day	0.000000082
					Heptachlor epoxide	0.0023	mg/kg	1.1E-12	mg/kg-day	9.1E+00	(mg/kg-day)	1.0E-11	7.9E-11	mg/kg-day	1.3E-05	mg/kg-day	0.0000061
				PCBs	PCBs (total Aroclors)	0.016	mg/kg	7.6E-12	mg/kg-day	2.0E+00	(mg/kg-day)	1.5E-11	5.3E-10	mg/kg-day	2.0E-05	mg/kg-day	0.000027
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.1E-08					0.0069
			Dermal	Metals	Aluminum	14000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	3.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	23	mg/kg	3.5E-09	mg/kg-day	1.5E+00	(mg/kg-day)	5.3E-09	2.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00082
					Cadmium	0.34	mg/kg	1.7E-12	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-10	mg/kg-day	2.5E-05	mg/kg-day	0.0000048
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	16	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	67	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	34000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	530	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	2.5	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	40	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	--	--	--	--	--	--	--	--	--	--	--	--
					Vanadium	63	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	160	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.2	mg/kg	1.3E-10	mg/kg-day	7.3E+00	(mg/kg-day)	9.7E-10	9.3E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	--	--	--	--	--	--	--	--	--	--	--	--
				Pesticides	Aldrin	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor	0.0012	mg/kg	NA	mg/kg-day	4.5E+00	(mg/kg-day)	NA	NA	mg/kg-day	5.0E-04	mg/kg-day	NA
					Heptachlor epoxide	0.0023	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.016	mg/kg	1.1E-11	mg/kg-day	2.0E+00	(mg/kg-day)	2.2E-11	7.8E-10	mg/kg-day	2.0E-05	mg/kg-day	0.000039
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									6.3E-09					0.00087
		Exposure Point Total										1.7E-08					0.0077
	Exposure Medium Total											1.7E-08					0.0077
Sediment Total												1.7E-08					0.0077
Total Receptor												2E-08					0.008

TABLE 7.115 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.116 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Berry's Creek Marsh	Ingestion	Metals	Aluminum	14000	mg/kg	6.6E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.6E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00046
					Antimony	2.2	mg/kg	1.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	7.4E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00018
					Arsenic	27	mg/kg	7.8E-09	mg/kg-day	1.5E+00	(mg/kg-day)	1.2E-08	5.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0018
					Cadmium	1.2	mg/kg	6.1E-10	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000043
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	18	mg/kg	8.7E-09	mg/kg-day	NA	(mg/kg-day)	NA	6.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
					Copper	130	mg/kg	6.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00011
					Iron	30000	mg/kg	1.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.0E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0015
					Manganese	800	mg/kg	3.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-05	mg/kg-day	1.4E-01	mg/kg-day	0.0002
					Mercury	6.1	mg/kg	3.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0007
					Nickel	94	mg/kg	4.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.2E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00016
					Thallium	2.6	mg/kg	1.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	8.9E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0089
					Vanadium	66	mg/kg	3.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00045
					Zinc	390	mg/kg	1.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-05	mg/kg-day	3.0E-01	mg/kg-day	0.000045
				PAHs	Benzo[a]pyrene	0.3	mg/kg	1.5E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.1E-09	1.0E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.077	mg/kg	3.8E-11	mg/kg-day	7.3E+00	(mg/kg-day)	2.8E-10	2.6E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.0015	mg/kg	7.3E-13	mg/kg-day	9.1E+00	(mg/kg-day)	6.7E-12	5.1E-11	mg/kg-day	1.3E-05	mg/kg-day	0.000004
				PCBs	PCBs (total Aroclors)	0.14	mg/kg	6.6E-11	mg/kg-day	2.0E+00	(mg/kg-day)	1.3E-10	4.6E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00023
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									1.3E-08					0.017
			Dermal	Metals	Aluminum	14000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	2.2	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	27	mg/kg	4.1E-09	mg/kg-day	1.5E+00	(mg/kg-day)	6.1E-09	2.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00095
					Cadmium	1.2	mg/kg	6.3E-12	mg/kg-day	NA	(mg/kg-day)	NA	4.4E-10	mg/kg-day	2.5E-05	mg/kg-day	0.000018
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	18	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	130	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	30000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	800	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	6.1	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	94	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	2.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Vanadium	66	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	390	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.3	mg/kg	2.0E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-09	1.4E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.077	mg/kg	5.1E-11	mg/kg-day	7.3E+00	(mg/kg-day)	3.7E-10	3.6E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.0015	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.14	mg/kg	9.7E-11	mg/kg-day	2.0E+00	(mg/kg-day)	1.9E-10	6.8E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00034
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									8.1E-09					0.0013
		Exposure Point Total										2.1E-08					0.018
	Exposure Medium Total											2.1E-08					0.018
Sediment Total												2.1E-08					0.018
Total Receptor												2E-08					0.02

TABLE 7.116 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.117 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Former ENCAP Restoration Area	Ingestion	Metals	Aluminum	8600	mg/kg	4.2E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.9E-04	mg/kg-day	1.0E+00	mg/kg-day	0.00029
					Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Arsenic	15	mg/kg	4.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)	6.6E-09	3.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
					Cadmium	--	--	--	--	--	--	--	--	--	--	--	--
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	6.8	mg/kg	3.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00077
					Copper	110	mg/kg	5.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.9E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000096
					Iron	14000	mg/kg	6.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	4.8E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00068
					Manganese	160	mg/kg	7.6E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-06	mg/kg-day	1.4E-01	mg/kg-day	0.000038
					Mercury	3.7	mg/kg	1.8E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00043
					Nickel	42	mg/kg	2.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-06	mg/kg-day	2.0E-02	mg/kg-day	0.000073
					Thallium	--	--	--	--	--	--	--	--	--	--	--	--
					Vanadium	78	mg/kg	3.8E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.7E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00053
					Zinc	140	mg/kg	7.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000016
				PAHs	Benzo[a]pyrene	0.35	mg/kg	1.7E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.3E-09	1.2E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	--	--	--	--	--	--	--	--	--	--	--	--
				Pesticides	Aldrin	0.0016	mg/kg	7.8E-13	mg/kg-day	1.7E+01	(mg/kg-day)	1.3E-11	5.5E-11	mg/kg-day	3.0E-05	mg/kg-day	0.0000018
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.002	mg/kg	9.8E-13	mg/kg-day	9.1E+00	(mg/kg-day)	8.9E-12	6.8E-11	mg/kg-day	1.3E-05	mg/kg-day	0.0000053
				PCBs	PCBs (total Aroclors)	0.2	mg/kg	9.9E-11	mg/kg-day	2.0E+00	(mg/kg-day)	2.0E-10	6.9E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00035
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									8.1E-09					0.0043
			Dermal	Metals	Aluminum	8600	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E+00	mg/kg-day	NA
					Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Arsenic	15	mg/kg	2.3E-09	mg/kg-day	1.5E+00	(mg/kg-day)	3.4E-09	1.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00053
					Cadmium	--	--	--	--	--	--	--	--	--	--	--	--
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	6.8	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	14000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	160	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	42	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	--	--	--	--	--	--	--	--	--	--	--	--
					Vanadium	78	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-04	mg/kg-day	NA
					Zinc	140	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benzo[a]pyrene	0.35	mg/kg	2.3E-10	mg/kg-day	7.3E+00	(mg/kg-day)	1.7E-09	1.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	--	--	--	--	--	--	--	--	--	--	--	--
				Pesticides	Aldrin	0.0016	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
					Heptachlor epoxide	0.002	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	0.2	mg/kg	1.4E-10	mg/kg-day	2.0E+00	(mg/kg-day)	2.9E-10	1.0E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0005
				Volatiles	Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--
			Exp. Route Total									5.4E-09					0.001
		Exposure Point Total										1.3E-08					0.0054
	Exposure Medium Total											1.3E-08					0.0054
Sediment Total												1.3E-08					0.0054
Total Receptor												1E-08					0.005

TABLE 7.117 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.118 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Ingestion	Metals	Antimony	5.7	mg/kg	1.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00015
					Arsenic	34	mg/kg	3.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	5.3E-08	2.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00069
					Cadmium	3	mg/kg	5.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000031
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	4.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00082
					Copper	330	mg/kg	5.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000084
					Iron	29000	mg/kg	5.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00043
					Manganese	1700	mg/kg	3.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00013
					Mercury	3.3	mg/kg	5.8E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00011
					Nickel	110	mg/kg	1.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.000054
					Thallium	1.9	mg/kg	3.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-08	mg/kg-day	1.0E-05	mg/kg-day	0.002
					Zinc	450	mg/kg	8.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000016
				PAHs	Benz[a]anthracene	1.3	mg/kg	2.3E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-09	1.3E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	2.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-08	1.2E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	2.7E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.0E-09	1.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	5.1E-10	mg/kg-day	7.3E+00	(mg/kg-day)	3.7E-09	3.0E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	1.3E-09	mg/kg-day	7.3E-01	(mg/kg-day)	9.8E-10	7.8E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	7.3E-12	mg/kg-day	1.7E+01	(mg/kg-day)	1.2E-10	4.3E-11	mg/kg-day	3.0E-05	mg/kg-day	0.0000014
					Heptachlor epoxide	0.026	mg/kg	4.6E-11	mg/kg-day	9.1E+00	(mg/kg-day)	4.2E-10	2.7E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000021
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.9E-09	mg/kg-day	2.0E+00	(mg/kg-day)	3.8E-09	1.1E-08	mg/kg-day	2.0E-05	mg/kg-day	0.00056
			Exp. Route Total									8.2E-08					0.0051
			Dermal	Metals	Antimony	5.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	1.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.9E-07	7.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0025
					Cadmium	3	mg/kg	3.8E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000089
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	2.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-08	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	1.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-07	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	2.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.9E-08	1.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	4.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	3.5E-08	2.8E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	1.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.1E-09	7.3E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.9E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.8E-08	1.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0056
			Exp. Route Total									4.5E-07					0.0082
		Exposure Point Total										5.3E-07					0.013
	Exposure Medium Total											5.3E-07					0.013
Sediment Total												5.3E-07					0.013

TABLE 7.118 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	White Perch Fillet	White Perch Fillet in Reference Sites	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	--	--	--	--	--	--	--	--	--	--	--	--
		White Perch Fillet in Reference Sites (continued)	Ingestion (continued)	Metals (continued)	Iron	--	--	--	--	--	--	--	--	--	--	--	--
					Manganese	--	--	--	--	--	--	--	--	--	--	--	--
					Mercury (inorganic)	0.045	mg/kg	2.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00038
					Selenium	0.82	mg/kg	3.6E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.1E-06	mg/kg-day	5.0E-03	mg/kg-day	0.00042
				Organometals	Methyl mercury	0.26	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.7E-07	mg/kg-day	1.0E-04	mg/kg-day	0.0067
				PCBs	PCBs (total Aroclors)	0.66	mg/kg	2.0E-07	mg/kg-day	2.0E+00	(mg/kg-day)	4.1E-07	1.2E-06	mg/kg-day	2.0E-05	mg/kg-day	0.059
			Exp. Route Total									4.1E-07					0.067
		Exposure Point Total										4.1E-07					0.067
	Exposure Medium Total											4.1E-07					0.067
Surface Water Total												4.1E-07					0.067
Total Receptor												9E-07					0.08

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.119 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Ingestion	Metals	Antimony	5.7	mg/kg	1.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00015
					Arsenic	34	mg/kg	3.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	5.3E-08	2.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00069
					Cadmium	3	mg/kg	5.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000031
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	4.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00082
					Copper	330	mg/kg	5.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000084
					Iron	29000	mg/kg	5.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00043
					Manganese	1700	mg/kg	3.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00013
					Mercury	3.3	mg/kg	5.8E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00011
					Nickel	110	mg/kg	1.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.000054
					Thallium	1.9	mg/kg	3.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-08	mg/kg-day	1.0E-05	mg/kg-day	0.002
					Zinc	450	mg/kg	8.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000016
				PAHs	Benz[a]anthracene	1.3	mg/kg	2.3E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-09	1.3E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	2.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-08	1.2E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	2.7E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.0E-09	1.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	5.1E-10	mg/kg-day	7.3E+00	(mg/kg-day)	3.7E-09	3.0E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	1.3E-09	mg/kg-day	7.3E-01	(mg/kg-day)	9.8E-10	7.8E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	7.3E-12	mg/kg-day	1.7E+01	(mg/kg-day)	1.2E-10	4.3E-11	mg/kg-day	3.0E-05	mg/kg-day	0.0000014
					Heptachlor epoxide	0.026	mg/kg	4.6E-11	mg/kg-day	9.1E+00	(mg/kg-day)	4.2E-10	2.7E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000021
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.9E-09	mg/kg-day	2.0E+00	(mg/kg-day)	3.8E-09	1.1E-08	mg/kg-day	2.0E-05	mg/kg-day	0.00056
			Exp. Route Total									8.2E-08					0.0051
			Dermal	Metals	Antimony	5.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	1.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.9E-07	7.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0025
					Cadmium	3	mg/kg	3.8E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000089
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	2.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-08	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	1.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-07	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	2.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.9E-08	1.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	4.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	3.5E-08	2.8E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	1.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.1E-09	7.3E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.9E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.8E-08	1.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0056
			Exp. Route Total									4.5E-07					0.0082
		Exposure Point Total										5.3E-07					0.013
	Exposure Medium Total											5.3E-07					0.013
Sediment Total												5.3E-07					0.013

TABLE 7.119 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
						Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle	Blue Crab Muscle in Reference Sites	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	--	--	--	--	--	--	--	--	--	--	--	--
		Blue Crab Muscle in Reference Sites (continued)	Ingestion (continued)	Metals (continued)	Iron	--	--	--	--	--	--	--	--	--	--	--	--
					Manganese	--	--	--	--	--	--	--	--	--	--	--	--
					Mercury (inorganic)	0.02	mg/kg	8.9E-09	mg/kg-day	NA	(mg/kg-day)	NA	5.2E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00017
					Selenium	--	--	--	--	--	--	--	--	--	--	--	--
				Organometals	Methyl mercury	0.21	mg/kg	9.1E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.3E-07	mg/kg-day	1.0E-04	mg/kg-day	0.0053
				PCBs	PCBs (total Aroclors)	0.0059	mg/kg	2.1E-09	mg/kg-day	2.0E+00	(mg/kg-day)	4.2E-09	1.2E-08	mg/kg-day	2.0E-05	mg/kg-day	0.00061
			Exp. Route Total									4.2E-09					0.0061
		Exposure Point Total										4.2E-09					0.0061
	Exposure Medium Total											4.2E-09					0.0061
Surface Water Total												4.2E-09					0.0061
Total Receptor												5E-07					0.02

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.120 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Ingestion	Metals	Antimony	5.7	mg/kg	1.0E-08	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00015
					Arsenic	34	mg/kg	3.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	5.3E-08	2.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00069
					Cadmium	3	mg/kg	5.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000031
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	4.2E-08	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00082
					Copper	330	mg/kg	5.7E-07	mg/kg-day	NA	(mg/kg-day)	NA	3.3E-06	mg/kg-day	4.0E-02	mg/kg-day	0.000084
					Iron	29000	mg/kg	5.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.0E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00043
					Manganese	1700	mg/kg	3.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00013
					Mercury	3.3	mg/kg	5.8E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.4E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00011
					Nickel	110	mg/kg	1.9E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.000054
					Thallium	1.9	mg/kg	3.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-08	mg/kg-day	1.0E-05	mg/kg-day	0.002
					Zinc	450	mg/kg	8.0E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.7E-06	mg/kg-day	3.0E-01	mg/kg-day	0.000016
				PAHs	Benz[a]anthracene	1.3	mg/kg	2.3E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.7E-09	1.3E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	2.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.5E-08	1.2E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	2.7E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.0E-09	1.6E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	5.1E-10	mg/kg-day	7.3E+00	(mg/kg-day)	3.7E-09	3.0E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	1.3E-09	mg/kg-day	7.3E-01	(mg/kg-day)	9.8E-10	7.8E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	7.3E-12	mg/kg-day	1.7E+01	(mg/kg-day)	1.2E-10	4.3E-11	mg/kg-day	3.0E-05	mg/kg-day	0.0000014
					Heptachlor epoxide	0.026	mg/kg	4.6E-11	mg/kg-day	9.1E+00	(mg/kg-day)	4.2E-10	2.7E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000021
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.9E-09	mg/kg-day	2.0E+00	(mg/kg-day)	3.8E-09	1.1E-08	mg/kg-day	2.0E-05	mg/kg-day	0.00056
			Exp. Route Total									8.2E-08					0.0051
			Dermal	Metals	Antimony	5.7	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	1.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)	1.9E-07	7.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0025
					Cadmium	3	mg/kg	3.8E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000089
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	2.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.5E-08	1.2E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	1.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.4E-07	1.1E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	2.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.9E-08	1.5E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	4.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	3.5E-08	2.8E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	1.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.1E-09	7.3E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0042	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.9E-08	mg/kg-day	2.0E+00	(mg/kg-day)	3.8E-08	1.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0056
			Exp. Route Total									4.5E-07					0.0082
		Exposure Point Total										5.3E-07					0.013
	Exposure Medium Total											5.3E-07					0.013
Sediment Total												5.3E-07					0.013

TABLE 7.120 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in	Ingestion	Metals	Antimony	--	--	--	--	--	--	--	--	--	--	--	--
					Copper	--	--	--	--	--	--	--	--	--	--	--	--
		Blue Crab Muscle & Hepatopancreas in Reference Sites (continued)	Ingestion (continued)	Metals (continued)	Iron	--	--	--	--	--	--	--	--	--	--	--	--
					Manganese	--	--	--	--	--	--	--	--	--	--	--	--
					Mercury (inorganic)	0.029	mg/kg	1.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	7.5E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00025
					Selenium	--	--	--	--	--	--	--	--	--	--	--	--
				Organometals	Methyl mercury	0.19	mg/kg	8.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	4.9E-07	mg/kg-day	1.0E-04	mg/kg-day	0.0049
				PCBs	PCBs (total Aroclors)	0.13	mg/kg	4.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)	9.0E-08	2.6E-07	mg/kg-day	2.0E-05	mg/kg-day	0.013
			Exp. Route Total									9.0E-08					0.018
		Exposure Point Total										9.0E-08					0.018
	Exposure Medium Total											9.0E-08					0.018
Surface Water Total												9.0E-08					0.018
Total Receptor												6E-07					0.03

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.121 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites	Ingestion	Metals	Antimony	5.6	mg/kg	6.0E-09	mg/kg-day	NA	(mg/kg-day)	NA	3.5E-08	mg/kg-day	4.0E-04	mg/kg-day	0.000087
					Arsenic	34	mg/kg	2.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)	3.2E-08	1.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00042
					Cadmium	3	mg/kg	3.2E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.9E-08	mg/kg-day	1.0E-03	mg/kg-day	0.000019
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	2.5E-08	mg/kg-day	NA	(mg/kg-day)	NA	1.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00049
					Copper	330	mg/kg	3.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00005
					Iron	29000	mg/kg	3.1E-05	mg/kg-day	NA	(mg/kg-day)	NA	1.8E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00026
					Manganese	1700	mg/kg	1.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	1.1E-05	mg/kg-day	1.4E-01	mg/kg-day	0.000075
					Mercury	3.3	mg/kg	3.5E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.0E-08	mg/kg-day	3.0E-04	mg/kg-day	0.000068
					Nickel	110	mg/kg	1.1E-07	mg/kg-day	NA	(mg/kg-day)	NA	6.5E-07	mg/kg-day	2.0E-02	mg/kg-day	0.000033
					Thallium	1.9	mg/kg	2.1E-09	mg/kg-day	NA	(mg/kg-day)	NA	1.2E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0012
					Zinc	450	mg/kg	4.8E-07	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-06	mg/kg-day	3.0E-01	mg/kg-day	0.0000093
				PAHs	Benz[a]anthracene	1.3	mg/kg	1.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)	9.9E-10	7.9E-09	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	1.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)	9.2E-09	7.3E-09	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	1.6E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-09	9.6E-09	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	3.1E-10	mg/kg-day	7.3E+00	(mg/kg-day)	2.2E-09	1.8E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	8.1E-10	mg/kg-day	7.3E-01	(mg/kg-day)	5.9E-10	4.7E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0041	mg/kg	4.4E-12	mg/kg-day	1.7E+01	(mg/kg-day)	7.4E-11	2.5E-11	mg/kg-day	3.0E-05	mg/kg-day	0.00000085
					Heptachlor epoxide	0.026	mg/kg	2.8E-11	mg/kg-day	9.1E+00	(mg/kg-day)	2.5E-10	1.6E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000012
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)	2.3E-09	6.7E-09	mg/kg-day	2.0E-05	mg/kg-day	0.00034
			Exp. Route Total									4.9E-08					0.0031
			Dermal	Metals	Antimony	5.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	7.6E-08	mg/kg-day	1.5E+00	(mg/kg-day)	1.1E-07	4.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0015
					Cadmium	3	mg/kg	2.3E-10	mg/kg-day	NA	(mg/kg-day)	NA	1.3E-09	mg/kg-day	2.5E-05	mg/kg-day	0.000053
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	1.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)	9.2E-09	7.4E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	1.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)	8.5E-08	6.8E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	1.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.1E-08	8.9E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	2.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)	2.1E-08	1.7E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	7.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)	5.5E-09	4.4E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0041	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	1.2E-08	mg/kg-day	2.0E+00	(mg/kg-day)	2.3E-08	6.7E-08	mg/kg-day	2.0E-05	mg/kg-day	0.0034
			Exp. Route Total									2.7E-07					0.0049
		Exposure Point Total										3.2E-07					0.0079
	Exposure Medium Total											3.2E-07					0.0079
Sediment Total												3.2E-07					0.0079
Total Receptor												3E-07					0.008

TABLE 7.121 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

TABLE 7.122 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites	Ingestion	Metals	Antimony	5.6	mg/kg	1.3E-08	mg/kg-day	NA	(mg/kg-day)	NA	7.3E-08	mg/kg-day	4.0E-04	mg/kg-day	0.00018
					Arsenic	34	mg/kg	4.5E-08	mg/kg-day	1.5E+00	(mg/kg-day)	6.8E-08	2.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.00088
					Cadmium	3	mg/kg	6.8E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.0E-08	mg/kg-day	1.0E-03	mg/kg-day	0.00004
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	5.4E-08	mg/kg-day	NA	(mg/kg-day)	NA	3.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
					Copper	330	mg/kg	7.3E-07	mg/kg-day	NA	(mg/kg-day)	NA	4.2E-06	mg/kg-day	4.0E-02	mg/kg-day	0.00011
					Iron	29000	mg/kg	6.5E-05	mg/kg-day	NA	(mg/kg-day)	NA	3.8E-04	mg/kg-day	7.0E-01	mg/kg-day	0.00054
					Manganese	1700	mg/kg	3.8E-06	mg/kg-day	NA	(mg/kg-day)	NA	2.2E-05	mg/kg-day	1.4E-01	mg/kg-day	0.00016
					Mercury	3.3	mg/kg	7.4E-09	mg/kg-day	NA	(mg/kg-day)	NA	4.3E-08	mg/kg-day	3.0E-04	mg/kg-day	0.00014
					Nickel	110	mg/kg	2.4E-07	mg/kg-day	NA	(mg/kg-day)	NA	1.4E-06	mg/kg-day	2.0E-02	mg/kg-day	0.000069
					Thallium	1.9	mg/kg	4.3E-09	mg/kg-day	NA	(mg/kg-day)	NA	2.5E-08	mg/kg-day	1.0E-05	mg/kg-day	0.0025
					Zinc	450	mg/kg	1.0E-06	mg/kg-day	NA	(mg/kg-day)	NA	5.9E-06	mg/kg-day	3.0E-01	mg/kg-day	0.00002
				PAHs	Benz[a]anthracene	1.3	mg/kg	2.9E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.1E-09	1.7E-08	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	2.7E-09	mg/kg-day	7.3E+00	(mg/kg-day)	1.9E-08	1.5E-08	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	3.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)	2.5E-09	2.0E-08	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	6.5E-10	mg/kg-day	7.3E+00	(mg/kg-day)	4.7E-09	3.8E-09	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	1.7E-09	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-09	9.9E-09	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0041	mg/kg	9.2E-12	mg/kg-day	1.7E+01	(mg/kg-day)	1.6E-10	5.4E-11	mg/kg-day	3.0E-05	mg/kg-day	0.0000018
					Heptachlor epoxide	0.026	mg/kg	5.9E-11	mg/kg-day	9.1E+00	(mg/kg-day)	5.3E-10	3.4E-10	mg/kg-day	1.3E-05	mg/kg-day	0.000026
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	2.4E-09	mg/kg-day	2.0E+00	(mg/kg-day)	4.9E-09	1.4E-08	mg/kg-day	2.0E-05	mg/kg-day	0.00071
			Exp. Route Total									1.0E-07					0.0065
			Dermal	Metals	Antimony	5.6	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	6.0E-05	mg/kg-day	NA
					Arsenic	34	mg/kg	1.6E-07	mg/kg-day	1.5E+00	(mg/kg-day)	2.4E-07	9.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0031
					Cadmium	3	mg/kg	4.8E-10	mg/kg-day	NA	(mg/kg-day)	NA	2.8E-09	mg/kg-day	2.5E-05	mg/kg-day	0.00011
					Chromium (VI)	--	--	--	--	--	--	--	--	--	--	--	--
					Cobalt	24	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-04	mg/kg-day	NA
					Copper	330	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	4.0E-02	mg/kg-day	NA
					Iron	29000	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	7.0E-01	mg/kg-day	NA
					Manganese	1700	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.4E-01	mg/kg-day	NA
					Mercury	3.3	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	2.1E-05	mg/kg-day	NA
					Nickel	110	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	8.0E-04	mg/kg-day	NA
					Thallium	1.9	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	1.0E-05	mg/kg-day	NA
					Zinc	450	mg/kg	NA	mg/kg-day	NA	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-01	mg/kg-day	NA
				PAHs	Benz[a]anthracene	1.3	mg/kg	2.7E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.9E-08	1.6E-07	mg/kg-day	NA	NA	NA
					Benzo[a]pyrene	1.2	mg/kg	2.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)	1.8E-07	1.4E-07	mg/kg-day	NA	NA	NA
					Benzo[b]fluoranthene	1.6	mg/kg	3.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)	2.4E-08	1.9E-07	mg/kg-day	NA	NA	NA
					Dibenz[a,h]anthracene	0.29	mg/kg	6.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)	4.4E-08	3.5E-08	mg/kg-day	NA	NA	NA
					Indeno[1,2,3-cd]pyrene	0.76	mg/kg	1.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)	1.2E-08	9.2E-08	mg/kg-day	NA	NA	NA
				Pesticides	Aldrin	0.0041	mg/kg	NA	mg/kg-day	1.7E+01	(mg/kg-day)	NA	NA	mg/kg-day	3.0E-05	mg/kg-day	NA
					Heptachlor epoxide	0.026	mg/kg	NA	mg/kg-day	9.1E+00	(mg/kg-day)	NA	NA	mg/kg-day	1.3E-05	mg/kg-day	NA
				PCBs	PCBs (total Aroclors)	1.1	mg/kg	2.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)	4.9E-08	1.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.0071
			Exp. Route Total									5.7E-07					0.01
		Exposure Point Total										6.7E-07					0.017
	Exposure Medium Total											6.7E-07					0.017
Sediment Total												6.7E-07					0.017
Total Receptor												7E-07					0.02

TABLE 7.122 CTE
CALCULATION OF CHEMICAL RISKS AND NONCANCER HAZARDS
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

						EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
								Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical Class	COPC	Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient

Notes:
COPC =chemical of potential concern
CSF = cancer slope factor
EPC =exposure point concentration
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RfC = non-cancer reference concentration
RfD = non-cancer reference dose
-- = not detected

Draft
Exhibit 6: RAGS D Table 9 Summary of Receptor Risk and Hazards for COPCs

Exposure and Risk Estimates

Berry's Creek Study Area
Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

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TABLE 9.1 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00031	NA	NA	0.00031
				Arsenic	4.8E-07	3.4E-07	NA	8.2E-07	Cardiovascular, Dermal	0.0093	0.0067	NA	0.016
				Cadmium	NA	NA	NA	NA	Kidney	0.0032	0.0018	NA	0.005
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0047	NA	NA	0.0047
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00081	NA	NA	0.00081
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0039	NA	NA	0.0039
				Manganese	NA	NA	NA	NA	CNS	0.0017	NA	NA	0.0017
				Mercury	NA	NA	NA	NA	Immunological	0.088	NA	NA	0.088
				Nickel	NA	NA	NA	NA	Body	0.00041	NA	NA	0.00041
				Thallium	NA	NA	NA	NA	Hair	0.029	NA	NA	0.029
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00096	NA	NA	0.00096
			PAHs	Benz[a]anthracene	8.9E-09	1.7E-08	NA	2.5E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.4E-07	2.6E-07	NA	3.9E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.7E-08	3.2E-08	NA	5.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	5.3E-08	9.8E-08	NA	1.5E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.0E-08	1.9E-08	NA	3.0E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.8E-09	NA	NA	4.8E-09	Liver	0.000082	NA	NA	0.000082
				Heptachlor epoxide	1.2E-08	NA	NA	1.2E-08	Liver	0.00085	NA	NA	0.00085
			PCBs	PCBs (total Aroclors)	1.3E-07	2.6E-07	NA	3.9E-07	Immunological, Dermal, Ocular	0.028	0.057	NA	0.085
				Chemical Total	8.5E-07	1.0E-06	NA	1.9E-06		0.17	0.065	NA	0.24
		Exposure Point Total						1.9E-06					0.24
	Exposure Medium Total							1.9E-06					0.24
Sediment Total								1.9E-06					0.24
Surface Water	White Perch Fillet	White Perch Fillet in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00092	NA	NA	0.00092
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00046	NA	NA	0.00046
				Manganese	NA	NA	NA	NA	CNS	0.000073	NA	NA	0.000073
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0069	NA	NA	0.0069
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0032	NA	NA	0.0032
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.097	NA	NA	0.097
			PCBs	PCBs (total Aroclors)	6.8E-06	NA	NA	6.8E-06	Immunological, Dermal, Ocular	1.5	NA	NA	1.5
				Chemical Total	6.8E-06	NA	NA	6.8E-06		1.6	NA	NA	1.6
		Exposure Point Total						6.8E-06					1.6
	Exposure Medium Total							6.8E-06					1.6
	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	NA	7.3E-09	NA	7.3E-09	Cardiovascular, Dermal	NA	0.00014	NA	0.00014
				Thallium	NA	NA	NA	NA	Hair	NA	0.00046	NA	0.00046
			Volatiles	Vinyl chloride	NA	2.2E-09	NA	2.2E-09	Liver	NA	0.0000088	NA	0.0000088
				Chemical Total	NA	9.5E-09	NA	9.5E-09		NA	0.00061	NA	0.00061
		Exposure Point Total						9.5E-09					0.00061
	Exposure Medium Total							9.5E-09					0.00061
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.004	0.004
				Chemical Total	NA	NA	NA	NA		NA	NA	0.004	0.004
		Exposure Point Total						NA					0.004
	Exposure Medium Total							NA					0.004
Surface Water Total								6.8E-06					1.6
Total Receptor Risks								9E-06					2

TABLE 9.1 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Class	COPC	Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
					Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation	Exposure Routes Total
									Total Body HI Across All Media=				0.0004
									Total Cardiovascular HI Across All Media=				0.02
									Total CNS HI Across All Media=				0.1
									Total Dermal HI Across All Media=				2
									Total Developmental HI Across All Media=				0.1
									Total Gastrointestinal HI Across All Media=				0.006
									Total Hair HI Across All Media=				0.03
									Total Hematological HI Across All Media=				0.004
									Total Immunological HI Across All Media=				2
									Total Kidney HI Across All Media=				0.005
									Total Liver HI Across All Media=				0.0009
									Total Ocular HI Across All Media=				2
									Total Thyroid HI Across All Media=				0.005

Notes:
CNS = central nervous system
COPC = chemical of potential concern
HI = hazard index
N = sample size
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek

TABLE 9.2 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00051	NA	NA	0.00051
				Arsenic	1.2E-06	3.7E-07	NA	1.5E-06	Cardiovascular, Dermal	0.015	0.0048	NA	0.02
				Cadmium	NA	NA	NA	NA	Kidney	0.0052	0.0013	NA	0.0065
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0078	NA	NA	0.0078
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0013	NA	NA	0.0013
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0064	NA	NA	0.0064
				Manganese	NA	NA	NA	NA	CNS	0.0028	NA	NA	0.0028
				Mercury	NA	NA	NA	NA	Immunological	0.14	NA	NA	0.14
				Nickel	NA	NA	NA	NA	Body	0.00066	NA	NA	0.00066
				Thallium	NA	NA	NA	NA	Hair	0.048	NA	NA	0.048
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0016	NA	NA	0.0016
			PAHs	Benz[a]anthracene	5.9E-08	4.8E-08	NA	1.1E-07	NA	NA	NA	NA	NA
				Benzo[a]pyrene	9.1E-07	7.4E-07	NA	1.7E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-07	9.3E-08	NA	2.1E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.5E-07	2.8E-07	NA	6.3E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	6.9E-08	5.5E-08	NA	1.2E-07	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.2E-08	NA	NA	1.2E-08	Liver	0.00013	NA	NA	0.00013
				Heptachlor epoxide	2.8E-08	NA	NA	2.8E-08	Liver	0.0014	NA	NA	0.0014
			PCBs	PCBs (total Aroclors)	3.2E-07	2.8E-07	NA	6.0E-07	Immunological, Dermal, Ocular	0.047	0.041	NA	0.087
				Chemical Total	3.0E-06	1.9E-06	NA	4.9E-06		0.28	0.047	NA	0.33
		Exposure Point Total						4.9E-06					0.33
	Exposure Medium Total							4.9E-06					0.33
Sediment Total								4.9E-06					0.33
Surface Water	White Perch Fillet	White Perch Fillet in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.001	NA	NA	0.001
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0005	NA	NA	0.0005
				Manganese	NA	NA	NA	NA	CNS	0.00008	NA	NA	0.00008
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0076	NA	NA	0.0076
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0035	NA	NA	0.0035
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.11	NA	NA	0.11
			PCBs	PCBs (total Aroclors)	1.1E-05	NA	NA	1.1E-05	Immunological, Dermal, Ocular	1.6	NA	NA	1.6
				Chemical Total	1.1E-05	NA	NA	1.1E-05		1.8	NA	NA	1.8
		Exposure Point Total						1.1E-05					1.8
	Exposure Medium Total							1.1E-05					1.8
	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	NA	1.2E-08	NA	1.2E-08	Cardiovascular, Dermal	NA	0.00015	NA	0.00015
				Thallium	NA	NA	NA	NA	Hair	NA	0.0005	NA	0.0005
			Volatiles	Vinyl chloride	NA	2.8E-07	NA	2.8E-07	Liver	NA	0.0000094	NA	0.0000094
				Chemical Total	NA	2.9E-07	NA	2.9E-07		NA	0.00066	NA	0.00066
		Exposure Point Total						2.9E-07					0.00066
	Exposure Medium Total							2.9E-07					0.00066
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.004	0.004
				Chemical Total	NA	NA	NA	NA		NA	NA	0.004	0.004
		Exposure Point Total						NA					0.004
	Exposure Medium Total							NA					0.004
Surface Water Total								1.1E-05					1.8
Total Receptor Risks								2E-05					2

TABLE 9.2 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical Class	COPC	Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation	Exposure Routes Total
									Total Body HI Across All Media=				0.0007
									Total Cardiovascular HI Across All Media=				0.02
									Total CNS HI Across All Media=				0.1
									Total Dermal HI Across All Media=				2
									Total Developmental HI Across All Media=				0.1
									Total Gastrointestinal HI Across All Media=				0.009
									Total Hair HI Across All Media=				0.05
									Total Hematological HI Across All Media=				0.006
									Total Immunological HI Across All Media=				2
									Total Kidney HI Across All Media=				0.006
									Total Liver HI Across All Media=				0.002
									Total Ocular HI Across All Media=				2
									Total Thyroid HI Across All Media=				0.008

Notes:
CNS = central nervous system
COPC = chemical of potential concern
HI = hazard index
N = sample size
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek

TABLE 9.3 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	White Perch Fillet	White Perch Fillet in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0016	NA	NA	0.0016
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00081	NA	NA	0.00081
				Manganese	NA	NA	NA	NA	CNS	0.00013	NA	NA	0.00013
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.012	NA	NA	0.012
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0057	NA	NA	0.0057
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.17	NA	NA	0.17
			PCBs	PCBs (total Aroclors)	9.0E-06	NA	NA	9.0E-06	Immunological, Dermal, Ocular	2.6	NA	NA	2.6
				Chemical Total	9.0E-06	NA	NA	9.0E-06		2.8	NA	NA	2.8
		Exposure Point Total						9.0E-06					2.8
	Exposure Medium Total							9.0E-06					2.8
Surface Water Total								9.0E-06					2.8
Total Receptor Risks								9E-06					3

Total CNS HI Across All Media=	0.2
Total Dermal HI Across All Media=	3
Total Developmental HI Across All Media=	0.2
Total Gastrointestinal HI Across All Media=	0.002
Total Hematological HI Across All Media=	0.006
Total Immunological HI Across All Media=	3
Total Ocular HI Across All Media=	3

Notes:
CNS = central nervous system
COPC = chemical of potential concern
HI = hazard index
N = sample size
NA = not available
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek

TABLE 9.4 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00031	NA	NA	0.00031
				Arsenic	4.8E-07	3.4E-07	NA	8.2E-07	Cardiovascular, Dermal	0.0093	0.0067	NA	0.016
				Cadmium	NA	NA	NA	NA	Kidney	0.0032	0.0018	NA	0.005
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0047	NA	NA	0.0047
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00081	NA	NA	0.00081
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0039	NA	NA	0.0039
				Manganese	NA	NA	NA	NA	CNS	0.0017	NA	NA	0.0017
				Mercury	NA	NA	NA	NA	Immunological	0.088	NA	NA	0.088
				Nickel	NA	NA	NA	NA	Body	0.00041	NA	NA	0.00041
				Thallium	NA	NA	NA	NA	Hair	0.029	NA	NA	0.029
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00096	NA	NA	0.00096
			PAHs	Benz[a]anthracene	8.9E-09	1.7E-08	NA	2.5E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.4E-07	2.6E-07	NA	3.9E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.7E-08	3.2E-08	NA	5.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	5.3E-08	9.8E-08	NA	1.5E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.0E-08	1.9E-08	NA	3.0E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.8E-09	NA	NA	4.8E-09	Liver	0.000082	NA	NA	0.000082
				Heptachlor epoxide	1.2E-08	NA	NA	1.2E-08	Liver	0.00085	NA	NA	0.00085
			PCBs	PCBs (total Aroclors)	1.3E-07	2.6E-07	NA	3.9E-07	Immunological, Dermal, Ocular	0.028	0.057	NA	0.085
				Chemical Total	8.5E-07	1.0E-06	NA	1.9E-06		0.17	0.065	NA	0.24
		Exposure Point Total						1.9E-06					0.24
	Exposure Medium Total							1.9E-06					0.24
Sediment Total								1.9E-06					0.24
Surface Water	Blue Crab Muscle	Blue Crab Muscle in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0069	NA	NA	0.0069
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00033	NA	NA	0.00033
				Manganese	NA	NA	NA	NA	CNS	0.005	NA	NA	0.005
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.00068	NA	NA	0.00068
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0041	NA	NA	0.0041
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.053	NA	NA	0.053
			PCBs	PCBs (total Aroclors)	5.9E-08	NA	NA	5.9E-08	Immunological, Dermal, Ocular	0.013	NA	NA	0.013
				Chemical Total	5.9E-08	NA	NA	5.9E-08		0.082	NA	NA	0.082
		Exposure Point Total						5.9E-08					0.082
	Exposure Medium Total							5.9E-08					0.082
	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	NA	7.3E-09	NA	7.3E-09	Cardiovascular, Dermal	NA	0.00014	NA	0.00014
				Thallium	NA	NA	NA	NA	Hair	NA	0.00046	NA	0.00046
			Volatiles	Vinyl chloride	NA	2.2E-09	NA	2.2E-09	Liver	NA	0.0000088	NA	0.0000088
				Chemical Total	NA	9.5E-09	NA	9.5E-09		NA	0.00061	NA	0.00061
		Exposure Point Total						9.5E-09					0.00061
	Exposure Medium Total							9.5E-09					0.00061
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.004	0.004
				Chemical Total	NA	NA	NA	NA		NA	NA	0.004	0.004
		Exposure Point Total						NA					0.004
	Exposure Medium Total							NA					0.004
Surface Water Total								6.8E-08					0.087
Total Receptor Risks								2E-06					0.3

TABLE 9.4 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical Class	COPC	Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation	Exposure Routes Total

Notes:
CNS = central nervous system
COPC = chemical of potential concern
N = sample size
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek

TABLE 9.5 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00051	NA	NA	0.00051
				Arsenic	1.2E-06	3.7E-07	NA	1.5E-06	Cardiovascular, Dermal	0.015	0.0048	NA	0.02
				Cadmium	NA	NA	NA	NA	Kidney	0.0052	0.0013	NA	0.0065
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0078	NA	NA	0.0078
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0013	NA	NA	0.0013
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0064	NA	NA	0.0064
				Manganese	NA	NA	NA	NA	CNS	0.0028	NA	NA	0.0028
				Mercury	NA	NA	NA	NA	Immunological	0.14	NA	NA	0.14
				Nickel	NA	NA	NA	NA	Body	0.00066	NA	NA	0.00066
				Thallium	NA	NA	NA	NA	Hair	0.048	NA	NA	0.048
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0016	NA	NA	0.0016
			PAHs	Benz[a]anthracene	5.9E-08	4.8E-08	NA	1.1E-07	NA	NA	NA	NA	NA
				Benzo[a]pyrene	9.1E-07	7.4E-07	NA	1.7E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-07	9.3E-08	NA	2.1E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.5E-07	2.8E-07	NA	6.3E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	6.9E-08	5.5E-08	NA	1.2E-07	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.2E-08	NA	NA	1.2E-08	Liver	0.00013	NA	NA	0.00013
				Heptachlor epoxide	2.8E-08	NA	NA	2.8E-08	Liver	0.0014	NA	NA	0.0014
			PCBs	PCBs (total Aroclors)	3.2E-07	2.8E-07	NA	6.0E-07	Immunological, Dermal, Ocular	0.047	0.041	NA	0.087
				Chemical Total	3.0E-06	1.9E-06	NA	4.9E-06		0.28	0.047	NA	0.33
		Exposure Point Total						4.9E-06					0.33
	Exposure Medium Total							4.9E-06					0.33
Sediment Total								4.9E-06					0.33
Surface Water	Blue Crab Muscle	Blue Crab Muscle in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0075	NA	NA	0.0075
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00036	NA	NA	0.00036
				Manganese	NA	NA	NA	NA	CNS	0.0055	NA	NA	0.0055
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.00074	NA	NA	0.00074
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0045	NA	NA	0.0045
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.058	NA	NA	0.058
			PCBs	PCBs (total Aroclors)	9.7E-08	NA	NA	9.7E-08	Immunological, Dermal, Ocular	0.014	NA	NA	0.014
				Chemical Total	9.7E-08	NA	NA	9.7E-08		0.09	NA	NA	0.09
		Exposure Point Total						9.7E-08					0.09
	Exposure Medium Total							9.7E-08					0.09
	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	NA	1.2E-08	NA	1.2E-08	Cardiovascular, Dermal	NA	0.00015	NA	0.00015
				Thallium	NA	NA	NA	NA	Hair	NA	0.0005	NA	0.0005
			Volatiles	Vinyl chloride	NA	2.8E-07	NA	2.8E-07	Liver	NA	0.0000094	NA	0.0000094
				Chemical Total	NA	2.9E-07	NA	2.9E-07		NA	0.00066	NA	0.00066
		Exposure Point Total						2.9E-07					0.00066
	Exposure Medium Total							2.9E-07					0.00066
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.004	0.004
				Chemical Total	NA	NA	NA	NA		NA	NA	0.004	0.004
		Exposure Point Total						NA					0.004
	Exposure Medium Total							NA					0.004
Surface Water Total								3.9E-07					0.095
Total Receptor Risks								5E-06					0.4

Notes:
CNS = central nervous system
COPC = chemical of potential concern
N = sample size
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek

TABLE 9.6 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	Blue Crab Muscle	Blue Crab Muscle in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.012	NA	NA	0.012
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00059	NA	NA	0.00059
				Manganese	NA	NA	NA	NA	CNS	0.0089	NA	NA	0.0089
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0012	NA	NA	0.0012
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0072	NA	NA	0.0072
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.093	NA	NA	0.093
			PCBs	PCBs (total Aroclors)	7.8E-08	NA	NA	7.8E-08	Immunological, Dermal, Ocular	0.023	NA	NA	0.023
				Chemical Total	7.8E-08	NA	NA	7.8E-08		0.15	NA	NA	0.15
		Exposure Point Total						7.8E-08					0.15
	Exposure Medium Total							7.8E-08					0.15
Surface Water Total								7.8E-08					0.15
Total Receptor Risks								8E-08					0.1

Notes:
CNS = central nervous system
COPC = chemical of potential concern
N = sample size
NA = not available
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek

TABLE 9.7 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00031	NA	NA	0.00031
				Arsenic	4.8E-07	3.4E-07	NA	8.2E-07	Cardiovascular, Dermal	0.0093	0.0067	NA	0.016
				Cadmium	NA	NA	NA	NA	Kidney	0.0032	0.0018	NA	0.005
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0047	NA	NA	0.0047
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00081	NA	NA	0.00081
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0039	NA	NA	0.0039
				Manganese	NA	NA	NA	NA	CNS	0.0017	NA	NA	0.0017
				Mercury	NA	NA	NA	NA	Immunological	0.088	NA	NA	0.088
				Nickel	NA	NA	NA	NA	Body	0.00041	NA	NA	0.00041
				Thallium	NA	NA	NA	NA	Hair	0.029	NA	NA	0.029
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00096	NA	NA	0.00096
			PAHs	Benz[a]anthracene	8.9E-09	1.7E-08	NA	2.5E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.4E-07	2.6E-07	NA	3.9E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.7E-08	3.2E-08	NA	5.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	5.3E-08	9.8E-08	NA	1.5E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.0E-08	1.9E-08	NA	3.0E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.8E-09	NA	NA	4.8E-09	Liver	0.000082	NA	NA	0.000082
				Heptachlor epoxide	1.2E-08	NA	NA	1.2E-08	Liver	0.00085	NA	NA	0.00085
			PCBs	PCBs (total Aroclors)	1.3E-07	2.6E-07	NA	3.9E-07	Immunological, Dermal, Ocular	0.028	0.057	NA	0.085
				Chemical Total	8.5E-07	1.0E-06	NA	1.9E-06		0.17	0.065	NA	0.24
		Exposure Point Total						1.9E-06					0.24
	Exposure Medium Total							1.9E-06					0.24
Sediment Total								1.9E-06					0.24
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0069	NA	NA	0.0069
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00033	NA	NA	0.00033
				Manganese	NA	NA	NA	NA	CNS	0.005	NA	NA	0.005
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0009	NA	NA	0.0009
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0041	NA	NA	0.0041
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.051	NA	NA	0.051
			PCBs	PCBs (total Aroclors)	8.3E-07	NA	NA	8.3E-07	Immunological, Dermal, Ocular	0.18	NA	NA	0.18
				Chemical Total	8.3E-07	NA	NA	8.3E-07		0.25	NA	NA	0.25
		Exposure Point Total						8.3E-07					0.25
	Exposure Medium Total							8.3E-07					0.25
	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	NA	7.3E-09	NA	7.3E-09	Cardiovascular, Dermal	NA	0.00014	NA	0.00014
				Thallium	NA	NA	NA	NA	Hair	NA	0.00046	NA	0.00046
			Volatiles	Vinyl chloride	NA	2.2E-09	NA	2.2E-09	Liver	NA	0.0000088	NA	0.0000088
				Chemical Total	NA	9.5E-09	NA	9.5E-09		NA	0.00061	NA	0.00061
		Exposure Point Total						9.5E-09					0.00061
	Exposure Medium Total							9.5E-09					0.00061
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.004	0.004
				Chemical Total	NA	NA	NA	NA		NA	NA	0.004	0.004
		Exposure Point Total						NA					0.004
	Exposure Medium Total							NA					0.004
Surface Water Total								8.4E-07					0.25
Total Receptor Risks								3E-06					0.5

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.8 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00051	NA	NA	0.00051
				Arsenic	1.2E-06	3.7E-07	NA	1.5E-06	Cardiovascular, Dermal	0.015	0.0048	NA	0.02
				Cadmium	NA	NA	NA	NA	Kidney	0.0052	0.0013	NA	0.0065
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0078	NA	NA	0.0078
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0013	NA	NA	0.0013
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0064	NA	NA	0.0064
				Manganese	NA	NA	NA	NA	CNS	0.0028	NA	NA	0.0028
				Mercury	NA	NA	NA	NA	Immunological	0.14	NA	NA	0.14
				Nickel	NA	NA	NA	NA	Body	0.00066	NA	NA	0.00066
				Thallium	NA	NA	NA	NA	Hair	0.048	NA	NA	0.048
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0016	NA	NA	0.0016
			PAHs	Benz[a]anthracene	5.9E-08	4.8E-08	NA	1.1E-07	NA	NA	NA	NA	NA
				Benzo[a]pyrene	9.1E-07	7.4E-07	NA	1.7E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-07	9.3E-08	NA	2.1E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.5E-07	2.8E-07	NA	6.3E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	6.9E-08	5.5E-08	NA	1.2E-07	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.2E-08	NA	NA	1.2E-08	Liver	0.00013	NA	NA	0.00013
				Heptachlor epoxide	2.8E-08	NA	NA	2.8E-08	Liver	0.0014	NA	NA	0.0014
			PCBs	PCBs (total Aroclors)	3.2E-07	2.8E-07	NA	6.0E-07	Immunological, Dermal, Ocular	0.047	0.041	NA	0.087
				Chemical Total	3.0E-06	1.9E-06	NA	4.9E-06		0.28	0.047	NA	0.33
		Exposure Point Total						4.9E-06					0.33
	Exposure Medium Total							4.9E-06					0.33
Sediment Total								4.9E-06					0.33
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0075	NA	NA	0.0075
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00036	NA	NA	0.00036
				Manganese	NA	NA	NA	NA	CNS	0.0055	NA	NA	0.0055
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.00099	NA	NA	0.00099
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0045	NA	NA	0.0045
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.056	NA	NA	0.056
			PCBs	PCBs (total Aroclors)	1.4E-06	NA	NA	1.4E-06	Immunological, Dermal, Ocular	0.2	NA	NA	0.2
				Chemical Total	1.4E-06	NA	NA	1.4E-06		0.27	NA	NA	0.27
		Exposure Point Total						1.4E-06					0.27
	Exposure Medium Total							1.4E-06					0.27
	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	NA	1.2E-08	NA	1.2E-08	Cardiovascular, Dermal	NA	0.00015	NA	0.00015
				Thallium	NA	NA	NA	NA	Hair	NA	0.0005	NA	0.0005
			Volatiles	Vinyl chloride	NA	2.8E-07	NA	2.8E-07	Liver	NA	0.0000094	NA	0.0000094
				Chemical Total	NA	2.9E-07	NA	2.9E-07		NA	0.00066	NA	0.00066
		Exposure Point Total						2.9E-07					0.00066
	Exposure Medium Total							2.9E-07					0.00066
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.004	0.004
				Chemical Total	NA	NA	NA	NA		NA	NA	0.004	0.004
		Exposure Point Total						NA					0.004
	Exposure Medium Total							NA					0.004
Surface Water Total								1.7E-06					0.28
Total Receptor Risks								7E-06					0.6

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.9 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.012	NA	NA	0.012
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00059	NA	NA	0.00059
				Manganese	NA	NA	NA	NA	CNS	0.0089	NA	NA	0.0089
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0016	NA	NA	0.0016
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0072	NA	NA	0.0072
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.09	NA	NA	0.09
			PCBs	PCBs (total Aroclors)	1.1E-06	NA	NA	1.1E-06	Immunological, Dermal, Ocular	0.32	NA	NA	0.32
				Chemical Total	1.1E-06	NA	NA	1.1E-06		0.44	NA	NA	0.44
		Exposure Point Total						1.1E-06					0.44
	Exposure Medium Total							1.1E-06					0.44
Surface Water Total								1.1E-06					0.44
Total Receptor Risks								1E-06					0.4

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.10 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00019	NA	NA	0.00019
				Arsenic	2.8E-07	2.0E-07	NA	4.9E-07	Cardiovascular, Dermal	0.0055	0.004	NA	0.0095
				Cadmium	NA	NA	NA	NA	Kidney	0.0019	0.0011	NA	0.0029
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.003	NA	NA	0.003
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00051	NA	NA	0.00051
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0026	NA	NA	0.0026
				Manganese	NA	NA	NA	NA	CNS	0.00094	NA	NA	0.00094
				Mercury	NA	NA	NA	NA	Immunological	0.053	NA	NA	0.053
				Nickel	NA	NA	NA	NA	Body	0.00025	NA	NA	0.00025
				Thallium	NA	NA	NA	NA	Hair	0.017	NA	NA	0.017
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00056	NA	NA	0.00056
			PAHs	Benz[a]anthracene	5.2E-09	9.7E-09	NA	1.5E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	7.5E-08	1.4E-07	NA	2.2E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	7.7E-09	1.4E-08	NA	2.2E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.8E-08	5.1E-08	NA	7.9E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	5.9E-09	1.1E-08	NA	1.7E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.9E-09	NA	NA	4.9E-09	Liver	0.000084	NA	NA	0.000084
				Heptachlor epoxide	5.6E-09	NA	NA	5.6E-09	Liver	0.00041	NA	NA	0.00041
			PCBs	PCBs (total Aroclors)	8.0E-08	1.6E-07	NA	2.4E-07	Immunological, Dermal, Ocular	0.018	0.035	NA	0.053
				Chemical Total	5.0E-07	5.9E-07	NA	1.1E-06		0.1	0.04	NA	0.14
		Exposure Point Total						1.1E-06					0.14
	Exposure Medium Total							1.1E-06					0.14
Sediment Total								1.1E-06					0.14
Surface Water	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	5.3E-09	2.2E-09	NA	7.5E-09	Cardiovascular, Dermal	0.0001	0.000043	NA	0.00015
				Thallium	NA	NA	NA	NA	Hair	0.00034	0.00014	NA	0.00048
			PAHs	Benzo[a]pyrene	4.2E-09	NA	NA	4.2E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.9E-08	NA	NA	1.9E-08	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	1.6E-10	1.5E-09	NA	1.7E-09	Liver	6.5E-07	0.0000061	NA	0.0000068
				Chemical Total	2.9E-08	3.7E-09	NA	3.3E-08		0.00044	0.00019	NA	0.00063
		Exposure Point Total						3.3E-08					0.00063
	Exposure Medium Total							3.3E-08					0.00063
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0011	0.0011
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0011	0.0011
		Exposure Point Total						NA					0.0011
	Exposure Medium Total							NA					0.0011
Surface Water Total								3.3E-08					0.0018
Total Receptor Risks								1E-06					0.1

Notes:

CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.11 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00031	NA	NA	0.00031
				Arsenic	7.0E-07	2.2E-07	NA	9.2E-07	Cardiovascular, Dermal	0.0091	0.0028	NA	0.012
				Cadmium	NA	NA	NA	NA	Kidney	0.0031	0.00076	NA	0.0038
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0049	NA	NA	0.0049
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00083	NA	NA	0.00083
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0042	NA	NA	0.0042
				Manganese	NA	NA	NA	NA	CNS	0.0015	NA	NA	0.0015
				Mercury	NA	NA	NA	NA	Immunological	0.087	NA	NA	0.087
				Nickel	NA	NA	NA	NA	Body	0.00041	NA	NA	0.00041
				Thallium	NA	NA	NA	NA	Hair	0.028	NA	NA	0.028
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00093	NA	NA	0.00093
			PAHs	Benz[a]anthracene	3.5E-08	2.8E-08	NA	6.2E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	5.0E-07	4.0E-07	NA	9.0E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	5.1E-08	4.1E-08	NA	9.2E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.8E-07	1.5E-07	NA	3.3E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	3.9E-08	3.2E-08	NA	7.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.2E-08	NA	NA	1.2E-08	Liver	0.00014	NA	NA	0.00014
				Heptachlor epoxide	1.4E-08	NA	NA	1.4E-08	Liver	0.00068	NA	NA	0.00068
			PCBs	PCBs (total Aroclors)	2.0E-07	1.7E-07	NA	3.7E-07	Immunological, Dermal, Ocular	0.029	0.025	NA	0.054
				Chemical Total	1.7E-06	1.0E-06	NA	2.8E-06		0.17	0.029	NA	0.2
		Exposure Point Total						2.8E-06					0.2
	Exposure Medium Total							2.8E-06					0.2
Sediment Total								2.8E-06					0.2
Surface Water	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	1.3E-08	3.7E-09	NA	1.7E-08	Cardiovascular, Dermal	0.00017	0.000048	NA	0.00022
				Thallium	NA	NA	NA	NA	Hair	0.00055	0.00016	NA	0.00071
			PAHs	Benzo[a]pyrene	2.8E-08	NA	NA	2.8E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.3E-07	NA	NA	1.3E-07	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	4.7E-08	3.0E-07	NA	3.5E-07	Liver	0.0000011	0.0000068	NA	0.0000079
				Chemical Total	2.2E-07	3.0E-07	NA	5.2E-07		0.00072	0.00021	NA	0.00094
		Exposure Point Total						5.2E-07					0.00094
	Exposure Medium Total							5.2E-07					0.00094
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0011	0.0011
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0011	0.0011
		Exposure Point Total						NA					0.0011
	Exposure Medium Total							NA					0.0011
Surface Water Total								5.2E-07					0.0021
Total Receptor Risks								3E-06					0.2

Notes:

CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.12 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00041	NA	NA	0.00041
				Arsenic	6.2E-07	4.4E-07	NA	1.1E-06	Cardiovascular, Dermal	0.012	0.0086	NA	0.021
				Cadmium	NA	NA	NA	NA	Kidney	0.0041	0.0023	NA	0.0064
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0065	NA	NA	0.0065
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0011	NA	NA	0.0011
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0056	NA	NA	0.0056
				Manganese	NA	NA	NA	NA	CNS	0.002	NA	NA	0.002
				Mercury	NA	NA	NA	NA	Immunological	0.12	NA	NA	0.12
				Nickel	NA	NA	NA	NA	Body	0.00054	NA	NA	0.00054
				Thallium	NA	NA	NA	NA	Hair	0.037	NA	NA	0.037
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0012	NA	NA	0.0012
			PAHs	Benz[a]anthracene	1.1E-08	2.1E-08	NA	3.2E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.6E-07	3.0E-07	NA	4.7E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.7E-08	3.1E-08	NA	4.7E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	6.0E-08	1.1E-07	NA	1.7E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.3E-08	2.4E-08	NA	3.7E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.1E-08	NA	NA	1.1E-08	Liver	0.00018	NA	NA	0.00018
				Heptachlor epoxide	1.2E-08	NA	NA	1.2E-08	Liver	0.0009	NA	NA	0.0009
			PCBs	PCBs (total Aroclors)	1.7E-07	3.5E-07	NA	5.2E-07	Immunological, Dermal, Ocular	0.038	0.076	NA	0.11
				Chemical Total	1.1E-06	1.3E-06	NA	2.4E-06		0.22	0.087	NA	0.31
		Exposure Point Total						2.4E-06					0.31
	Exposure Medium Total							2.4E-06					0.31
Sediment Total								2.4E-06					0.31
Surface Water	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	1.2E-08	4.8E-09	NA	1.6E-08	Cardiovascular, Dermal	0.00022	0.000094	NA	0.00032
				Thallium	NA	NA	NA	NA	Hair	0.00073	0.00031	NA	0.001
			PAHs	Benzo[a]pyrene	9.1E-09	NA	NA	9.1E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.2E-08	NA	NA	4.2E-08	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	3.5E-10	3.3E-09	NA	3.6E-09	Liver	0.0000014	0.000013	NA	0.000015
				Chemical Total	6.3E-08	8.1E-09	NA	7.1E-08		0.00096	0.00041	NA	0.0014
		Exposure Point Total						7.1E-08					0.0014
	Exposure Medium Total							7.1E-08					0.0014
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								7.1E-08					0.0038
Total Receptor Risks								2E-06					0.3

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.13 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00067	NA	NA	0.00067
				Arsenic	1.5E-06	4.7E-07	NA	2.0E-06	Cardiovascular, Dermal	0.02	0.0061	NA	0.026
				Cadmium	NA	NA	NA	NA	Kidney	0.0066	0.0017	NA	0.0083
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.011	NA	NA	0.011
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0018	NA	NA	0.0018
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0091	NA	NA	0.0091
				Manganese	NA	NA	NA	NA	CNS	0.0033	NA	NA	0.0033
				Mercury	NA	NA	NA	NA	Immunological	0.19	NA	NA	0.19
				Nickel	NA	NA	NA	NA	Body	0.00088	NA	NA	0.00088
				Thallium	NA	NA	NA	NA	Hair	0.06	NA	NA	0.06
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.002	NA	NA	0.002
			PAHs	Benz[a]anthracene	7.5E-08	6.0E-08	NA	1.4E-07	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.1E-06	8.8E-07	NA	2.0E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.1E-07	8.9E-08	NA	2.0E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.0E-07	3.2E-07	NA	7.2E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	8.5E-08	6.9E-08	NA	1.5E-07	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.6E-08	NA	NA	2.6E-08	Liver	0.0003	NA	NA	0.0003
				Heptachlor epoxide	3.0E-08	NA	NA	3.0E-08	Liver	0.0015	NA	NA	0.0015
			PCBs	PCBs (total Aroclors)	4.3E-07	3.7E-07	NA	8.0E-07	Immunological, Dermal, Ocular	0.063	0.054	NA	0.12
				Chemical Total	3.8E-06	2.3E-06	NA	6.0E-06		0.37	0.062	NA	0.43
		Exposure Point Total						6.0E-06					0.43
	Exposure Medium Total							6.0E-06					0.43
Sediment Total								6.0E-06					0.43
Surface Water	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	2.8E-08	8.0E-09	NA	3.6E-08	Cardiovascular, Dermal	0.00037	0.0001	NA	0.00047
				Thallium	NA	NA	NA	NA	Hair	0.0012	0.00034	NA	0.0015
			PAHs	Benzo[a]pyrene	6.1E-08	NA	NA	6.1E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.8E-07	NA	NA	2.8E-07	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	4.8E-08	3.0E-07	NA	3.5E-07	Liver	0.0000023	0.000015	NA	0.000017
				Chemical Total	4.1E-07	3.1E-07	NA	7.3E-07		0.0016	0.00046	NA	0.002
		Exposure Point Total						7.3E-07					0.002
	Exposure Medium Total							7.3E-07					0.002
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								7.3E-07					0.0045
Total Receptor Risks								7E-06					0.4

Notes:

CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.14 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in UBC	Metals	Aluminum	NA	NA	NA	NA	CNS	0.005	NA	NA	0.005
				Antimony	NA	NA	NA	NA	Hematological	0.0028	NA	NA	0.0028
				Arsenic	2.1E-07	3.4E-08	NA	2.5E-07	Cardiovascular, Dermal	0.033	0.0053	NA	0.039
				Cadmium	NA	NA	NA	NA	Kidney	0.0095	0.0012	NA	0.011
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.019	NA	NA	0.019
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0044	NA	NA	0.0044
				Iron	NA	NA	NA	NA	Gastrointestinal	0.017	NA	NA	0.017
				Manganese	NA	NA	NA	NA	CNS	0.0025	NA	NA	0.0025
				Mercury	NA	NA	NA	NA	Immunological	0.31	NA	NA	0.31
				Nickel	NA	NA	NA	NA	Body	0.0016	NA	NA	0.0016
				Thallium	NA	NA	NA	NA	Hair	0.11	NA	NA	0.11
				Vanadium	NA	NA	NA	NA	Dermal	0.0037	NA	NA	0.0037
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0031	NA	NA	0.0031
			PAHs	Benzo[a]pyrene	4.9E-08	2.0E-08	NA	6.9E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	9.8E-09	4.0E-09	NA	1.4E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	6.9E-09	NA	NA	6.9E-09	Liver	0.00095	NA	NA	0.00095
				Heptachlor	5.4E-10	NA	NA	5.4E-10	Liver	0.000017	NA	NA	0.000017
				Heptachlor epoxide	4.5E-09	NA	NA	4.5E-09	Liver	0.0027	NA	NA	0.0027
			PCBs	PCBs (total Aroclors)	4.6E-08	2.0E-08	NA	6.6E-08	Immunological, Dermal, Ocular	0.081	0.036	NA	0.12
			Volatiles	Trichloroethene	4.5E-13	NA	NA	4.5E-13	pmental, Cardiovascular, Immun	0.0000014	NA	NA	0.0000014
				Chemical Total	3.3E-07	7.8E-08	NA	4.1E-07		0.6	0.042	NA	0.64
		Exposure Point Total						4.1E-07					0.64
	Exposure Medium Total							4.1E-07					0.64
Sediment Total								4.1E-07					0.64
Surface Water	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.005	0.005
				Chemical Total	NA	NA	NA	NA		NA	NA	0.005	0.005
		Exposure Point Total						NA					0.005
	Exposure Medium Total							NA					0.005
Surface Water Total								NA					0.005
Total Receptor Risks								4E-07					0.6

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.15 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in Upper Peach Island Creek	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0072	NA	NA	0.0072
				Antimony	NA	NA	NA	NA	Hematological	0.0025	NA	NA	0.0025
				Arsenic	3.5E-07	5.6E-08	NA	4.1E-07	Cardiovascular, Dermal	0.055	0.0087	NA	0.064
				Cadmium	NA	NA	NA	NA	Kidney	0.058	0.0073	NA	0.065
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.029	NA	NA	0.029
				Copper	NA	NA	NA	NA	Gastrointestinal	0.03	NA	NA	0.03
				Iron	NA	NA	NA	NA	Gastrointestinal	0.022	NA	NA	0.022
				Manganese	NA	NA	NA	NA	CNS	0.0022	NA	NA	0.0022
				Mercury	NA	NA	NA	NA	Immunological	0.42	NA	NA	0.42
				Nickel	NA	NA	NA	NA	Body	0.0097	NA	NA	0.0097
				Thallium	NA	NA	NA	NA	Hair	0.17	NA	NA	0.17
				Vanadium	NA	NA	NA	NA	Dermal	0.0055	NA	NA	0.0055
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0053	NA	NA	0.0053
			PAHs	Benzo[a]pyrene	5.7E-08	2.3E-08	NA	8.1E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.7E-08	7.0E-09	NA	2.4E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	5.5E-09	NA	NA	5.5E-09	Liver	0.00075	NA	NA	0.00075
				Heptachlor	8.4E-10	NA	NA	8.4E-10	Liver	0.000026	NA	NA	0.000026
				Heptachlor epoxide	6.5E-09	NA	NA	6.5E-09	Liver	0.0038	NA	NA	0.0038
			PCBs	PCBs (total Aroclors)	1.4E-07	6.2E-08	NA	2.0E-07	Immunological, Dermal, Ocular	0.25	0.11	NA	0.35
			Volatiles	Trichloroethene	8.0E-09	NA	NA	8.0E-09	pmental, Cardiovascular, Immunc	0.024	NA	NA	0.024
				Chemical Total	5.9E-07	1.5E-07	NA	7.4E-07		1.1	0.12	NA	1.2
		Exposure Point Total						7.4E-07					1.2
	Exposure Medium Total							7.4E-07					1.2
Sediment Total								7.4E-07					1.2
Total Receptor Risks								7E-07					1

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
Upper Peach Island Creek is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

TABLE 9.16 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00027	NA	NA	0.00027
				Arsenic	1.8E-07	1.3E-07	NA	3.1E-07	Cardiovascular, Dermal	0.0035	0.0025	NA	0.0059
				Cadmium	NA	NA	NA	NA	Kidney	0.00033	0.00019	NA	0.00051
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0058	NA	NA	0.0058
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0003	NA	NA	0.0003
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0046	NA	NA	0.0046
				Manganese	NA	NA	NA	NA	CNS	0.0058	NA	NA	0.0058
				Mercury	NA	NA	NA	NA	Immunological	0.0073	NA	NA	0.0073
				Nickel	NA	NA	NA	NA	Body	0.00025	NA	NA	0.00025
				Thallium	NA	NA	NA	NA	Hair	0.094	NA	NA	0.094
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00016	NA	NA	0.00016
			PAHs	Benz[a]anthracene	8.1E-09	1.5E-08	NA	2.3E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	8.6E-08	1.6E-07	NA	2.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-08	2.2E-08	NA	3.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.8E-08	5.3E-08	NA	8.1E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	6.3E-09	1.2E-08	NA	1.8E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	8.3E-09	NA	NA	8.3E-09	Liver	0.00014	NA	NA	0.00014
				Heptachlor epoxide	1.5E-09	NA	NA	1.5E-09	Liver	0.00011	NA	NA	0.00011
			PCBs	PCBs (total Aroclors)	3.4E-08	6.7E-08	NA	1.0E-07	Immunological, Dermal, Ocular	0.0073	0.015	NA	0.022
				Chemical Total	3.6E-07	4.6E-07	NA	8.2E-07		0.13	0.017	NA	0.15
		Exposure Point Total						8.2E-07					0.15
	Exposure Medium Total							8.2E-07					0.15
Sediment Total								8.2E-07					0.15
Surface Water	White Perch Fillet	White Perch Fillet in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00066	NA	NA	0.00066
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00031	NA	NA	0.00031
				Manganese	NA	NA	NA	NA	CNS	0.000077	NA	NA	0.000077
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.014	NA	NA	0.014
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0034	NA	NA	0.0034
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.084	NA	NA	0.084
			PCBs	PCBs (total Aroclors)	5.4E-06	NA	NA	5.4E-06	Immunological, Dermal, Ocular	1.2	NA	NA	1.2
				Chemical Total	5.4E-06	NA	NA	5.4E-06		1.3	NA	NA	1.3
		Exposure Point Total						5.4E-06					1.3
	Exposure Medium Total							5.4E-06					1.3
	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	NA	6.5E-09	NA	6.5E-09	Cardiovascular, Dermal	NA	0.00013	NA	0.00013
				Thallium	NA	NA	NA	NA	Hair	NA	0.0006	NA	0.0006
			Volatiles	Vinyl chloride	NA	2.4E-09	NA	2.4E-09	Liver	NA	0.0000096	NA	0.0000096
				Chemical Total	NA	8.8E-09	NA	8.8E-09		NA	0.00073	NA	0.00073
		Exposure Point Total						8.8E-09					0.00073
	Exposure Medium Total							8.8E-09					0.00073
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								5.4E-06					1.3
Total Receptor Risks								6E-06					1

Notes:

CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.17 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00044	NA	NA	0.00044
				Arsenic	4.4E-07	1.4E-07	NA	5.7E-07	Cardiovascular, Dermal	0.0057	0.0018	NA	0.0074
				Cadmium	NA	NA	NA	NA	Kidney	0.00053	0.00013	NA	0.00067
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0095	NA	NA	0.0095
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00049	NA	NA	0.00049
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0075	NA	NA	0.0075
				Manganese	NA	NA	NA	NA	CNS	0.0095	NA	NA	0.0095
				Mercury	NA	NA	NA	NA	Immunological	0.012	NA	NA	0.012
				Nickel	NA	NA	NA	NA	Body	0.00042	NA	NA	0.00042
				Thallium	NA	NA	NA	NA	Hair	0.15	NA	NA	0.15
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00026	NA	NA	0.00026
			PAHs	Benz[a]anthracene	5.4E-08	4.4E-08	NA	9.7E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	5.7E-07	4.6E-07	NA	1.0E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	7.9E-08	6.4E-08	NA	1.4E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.9E-07	1.5E-07	NA	3.4E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	4.2E-08	3.4E-08	NA	7.6E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.0E-08	NA	NA	2.0E-08	Liver	0.00023	NA	NA	0.00023
				Heptachlor epoxide	3.7E-09	NA	NA	3.7E-09	Liver	0.00018	NA	NA	0.00018
			PCBs	PCBs (total Aroclors)	8.2E-08	7.2E-08	NA	1.5E-07	Immunological, Dermal, Ocular	0.012	0.01	NA	0.022
				Chemical Total	1.5E-06	9.6E-07	NA	2.4E-06		0.21	0.012	NA	0.23
		Exposure Point Total						2.4E-06					0.23
	Exposure Medium Total							2.4E-06					0.23
Sediment Total								2.4E-06					0.23
Surface Water	White Perch Fillet	White Perch Fillet in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00072	NA	NA	0.00072
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00034	NA	NA	0.00034
				Manganese	NA	NA	NA	NA	CNS	0.000084	NA	NA	0.000084
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.016	NA	NA	0.016
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0037	NA	NA	0.0037
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.092	NA	NA	0.092
			PCBs	PCBs (total Aroclors)	8.8E-06	NA	NA	8.8E-06	Immunological, Dermal, Ocular	1.3	NA	NA	1.3
				Chemical Total	8.8E-06	NA	NA	8.8E-06		1.4	NA	NA	1.4
		Exposure Point Total						8.8E-06					1.4
	Exposure Medium Total							8.8E-06					1.4
	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	NA	1.0E-08	NA	1.0E-08	Cardiovascular, Dermal	NA	0.00013	NA	0.00013
				Thallium	NA	NA	NA	NA	Hair	NA	0.00064	NA	0.00064
			Volatiles	Vinyl chloride	NA	3.0E-07	NA	3.0E-07	Liver	NA	0.00001	NA	0.00001
				Chemical Total	NA	3.1E-07	NA	3.1E-07		NA	0.00078	NA	0.00078
		Exposure Point Total						3.1E-07					0.00078
	Exposure Medium Total							3.1E-07					0.00078
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								9.1E-06					1.4
Total Receptor Risks								1E-05					2

TABLE 9.17 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

Medium	Exposure Medium	Exposure Point	Chemical Class	COPC	Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
					Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation	Exposure Routes Total
									Total Body HI Across All Media=				0.0004
									Total Cardiovascular HI Across All Media=				0.008
									Total CNS HI Across All Media=				0.1
									Total Dermal HI Across All Media=				1
									Total Developmental HI Across All Media=				0.09
									Total Gastrointestinal HI Across All Media=				0.009
									Total Hair HI Across All Media=				0.2
									Total Hematological HI Across All Media=				0.004
									Total Immunological HI Across All Media=				1
									Total Kidney HI Across All Media=				0.0007
									Total Liver HI Across All Media=				0.0004
									Total Ocular HI Across All Media=				1
									Total Thyroid HI Across All Media=				0.01

Notes:
CNS = central nervous system
COPC =chemical of potential concern
HI = hazard index
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.18 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	White Perch Fillet	White Perch Fillet in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0012	NA	NA	0.0012
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00055	NA	NA	0.00055
				Manganese	NA	NA	NA	NA	CNS	0.00014	NA	NA	0.00014
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.025	NA	NA	0.025
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.006	NA	NA	0.006
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.15	NA	NA	0.15
			PCBs	PCBs (total Aroclors)	7.1E-06	NA	NA	7.1E-06	Immunological, Dermal, Ocular	2.1	NA	NA	2.1
				Chemical Total	7.1E-06	NA	NA	7.1E-06		2.3	NA	NA	2.3
		Exposure Point Total						7.1E-06					2.3
	Exposure Medium Total							7.1E-06					2.3
Surface Water Total								7.1E-06					2.3
Total Receptor Risks								7E-06					2

Total CNS HI Across All Media=	0.2
Total Dermal HI Across All Media=	2
Total Developmental HI Across All Media=	0.2
Total Gastrointestinal HI Across All Media=	0.002
Total Hematological HI Across All Media=	0.006
Total Immunological HI Across All Media=	2
Total Ocular HI Across All Media=	2

Notes:
CNS = central nervous system
COPC =chemical of potential concern
HI = hazard index
MBC = Middle Berry's Creek
N = sample size
NA = not available
PCBs = polychlorinated biphenyls

TABLE 9.19 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00027	NA	NA	0.00027
				Arsenic	1.8E-07	1.3E-07	NA	3.1E-07	Cardiovascular, Dermal	0.0035	0.0025	NA	0.0059
				Cadmium	NA	NA	NA	NA	Kidney	0.00033	0.00019	NA	0.00051
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0058	NA	NA	0.0058
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0003	NA	NA	0.0003
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0046	NA	NA	0.0046
				Manganese	NA	NA	NA	NA	CNS	0.0058	NA	NA	0.0058
				Mercury	NA	NA	NA	NA	Immunological	0.0073	NA	NA	0.0073
				Nickel	NA	NA	NA	NA	Body	0.00025	NA	NA	0.00025
				Thallium	NA	NA	NA	NA	Hair	0.094	NA	NA	0.094
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00016	NA	NA	0.00016
			PAHs	Benz[a]anthracene	8.1E-09	1.5E-08	NA	2.3E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	8.6E-08	1.6E-07	NA	2.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-08	2.2E-08	NA	3.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.8E-08	5.3E-08	NA	8.1E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	6.3E-09	1.2E-08	NA	1.8E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	8.3E-09	NA	NA	8.3E-09	Liver	0.00014	NA	NA	0.00014
				Heptachlor epoxide	1.5E-09	NA	NA	1.5E-09	Liver	0.00011	NA	NA	0.00011
			PCBs	PCBs (total Aroclors)	3.4E-08	6.7E-08	NA	1.0E-07	Immunological, Dermal, Ocular	0.0073	0.015	NA	0.022
				Chemical Total	3.6E-07	4.6E-07	NA	8.2E-07		0.13	0.017	NA	0.15
		Exposure Point Total						8.2E-07					0.15
	Exposure Medium Total							8.2E-07					0.15
Sediment Total								8.2E-07					0.15
Surface Water	Blue Crab Muscle	Blue Crab Muscle in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0083	NA	NA	0.0083
				Iron	NA	NA	NA	NA	Gastrointestinal	0.001	NA	NA	0.001
				Manganese	NA	NA	NA	NA	CNS	0.009	NA	NA	0.009
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0095	NA	NA	0.0095
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0061	NA	NA	0.0061
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.056	NA	NA	0.056
			PCBs	PCBs (total Aroclors)	1.9E-07	NA	NA	1.9E-07	Immunological, Dermal, Ocular	0.041	NA	NA	0.041
				Chemical Total	1.9E-07	NA	NA	1.9E-07		0.13	NA	NA	0.13
		Exposure Point Total						1.9E-07					0.13
	Exposure Medium Total							1.9E-07					0.13
	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	NA	6.5E-09	NA	6.5E-09	Cardiovascular, Dermal	NA	0.00013	NA	0.00013
				Thallium	NA	NA	NA	NA	Hair	NA	0.0006	NA	0.0006
			Volatiles	Vinyl chloride	NA	2.4E-09	NA	2.4E-09	Liver	NA	0.0000096	NA	0.0000096
				Chemical Total	NA	8.8E-09	NA	8.8E-09		NA	0.00073	NA	0.00073
		Exposure Point Total						8.8E-09					0.00073
	Exposure Medium Total							8.8E-09					0.00073
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								1.9E-07					0.13
Total Receptor Risks								1E-06					0.3

Notes:
CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.20 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00044	NA	NA	0.00044
				Arsenic	4.4E-07	1.4E-07	NA	5.7E-07	Cardiovascular, Dermal	0.0057	0.0018	NA	0.0074
				Cadmium	NA	NA	NA	NA	Kidney	0.00053	0.00013	NA	0.00067
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0095	NA	NA	0.0095
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00049	NA	NA	0.00049
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0075	NA	NA	0.0075
				Manganese	NA	NA	NA	NA	CNS	0.0095	NA	NA	0.0095
				Mercury	NA	NA	NA	NA	Immunological	0.012	NA	NA	0.012
				Nickel	NA	NA	NA	NA	Body	0.00042	NA	NA	0.00042
				Thallium	NA	NA	NA	NA	Hair	0.15	NA	NA	0.15
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00026	NA	NA	0.00026
			PAHs	Benz[a]anthracene	5.4E-08	4.4E-08	NA	9.7E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	5.7E-07	4.6E-07	NA	1.0E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	7.9E-08	6.4E-08	NA	1.4E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.9E-07	1.5E-07	NA	3.4E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	4.2E-08	3.4E-08	NA	7.6E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.0E-08	NA	NA	2.0E-08	Liver	0.00023	NA	NA	0.00023
				Heptachlor epoxide	3.7E-09	NA	NA	3.7E-09	Liver	0.00018	NA	NA	0.00018
			PCBs	PCBs (total Aroclors)	8.2E-08	7.2E-08	NA	1.5E-07	Immunological, Dermal, Ocular	0.012	0.01	NA	0.022
				Chemical Total	1.5E-06	9.6E-07	NA	2.4E-06		0.21	0.012	NA	0.23
		Exposure Point Total						2.4E-06					0.23
	Exposure Medium Total							2.4E-06					0.23
Sediment Total								2.4E-06					0.23
Surface Water	Blue Crab Muscle	Blue Crab Muscle in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0091	NA	NA	0.0091
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0011	NA	NA	0.0011
				Manganese	NA	NA	NA	NA	CNS	0.0099	NA	NA	0.0099
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.01	NA	NA	0.01
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0067	NA	NA	0.0067
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.061	NA	NA	0.061
			PCBs	PCBs (total Aroclors)	3.1E-07	NA	NA	3.1E-07	Immunological, Dermal, Ocular	0.045	NA	NA	0.045
				Chemical Total	3.1E-07	NA	NA	3.1E-07		0.14	NA	NA	0.14
		Exposure Point Total						3.1E-07					0.14
	Exposure Medium Total							3.1E-07					0.14
	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	NA	1.0E-08	NA	1.0E-08	Cardiovascular, Dermal	NA	0.00013	NA	0.00013
				Thallium	NA	NA	NA	NA	Hair	NA	0.00064	NA	0.00064
			Volatiles	Vinyl chloride	NA	3.0E-07	NA	3.0E-07	Liver	NA	0.00001	NA	0.00001
				Chemical Total	NA	3.1E-07	NA	3.1E-07		NA	0.00078	NA	0.00078
		Exposure Point Total						3.1E-07					0.00078
	Exposure Medium Total							3.1E-07					0.00078
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								6.2E-07					0.15
Total Receptor Risks								3E-06					0.4

Notes:

CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.21 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	Blue Crab Muscle	Blue Crab Muscle in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.015	NA	NA	0.015
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0018	NA	NA	0.0018
				Manganese	NA	NA	NA	NA	CNS	0.016	NA	NA	0.016
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.017	NA	NA	0.017
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.011	NA	NA	0.011
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.099	NA	NA	0.099
			PCBs	PCBs (total Aroclors)	2.5E-07	NA	NA	2.5E-07	Immunological, Dermal, Ocular	0.072	NA	NA	0.072
				Chemical Total	2.5E-07	NA	NA	2.5E-07		0.23	NA	NA	0.23
		Exposure Point Total						2.5E-07					0.23
	Exposure Medium Total							2.5E-07					0.23
Surface Water Total								2.5E-07					0.23
Total Receptor Risks								2E-07					0.2

Notes:
CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PCBs = polychlorinated biphenyls

TABLE 9.22 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00027	NA	NA	0.00027
				Arsenic	1.8E-07	1.3E-07	NA	3.1E-07	Cardiovascular, Dermal	0.0035	0.0025	NA	0.0059
				Cadmium	NA	NA	NA	NA	Kidney	0.00033	0.00019	NA	0.00051
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0058	NA	NA	0.0058
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0003	NA	NA	0.0003
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0046	NA	NA	0.0046
				Manganese	NA	NA	NA	NA	CNS	0.0058	NA	NA	0.0058
				Mercury	NA	NA	NA	NA	Immunological	0.0073	NA	NA	0.0073
				Nickel	NA	NA	NA	NA	Body	0.00025	NA	NA	0.00025
				Thallium	NA	NA	NA	NA	Hair	0.094	NA	NA	0.094
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00016	NA	NA	0.00016
			PAHs	Benz[a]anthracene	8.1E-09	1.5E-08	NA	2.3E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	8.6E-08	1.6E-07	NA	2.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-08	2.2E-08	NA	3.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.8E-08	5.3E-08	NA	8.1E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	6.3E-09	1.2E-08	NA	1.8E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	8.3E-09	NA	NA	8.3E-09	Liver	0.00014	NA	NA	0.00014
				Heptachlor epoxide	1.5E-09	NA	NA	1.5E-09	Liver	0.00011	NA	NA	0.00011
			PCBs	PCBs (total Aroclors)	3.4E-08	6.7E-08	NA	1.0E-07	Immunological, Dermal, Ocular	0.0073	0.015	NA	0.022
				Chemical Total	3.6E-07	4.6E-07	NA	8.2E-07		0.13	0.017	NA	0.15
		Exposure Point Total						8.2E-07					0.15
	Exposure Medium Total							8.2E-07					0.15
Sediment Total								8.2E-07					0.15
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0083	NA	NA	0.0083
				Iron	NA	NA	NA	NA	Gastrointestinal	0.001	NA	NA	0.001
				Manganese	NA	NA	NA	NA	CNS	0.009	NA	NA	0.009
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0082	NA	NA	0.0082
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0061	NA	NA	0.0061
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.039	NA	NA	0.039
			PCBs	PCBs (total Aroclors)	6.0E-07	NA	NA	6.0E-07	Immunological, Dermal, Ocular	0.13	NA	NA	0.13
				Chemical Total	6.0E-07	NA	NA	6.0E-07		0.2	NA	NA	0.2
		Exposure Point Total						6.0E-07					0.2
	Exposure Medium Total							6.0E-07					0.2
	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	NA	6.5E-09	NA	6.5E-09	Cardiovascular, Dermal	NA	0.00013	NA	0.00013
				Thallium	NA	NA	NA	NA	Hair	NA	0.0006	NA	0.0006
			Volatiles	Vinyl chloride	NA	2.4E-09	NA	2.4E-09	Liver	NA	0.0000096	NA	0.0000096
				Chemical Total	NA	8.8E-09	NA	8.8E-09		NA	0.00073	NA	0.00073
		Exposure Point Total						8.8E-09					0.00073
	Exposure Medium Total							8.8E-09					0.00073
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								6.1E-07					0.21
Total Receptor Risks								1E-06					0.4

Notes:
CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.23 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00044	NA	NA	0.00044
				Arsenic	4.4E-07	1.4E-07	NA	5.7E-07	Cardiovascular, Dermal	0.0057	0.0018	NA	0.0074
				Cadmium	NA	NA	NA	NA	Kidney	0.00053	0.00013	NA	0.00067
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0095	NA	NA	0.0095
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00049	NA	NA	0.00049
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0075	NA	NA	0.0075
				Manganese	NA	NA	NA	NA	CNS	0.0095	NA	NA	0.0095
				Mercury	NA	NA	NA	NA	Immunological	0.012	NA	NA	0.012
				Nickel	NA	NA	NA	NA	Body	0.00042	NA	NA	0.00042
				Thallium	NA	NA	NA	NA	Hair	0.15	NA	NA	0.15
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00026	NA	NA	0.00026
			PAHs	Benz[a]anthracene	5.4E-08	4.4E-08	NA	9.7E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	5.7E-07	4.6E-07	NA	1.0E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	7.9E-08	6.4E-08	NA	1.4E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.9E-07	1.5E-07	NA	3.4E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	4.2E-08	3.4E-08	NA	7.6E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.0E-08	NA	NA	2.0E-08	Liver	0.00023	NA	NA	0.00023
				Heptachlor epoxide	3.7E-09	NA	NA	3.7E-09	Liver	0.00018	NA	NA	0.00018
			PCBs	PCBs (total Aroclors)	8.2E-08	7.2E-08	NA	1.5E-07	Immunological, Dermal, Ocular	0.012	0.01	NA	0.022
				Chemical Total	1.5E-06	9.6E-07	NA	2.4E-06		0.21	0.012	NA	0.23
		Exposure Point Total						2.4E-06					0.23
	Exposure Medium Total							2.4E-06					0.23
Sediment Total								2.4E-06					0.23
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0091	NA	NA	0.0091
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0011	NA	NA	0.0011
				Manganese	NA	NA	NA	NA	CNS	0.0099	NA	NA	0.0099
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.009	NA	NA	0.009
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0067	NA	NA	0.0067
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.043	NA	NA	0.043
			PCBs	PCBs (total Aroclors)	9.8E-07	NA	NA	9.8E-07	Immunological, Dermal, Ocular	0.14	NA	NA	0.14
				Chemical Total	9.8E-07	NA	NA	9.8E-07		0.22	NA	NA	0.22
		Exposure Point Total						9.8E-07					0.22
	Exposure Medium Total							9.8E-07					0.22
	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	NA	1.0E-08	NA	1.0E-08	Cardiovascular, Dermal	NA	0.00013	NA	0.00013
				Thallium	NA	NA	NA	NA	Hair	NA	0.00064	NA	0.00064
			Volatiles	Vinyl chloride	NA	3.0E-07	NA	3.0E-07	Liver	NA	0.00001	NA	0.00001
				Chemical Total	NA	3.1E-07	NA	3.1E-07		NA	0.00078	NA	0.00078
		Exposure Point Total						3.1E-07					0.00078
	Exposure Medium Total							3.1E-07					0.00078
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								1.3E-06					0.22
Total Receptor Risks								4E-06					0.5

Notes:

CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.24 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.015	NA	NA	0.015
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0018	NA	NA	0.0018
				Manganese	NA	NA	NA	NA	CNS	0.016	NA	NA	0.016
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.015	NA	NA	0.015
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.011	NA	NA	0.011
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.069	NA	NA	0.069
			PCBs	PCBs (total Aroclors)	7.9E-07	NA	NA	7.9E-07	Immunological, Dermal, Ocular	0.23	NA	NA	0.23
				Chemical Total	7.9E-07	NA	NA	7.9E-07		0.36	NA	NA	0.36
		Exposure Point Total						7.9E-07					0.36
	Exposure Medium Total							7.9E-07					0.36
Surface Water Total								7.9E-07					0.36
Total Receptor Risks								8E-07					0.4

Notes:
CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PCBs = polychlorinated biphenyls

TABLE 9.25 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00016	NA	NA	0.00016
				Arsenic	1.1E-07	8.0E-08	NA	1.9E-07	Cardiovascular, Dermal	0.0022	0.0015	NA	0.0037
				Cadmium	NA	NA	NA	NA	Kidney	0.00022	0.00012	NA	0.00034
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0033	NA	NA	0.0033
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0002	NA	NA	0.0002
				Iron	NA	NA	NA	NA	Gastrointestinal	0.003	NA	NA	0.003
				Manganese	NA	NA	NA	NA	CNS	0.0029	NA	NA	0.0029
				Mercury	NA	NA	NA	NA	Immunological	0.0044	NA	NA	0.0044
				Nickel	NA	NA	NA	NA	Body	0.00015	NA	NA	0.00015
				Thallium	NA	NA	NA	NA	Hair	0.047	NA	NA	0.047
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0001	NA	NA	0.0001
			PAHs	Benz[a]anthracene	4.9E-09	9.0E-09	NA	1.4E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	7.1E-08	1.3E-07	NA	2.0E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	7.3E-09	1.4E-08	NA	2.1E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.0E-08	3.7E-08	NA	5.7E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	4.0E-09	7.4E-09	NA	1.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.7E-09	NA	NA	1.7E-09	Liver	0.000028	NA	NA	0.000028
				Heptachlor epoxide	9.2E-10	NA	NA	9.2E-10	Liver	0.000068	NA	NA	0.000068
			PCBs	PCBs (total Aroclors)	2.0E-08	4.1E-08	NA	6.1E-08	Immunological, Dermal, Ocular	0.0044	0.0089	NA	0.013
				Chemical Total	2.4E-07	3.2E-07	NA	5.6E-07		0.068	0.011	NA	0.079
		Exposure Point Total						5.6E-07					0.079
	Exposure Medium Total							5.6E-07					0.079
Sediment Total								5.6E-07					0.079
Surface Water	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	4.7E-09	2.0E-09	NA	6.7E-09	Cardiovascular, Dermal	0.000092	0.000038	NA	0.00013
				Thallium	NA	NA	NA	NA	Hair	0.00044	0.00018	NA	0.00062
			PAHs	Benzo[a]pyrene	4.7E-09	NA	NA	4.7E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.0E-08	NA	NA	3.0E-08	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	1.7E-10	1.6E-09	NA	1.8E-09	Liver	7.1E-07	0.0000067	NA	0.0000074
				Chemical Total	4.0E-08	3.6E-09	NA	4.3E-08		0.00053	0.00023	NA	0.00075
		Exposure Point Total						4.3E-08					0.00075
	Exposure Medium Total							4.3E-08					0.00075
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00068	0.00068
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00068	0.00068
		Exposure Point Total						NA					0.00068
	Exposure Medium Total							NA					0.00068
Surface Water Total								4.3E-08					0.0014
Total Receptor Risks								6E-07					0.08

Notes:

CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.26 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00027	NA	NA	0.00027
				Arsenic	2.7E-07	8.5E-08	NA	3.6E-07	Cardiovascular, Dermal	0.0036	0.0011	NA	0.0047
				Cadmium	NA	NA	NA	NA	Kidney	0.00036	0.000088	NA	0.00044
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0055	NA	NA	0.0055
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00033	NA	NA	0.00033
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0049	NA	NA	0.0049
				Manganese	NA	NA	NA	NA	CNS	0.0048	NA	NA	0.0048
				Mercury	NA	NA	NA	NA	Immunological	0.0072	NA	NA	0.0072
				Nickel	NA	NA	NA	NA	Body	0.00025	NA	NA	0.00025
				Thallium	NA	NA	NA	NA	Hair	0.077	NA	NA	0.077
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00017	NA	NA	0.00017
			PAHs	Benz[a]anthracene	3.2E-08	2.6E-08	NA	5.8E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	4.7E-07	3.8E-07	NA	8.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	4.9E-08	3.9E-08	NA	8.8E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.3E-07	1.1E-07	NA	2.4E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	2.6E-08	2.1E-08	NA	4.8E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.1E-09	NA	NA	4.1E-09	Liver	0.000047	NA	NA	0.000047
				Heptachlor epoxide	2.3E-09	NA	NA	2.3E-09	Liver	0.00011	NA	NA	0.00011
			PCBs	PCBs (total Aroclors)	5.0E-08	4.3E-08	NA	9.3E-08	Immunological, Dermal, Ocular	0.0073	0.0063	NA	0.014
				Chemical Total	1.0E-06	7.0E-07	NA	1.7E-06		0.11	0.0075	NA	0.12
		Exposure Point Total						1.7E-06					0.12
	Exposure Medium Total							1.7E-06					0.12
Sediment Total								1.7E-06					0.12
Surface Water	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	1.2E-08	3.3E-09	NA	1.5E-08	Cardiovascular, Dermal	0.00015	0.000043	NA	0.00019
				Thallium	NA	NA	NA	NA	Hair	0.00071	0.0002	NA	0.00092
			PAHs	Benzo[a]pyrene	3.1E-08	NA	NA	3.1E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.0E-07	NA	NA	2.0E-07	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	5.1E-08	3.3E-07	NA	3.8E-07	Liver	0.0000012	0.0000074	NA	0.0000086
				Chemical Total	2.9E-07	3.3E-07	NA	6.3E-07		0.00087	0.00025	NA	0.0011
		Exposure Point Total						6.3E-07					0.0011
	Exposure Medium Total							6.3E-07					0.0011
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00068	0.00068
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00068	0.00068
		Exposure Point Total						NA					0.00068
	Exposure Medium Total							NA					0.00068
Surface Water Total								6.3E-07					0.0018
Total Receptor Risks								2E-06					0.1

Notes:
CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.27 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00035	NA	NA	0.00035
				Arsenic	2.4E-07	1.7E-07	NA	4.1E-07	Cardiovascular, Dermal	0.0047	0.0034	NA	0.008
				Cadmium	NA	NA	NA	NA	Kidney	0.00047	0.00027	NA	0.00074
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0072	NA	NA	0.0072
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00044	NA	NA	0.00044
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0064	NA	NA	0.0064
				Manganese	NA	NA	NA	NA	CNS	0.0063	NA	NA	0.0063
				Mercury	NA	NA	NA	NA	Immunological	0.0095	NA	NA	0.0095
				Nickel	NA	NA	NA	NA	Body	0.00033	NA	NA	0.00033
				Thallium	NA	NA	NA	NA	Hair	0.1	NA	NA	0.1
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00022	NA	NA	0.00022
			PAHs	Benz[a]anthracene	1.1E-08	2.0E-08	NA	3.0E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.5E-07	2.8E-07	NA	4.4E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.6E-08	2.9E-08	NA	4.5E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.3E-08	8.1E-08	NA	1.2E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	8.6E-09	1.6E-08	NA	2.5E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	3.6E-09	NA	NA	3.6E-09	Liver	0.000061	NA	NA	0.000061
				Heptachlor epoxide	2.0E-09	NA	NA	2.0E-09	Liver	0.00015	NA	NA	0.00015
			PCBs	PCBs (total Aroclors)	4.4E-08	8.8E-08	NA	1.3E-07	Immunological, Dermal, Ocular	0.0096	0.019	NA	0.029
				Chemical Total	5.2E-07	6.9E-07	NA	1.2E-06		0.15	0.023	NA	0.17
		Exposure Point Total						1.2E-06					0.17
	Exposure Medium Total							1.2E-06					0.17
Sediment Total								1.2E-06					0.17
Surface Water	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	1.0E-08	4.3E-09	NA	1.5E-08	Cardiovascular, Dermal	0.0002	0.000083	NA	0.00028
				Thallium	NA	NA	NA	NA	Hair	0.00094	0.00039	NA	0.0013
			PAHs	Benzo[a]pyrene	1.0E-08	NA	NA	1.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	6.5E-08	NA	NA	6.5E-08	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	3.8E-10	3.6E-09	NA	3.9E-09	Liver	0.0000015	0.000014	NA	0.000016
				Chemical Total	8.6E-08	7.8E-09	NA	9.4E-08		0.0011	0.00049	NA	0.0016
		Exposure Point Total						9.4E-08					0.0016
	Exposure Medium Total							9.4E-08					0.0016
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0015	0.0015
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0015	0.0015
		Exposure Point Total						NA					0.0015
	Exposure Medium Total							NA					0.0015
Surface Water Total								9.4E-08					0.0031
Total Receptor Risks								1E-06					0.2

Notes:
CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.28 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00058	NA	NA	0.00058
				Arsenic	5.9E-07	1.8E-07	NA	7.8E-07	Cardiovascular, Dermal	0.0077	0.0024	NA	0.01
				Cadmium	NA	NA	NA	NA	Kidney	0.00077	0.00019	NA	0.00096
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.012	NA	NA	0.012
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00071	NA	NA	0.00071
				Iron	NA	NA	NA	NA	Gastrointestinal	0.011	NA	NA	0.011
				Manganese	NA	NA	NA	NA	CNS	0.01	NA	NA	0.01
				Mercury	NA	NA	NA	NA	Immunological	0.016	NA	NA	0.016
				Nickel	NA	NA	NA	NA	Body	0.00055	NA	NA	0.00055
				Thallium	NA	NA	NA	NA	Hair	0.17	NA	NA	0.17
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00037	NA	NA	0.00037
			PAHs	Benz[a]anthracene	7.0E-08	5.6E-08	NA	1.3E-07	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.0E-06	8.2E-07	NA	1.8E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.1E-07	8.5E-08	NA	1.9E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.9E-07	2.3E-07	NA	5.2E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	5.7E-08	4.6E-08	NA	1.0E-07	NA	NA	NA	NA	NA
			Pesticides	Aldrin	8.8E-09	NA	NA	8.8E-09	Liver	0.0001	NA	NA	0.0001
				Heptachlor epoxide	4.9E-09	NA	NA	4.9E-09	Liver	0.00024	NA	NA	0.00024
			PCBs	PCBs (total Aroclors)	1.1E-07	9.4E-08	NA	2.0E-07	Immunological, Dermal, Ocular	0.016	0.014	NA	0.03
				Chemical Total	2.3E-06	1.5E-06	NA	3.8E-06		0.24	0.016	NA	0.26
		Exposure Point Total						3.8E-06					0.26
	Exposure Medium Total							3.8E-06					0.26
Sediment Total								3.8E-06					0.26
Surface Water	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	2.5E-08	7.1E-09	NA	3.2E-08	Cardiovascular, Dermal	0.00033	0.000093	NA	0.00042
				Thallium	NA	NA	NA	NA	Hair	0.0015	0.00044	NA	0.002
			PAHs	Benzo[a]pyrene	6.8E-08	NA	NA	6.8E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.3E-07	NA	NA	4.3E-07	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	5.2E-08	3.3E-07	NA	3.8E-07	Liver	0.0000025	0.000016	NA	0.000019
				Chemical Total	5.8E-07	3.4E-07	NA	9.2E-07		0.0019	0.00055	NA	0.0024
		Exposure Point Total						9.2E-07					0.0024
	Exposure Medium Total							9.2E-07					0.0024
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0015	0.0015
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0015	0.0015
		Exposure Point Total						NA					0.0015
	Exposure Medium Total							NA					0.0015
Surface Water Total								9.2E-07					0.0039
Total Receptor Risks								5E-06					0.3

Notes:
CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.29 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in MBC	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0068	NA	NA	0.0068
				Antimony	NA	NA	NA	NA	Hematological	0.0018	NA	NA	0.0018
				Arsenic	1.1E-07	1.8E-08	NA	1.3E-07	Cardiovascular, Dermal	0.018	0.0028	NA	0.021
				Cadmium	NA	NA	NA	NA	Kidney	0.003	0.00038	NA	0.0034
				Chromium (VI)	1.2E-08	NA	NA	1.2E-08	NA	0.00058	NA	NA	0.00058
				Cobalt	NA	NA	NA	NA	Thyroid	0.021	NA	NA	0.021
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0018	NA	NA	0.0018
				Iron	NA	NA	NA	NA	Gastrointestinal	0.024	NA	NA	0.024
				Manganese	NA	NA	NA	NA	CNS	0.0037	NA	NA	0.0037
				Mercury	NA	NA	NA	NA	Immunological	0.1	NA	NA	0.1
				Nickel	NA	NA	NA	NA	Body	0.00096	NA	NA	0.00096
				Thallium	NA	NA	NA	NA	Hair	0.061	NA	NA	0.061
				Vanadium	NA	NA	NA	NA	Dermal	0.0035	NA	NA	0.0035
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0013	NA	NA	0.0013
			PAHs	Benzo[a]pyrene	1.0E-07	4.2E-08	NA	1.5E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.6E-08	6.7E-09	NA	2.3E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	5.2E-09	NA	NA	5.2E-09	Liver	0.00071	NA	NA	0.00071
				Heptachlor	1.4E-10	NA	NA	1.4E-10	Liver	0.0000043	NA	NA	0.0000043
				Heptachlor epoxide	6.3E-10	NA	NA	6.3E-10	Liver	0.00037	NA	NA	0.00037
			PCBs	PCBs (total Aroclors)	1.1E-07	4.9E-08	NA	1.6E-07	Immunological, Dermal, Ocular	0.2	0.086	NA	0.28
			Volatiles	Trichloroethene	3.6E-13	NA	NA	3.6E-13	pmental, Cardiovascular, Immun	0.0000011	NA	NA	0.0000011
				Chemical Total	3.6E-07	1.2E-07	NA	4.8E-07		0.45	0.089	NA	0.54
		Exposure Point Total						4.8E-07					0.54
	Exposure Medium Total							4.8E-07					0.54
Sediment Total								4.8E-07					0.54
Surface Water	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.003	0.003
				Chemical Total	NA	NA	NA	NA		NA	NA	0.003	0.003
		Exposure Point Total						NA					0.003
	Exposure Medium Total							NA					0.003
Surface Water Total								NA					0.003
Total Receptor Risks								5E-07					0.5

Notes:
CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.30 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00042	NA	NA	0.00042
				Arsenic	1.2E-07	8.4E-08	NA	2.0E-07	Cardiovascular, Dermal	0.0023	0.0016	NA	0.0039
				Cadmium	NA	NA	NA	NA	Kidney	0.00019	0.00011	NA	0.0003
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0035	NA	NA	0.0035
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00028	NA	NA	0.00028
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0041	NA	NA	0.0041
				Manganese	NA	NA	NA	NA	CNS	0.00025	NA	NA	0.00025
				Mercury	NA	NA	NA	NA	Immunological	0.0039	NA	NA	0.0039
				Nickel	NA	NA	NA	NA	Body	0.00018	NA	NA	0.00018
				Thallium	NA	NA	NA	NA	Hair	0.031	NA	NA	0.031
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0001	NA	NA	0.0001
			PAHs	Benz[a]anthracene	1.0E-08	1.9E-08	NA	3.0E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.1E-07	2.1E-07	NA	3.2E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.5E-08	2.8E-08	NA	4.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.2E-08	7.9E-08	NA	1.2E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	7.3E-09	1.4E-08	NA	2.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.8E-09	NA	NA	1.8E-09	Liver	0.000031	NA	NA	0.000031
				Heptachlor epoxide	6.9E-10	NA	NA	6.9E-10	Liver	0.000051	NA	NA	0.000051
			PCBs	PCBs (total Aroclors)	1.7E-08	3.5E-08	NA	5.2E-08	Immunological, Dermal, Ocular	0.0038	0.0076	NA	0.011
				Chemical Total	3.2E-07	4.6E-07	NA	7.9E-07		0.051	0.0093	NA	0.06
		Exposure Point Total						7.9E-07					0.06
	Exposure Medium Total							7.9E-07					0.06
Sediment Total								7.9E-07					0.06
Surface Water	White Perch Fillet	White Perch Fillet in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.024	NA	NA	0.024
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00061	NA	NA	0.00061
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00037	NA	NA	0.00037
				Manganese	NA	NA	NA	NA	CNS	0.0001	NA	NA	0.0001
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0084	NA	NA	0.0084
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0039	NA	NA	0.0039
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.079	NA	NA	0.079
			PCBs	PCBs (total Aroclors)	5.5E-06	NA	NA	5.5E-06	Immunological, Dermal, Ocular	1.2	NA	NA	1.2
				Chemical Total	5.5E-06	NA	NA	5.5E-06		1.3	NA	NA	1.3
		Exposure Point Total						5.5E-06					1.3
	Exposure Medium Total							5.5E-06					1.3
	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	NA	6.0E-09	NA	6.0E-09	Cardiovascular, Dermal	NA	0.00012	NA	0.00012
				Thallium	NA	NA	NA	NA	Hair	NA	0.00051	NA	0.00051
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	6.0E-09	NA	6.0E-09		NA	0.00063	NA	0.00063
		Exposure Point Total						6.0E-09					0.00063
	Exposure Medium Total							6.0E-09					0.00063
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								5.5E-06					1.3
Total Receptor Risks								6E-06					1

Notes:

BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.31 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00069	NA	NA	0.00069
				Arsenic	2.9E-07	9.0E-08	NA	3.8E-07	Cardiovascular, Dermal	0.0037	0.0012	NA	0.0049
				Cadmium	NA	NA	NA	NA	Kidney	0.00032	0.000079	NA	0.0004
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0058	NA	NA	0.0058
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00045	NA	NA	0.00045
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0068	NA	NA	0.0068
				Manganese	NA	NA	NA	NA	CNS	0.00042	NA	NA	0.00042
				Mercury	NA	NA	NA	NA	Immunological	0.0065	NA	NA	0.0065
				Nickel	NA	NA	NA	NA	Body	0.0003	NA	NA	0.0003
				Thallium	NA	NA	NA	NA	Hair	0.052	NA	NA	0.052
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00016	NA	NA	0.00016
			PAHs	Benz[a]anthracene	7.0E-08	5.6E-08	NA	1.3E-07	NA	NA	NA	NA	NA
				Benzo[a]pyrene	7.3E-07	5.9E-07	NA	1.3E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.0E-07	8.2E-08	NA	1.8E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.8E-07	2.3E-07	NA	5.1E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	4.8E-08	3.9E-08	NA	8.8E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.4E-09	NA	NA	4.4E-09	Liver	0.000051	NA	NA	0.000051
				Heptachlor epoxide	1.7E-09	NA	NA	1.7E-09	Liver	0.000083	NA	NA	0.000083
			PCBs	PCBs (total Aroclors)	4.3E-08	3.7E-08	NA	8.0E-08	Immunological, Dermal, Ocular	0.0062	0.0054	NA	0.012
				Chemical Total	1.6E-06	1.1E-06	NA	2.7E-06		0.083	0.0066	NA	0.09
		Exposure Point Total						2.7E-06					0.09
	Exposure Medium Total							2.7E-06					0.09
Sediment Total								2.7E-06					0.09
Surface Water	White Perch Fillet	White Perch Fillet in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.026	NA	NA	0.026
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00067	NA	NA	0.00067
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00041	NA	NA	0.00041
				Manganese	NA	NA	NA	NA	CNS	0.00011	NA	NA	0.00011
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0093	NA	NA	0.0093
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0042	NA	NA	0.0042
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.086	NA	NA	0.086
			PCBs	PCBs (total Aroclors)	9.0E-06	NA	NA	9.0E-06	Immunological, Dermal, Ocular	1.3	NA	NA	1.3
				Chemical Total	9.0E-06	NA	NA	9.0E-06		1.4	NA	NA	1.4
		Exposure Point Total						9.0E-06					1.4
	Exposure Medium Total							9.0E-06					1.4
	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	NA	9.6E-09	NA	9.6E-09	Cardiovascular, Dermal	NA	0.00012	NA	0.00012
				Thallium	NA	NA	NA	NA	Hair	NA	0.00055	NA	0.00055
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	9.6E-09	NA	9.6E-09		NA	0.00067	NA	0.00067
		Exposure Point Total						9.6E-09					0.00067
	Exposure Medium Total							9.6E-09					0.00067
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								9.0E-06					1.4
Total Receptor Risks								1E-05					2

TABLE 9.31 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical Class	COPC	Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation	Exposure Routes Total

Total Body HI Across All Media=	0.0003
Total Cardiovascular HI Across All Media=	0.005
Total CNS HI Across All Media=	0.09
Total Dermal HI Across All Media=	1
Total Developmental HI Across All Media=	0.09
Total Gastrointestinal HI Across All Media=	0.008
Total Hair HI Across All Media=	0.05
Total Hematological HI Across All Media=	0.03
Total Immunological HI Across All Media=	1
Total Kidney HI Across All Media=	0.0004
Total Liver HI Across All Media=	0.0001
Total Ocular HI Across All Media=	1
Total Thyroid HI Across All Media=	0.006

Notes:
BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
HI = hazard index
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.32 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	White Perch Fillet	White Perch Fillet in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.042	NA	NA	0.042
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0011	NA	NA	0.0011
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00066	NA	NA	0.00066
				Manganese	NA	NA	NA	NA	CNS	0.00018	NA	NA	0.00018
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.015	NA	NA	0.015
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0069	NA	NA	0.0069
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.14	NA	NA	0.14
			PCBs	PCBs (total Aroclors)	7.2E-06	NA	NA	7.2E-06	Immunological, Dermal, Ocular	2.1	NA	NA	2.1
				Chemical Total	7.2E-06	NA	NA	7.2E-06		2.3	NA	NA	2.3
		Exposure Point Total						7.2E-06					2.3
	Exposure Medium Total							7.2E-06					2.3
Surface Water Total								7.2E-06					2.3
Total Receptor Risks								7E-06					2

Total CNS HI Across All Media=	0.2
Total Dermal HI Across All Media=	2
Total Developmental HI Across All Media=	0.1
Total Gastrointestinal HI Across All Media=	0.002
Total Hematological HI Across All Media=	0.05
Total Immunological HI Across All Media=	2
Total Ocular HI Across All Media=	2

Notes:
BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
HI = hazard index
N = sample size
NA = not available
PCBs = polychlorinated biphenyls

TABLE 9.33 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00042	NA	NA	0.00042
				Arsenic	1.2E-07	8.4E-08	NA	2.0E-07	Cardiovascular, Dermal	0.0023	0.0016	NA	0.0039
				Cadmium	NA	NA	NA	NA	Kidney	0.00019	0.00011	NA	0.0003
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0035	NA	NA	0.0035
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00028	NA	NA	0.00028
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0041	NA	NA	0.0041
				Manganese	NA	NA	NA	NA	CNS	0.00025	NA	NA	0.00025
				Mercury	NA	NA	NA	NA	Immunological	0.0039	NA	NA	0.0039
				Nickel	NA	NA	NA	NA	Body	0.00018	NA	NA	0.00018
				Thallium	NA	NA	NA	NA	Hair	0.031	NA	NA	0.031
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0001	NA	NA	0.0001
			PAHs	Benz[a]anthracene	1.0E-08	1.9E-08	NA	3.0E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.1E-07	2.1E-07	NA	3.2E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.5E-08	2.8E-08	NA	4.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.2E-08	7.9E-08	NA	1.2E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	7.3E-09	1.4E-08	NA	2.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.8E-09	NA	NA	1.8E-09	Liver	0.000031	NA	NA	0.000031
				Heptachlor epoxide	6.9E-10	NA	NA	6.9E-10	Liver	0.000051	NA	NA	0.000051
			PCBs	PCBs (total Aroclors)	1.7E-08	3.5E-08	NA	5.2E-08	Immunological, Dermal, Ocular	0.0038	0.0076	NA	0.011
				Chemical Total	3.2E-07	4.6E-07	NA	7.9E-07		0.051	0.0093	NA	0.06
		Exposure Point Total						7.9E-07					0.06
	Exposure Medium Total							7.9E-07					0.06
Sediment Total								7.9E-07					0.06
Surface Water	Blue Crab Muscle	Blue Crab Muscle in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0071	NA	NA	0.0071
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00051	NA	NA	0.00051
				Manganese	NA	NA	NA	NA	CNS	0.0019	NA	NA	0.0019
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0035	NA	NA	0.0035
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0037	NA	NA	0.0037
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.052	NA	NA	0.052
			PCBs	PCBs (total Aroclors)	5.3E-08	NA	NA	5.3E-08	Immunological, Dermal, Ocular	0.012	NA	NA	0.012
				Chemical Total	5.3E-08	NA	NA	5.3E-08		0.081	NA	NA	0.081
		Exposure Point Total						5.3E-08					0.081
	Exposure Medium Total							5.3E-08					0.081
	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	NA	6.0E-09	NA	6.0E-09	Cardiovascular, Dermal	NA	0.00012	NA	0.00012
				Thallium	NA	NA	NA	NA	Hair	NA	0.00051	NA	0.00051
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	6.0E-09	NA	6.0E-09		NA	0.00063	NA	0.00063
		Exposure Point Total						6.0E-09					0.00063
	Exposure Medium Total							6.0E-09					0.00063
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								5.9E-08					0.084
Total Receptor Risks								8E-07					0.1

Notes:

BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.34 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00069	NA	NA	0.00069
				Arsenic	2.9E-07	9.0E-08	NA	3.8E-07	Cardiovascular, Dermal	0.0037	0.0012	NA	0.0049
				Cadmium	NA	NA	NA	NA	Kidney	0.00032	0.000079	NA	0.0004
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0058	NA	NA	0.0058
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00045	NA	NA	0.00045
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0068	NA	NA	0.0068
				Manganese	NA	NA	NA	NA	CNS	0.00042	NA	NA	0.00042
				Mercury	NA	NA	NA	NA	Immunological	0.0065	NA	NA	0.0065
				Nickel	NA	NA	NA	NA	Body	0.0003	NA	NA	0.0003
				Thallium	NA	NA	NA	NA	Hair	0.052	NA	NA	0.052
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00016	NA	NA	0.00016
			PAHs	Benz[a]anthracene	7.0E-08	5.6E-08	NA	1.3E-07	NA	NA	NA	NA	NA
				Benzo[a]pyrene	7.3E-07	5.9E-07	NA	1.3E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.0E-07	8.2E-08	NA	1.8E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.8E-07	2.3E-07	NA	5.1E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	4.8E-08	3.9E-08	NA	8.8E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.4E-09	NA	NA	4.4E-09	Liver	0.000051	NA	NA	0.000051
				Heptachlor epoxide	1.7E-09	NA	NA	1.7E-09	Liver	0.000083	NA	NA	0.000083
			PCBs	PCBs (total Aroclors)	4.3E-08	3.7E-08	NA	8.0E-08	Immunological, Dermal, Ocular	0.0062	0.0054	NA	0.012
				Chemical Total	1.6E-06	1.1E-06	NA	2.7E-06		0.083	0.0066	NA	0.09
		Exposure Point Total						2.7E-06					0.09
	Exposure Medium Total							2.7E-06					0.09
Sediment Total								2.7E-06					0.09
Surface Water	Blue Crab Muscle	Blue Crab Muscle in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0078	NA	NA	0.0078
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00056	NA	NA	0.00056
				Manganese	NA	NA	NA	NA	CNS	0.0021	NA	NA	0.0021
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0039	NA	NA	0.0039
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0041	NA	NA	0.0041
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.057	NA	NA	0.057
			PCBs	PCBs (total Aroclors)	8.8E-08	NA	NA	8.8E-08	Immunological, Dermal, Ocular	0.013	NA	NA	0.013
				Chemical Total	8.8E-08	NA	NA	8.8E-08		0.088	NA	NA	0.088
		Exposure Point Total						8.8E-08					0.088
	Exposure Medium Total							8.8E-08					0.088
	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	NA	9.6E-09	NA	9.6E-09	Cardiovascular, Dermal	NA	0.00012	NA	0.00012
				Thallium	NA	NA	NA	NA	Hair	NA	0.00055	NA	0.00055
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	9.6E-09	NA	9.6E-09		NA	0.00067	NA	0.00067
		Exposure Point Total						9.6E-09					0.00067
	Exposure Medium Total							9.6E-09					0.00067
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								9.7E-08					0.091
Total Receptor Risks								3E-06					0.2

Notes:

BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.35 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	Blue Crab Muscle	Blue Crab Muscle in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.013	NA	NA	0.013
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00091	NA	NA	0.00091
				Manganese	NA	NA	NA	NA	CNS	0.0034	NA	NA	0.0034
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0063	NA	NA	0.0063
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0066	NA	NA	0.0066
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.092	NA	NA	0.092
			PCBs	PCBs (total Aroclors)	7.1E-08	NA	NA	7.1E-08	Immunological, Dermal, Ocular	0.021	NA	NA	0.021
				Chemical Total	7.1E-08	NA	NA	7.1E-08		0.14	NA	NA	0.14
		Exposure Point Total						7.1E-08					0.14
	Exposure Medium Total							7.1E-08					0.14
Surface Water Total								7.1E-08					0.14
Total Receptor Risks								7E-08					0.1

Notes:
BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PCBs = polychlorinated biphenyls

TABLE 9.36 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00042	NA	NA	0.00042
				Arsenic	1.2E-07	8.4E-08	NA	2.0E-07	Cardiovascular, Dermal	0.0023	0.0016	NA	0.0039
				Cadmium	NA	NA	NA	NA	Kidney	0.00019	0.00011	NA	0.0003
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0035	NA	NA	0.0035
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00028	NA	NA	0.00028
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0041	NA	NA	0.0041
				Manganese	NA	NA	NA	NA	CNS	0.00025	NA	NA	0.00025
				Mercury	NA	NA	NA	NA	Immunological	0.0039	NA	NA	0.0039
				Nickel	NA	NA	NA	NA	Body	0.00018	NA	NA	0.00018
				Thallium	NA	NA	NA	NA	Hair	0.031	NA	NA	0.031
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0001	NA	NA	0.0001
			PAHs	Benz[a]anthracene	1.0E-08	1.9E-08	NA	3.0E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.1E-07	2.1E-07	NA	3.2E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.5E-08	2.8E-08	NA	4.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.2E-08	7.9E-08	NA	1.2E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	7.3E-09	1.4E-08	NA	2.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.8E-09	NA	NA	1.8E-09	Liver	0.000031	NA	NA	0.000031
				Heptachlor epoxide	6.9E-10	NA	NA	6.9E-10	Liver	0.000051	NA	NA	0.000051
			PCBs	PCBs (total Aroclors)	1.7E-08	3.5E-08	NA	5.2E-08	Immunological, Dermal, Ocular	0.0038	0.0076	NA	0.011
				Chemical Total	3.2E-07	4.6E-07	NA	7.9E-07		0.051	0.0093	NA	0.06
		Exposure Point Total						7.9E-07					0.06
	Exposure Medium Total							7.9E-07					0.06
Sediment Total								7.9E-07					0.06
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0071	NA	NA	0.0071
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00051	NA	NA	0.00051
				Manganese	NA	NA	NA	NA	CNS	0.0019	NA	NA	0.0019
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0063	NA	NA	0.0063
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0037	NA	NA	0.0037
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.047	NA	NA	0.047
			PCBs	PCBs (total Aroclors)	7.1E-07	NA	NA	7.1E-07	Immunological, Dermal, Ocular	0.16	NA	NA	0.16
				Chemical Total	7.1E-07	NA	NA	7.1E-07		0.22	NA	NA	0.22
		Exposure Point Total						7.1E-07					0.22
	Exposure Medium Total							7.1E-07					0.22
	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	NA	6.0E-09	NA	6.0E-09	Cardiovascular, Dermal	NA	0.00012	NA	0.00012
				Thallium	NA	NA	NA	NA	Hair	NA	0.00051	NA	0.00051
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	6.0E-09	NA	6.0E-09		NA	0.00063	NA	0.00063
		Exposure Point Total						6.0E-09					0.00063
	Exposure Medium Total							6.0E-09					0.00063
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								7.2E-07					0.23
Total Receptor Risks								2E-06					0.3

Notes:

BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.37 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00069	NA	NA	0.00069
				Arsenic	2.9E-07	9.0E-08	NA	3.8E-07	Cardiovascular, Dermal	0.0037	0.0012	NA	0.0049
				Cadmium	NA	NA	NA	NA	Kidney	0.00032	0.000079	NA	0.0004
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0058	NA	NA	0.0058
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00045	NA	NA	0.00045
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0068	NA	NA	0.0068
				Manganese	NA	NA	NA	NA	CNS	0.00042	NA	NA	0.00042
				Mercury	NA	NA	NA	NA	Immunological	0.0065	NA	NA	0.0065
				Nickel	NA	NA	NA	NA	Body	0.0003	NA	NA	0.0003
				Thallium	NA	NA	NA	NA	Hair	0.052	NA	NA	0.052
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00016	NA	NA	0.00016
			PAHs	Benz[a]anthracene	7.0E-08	5.6E-08	NA	1.3E-07	NA	NA	NA	NA	NA
				Benzo[a]pyrene	7.3E-07	5.9E-07	NA	1.3E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.0E-07	8.2E-08	NA	1.8E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.8E-07	2.3E-07	NA	5.1E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	4.8E-08	3.9E-08	NA	8.8E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.4E-09	NA	NA	4.4E-09	Liver	0.000051	NA	NA	0.000051
				Heptachlor epoxide	1.7E-09	NA	NA	1.7E-09	Liver	0.000083	NA	NA	0.000083
			PCBs	PCBs (total Aroclors)	4.3E-08	3.7E-08	NA	8.0E-08	Immunological, Dermal, Ocular	0.0062	0.0054	NA	0.012
				Chemical Total	1.6E-06	1.1E-06	NA	2.7E-06		0.083	0.0066	NA	0.09
		Exposure Point Total						2.7E-06					0.09
	Exposure Medium Total							2.7E-06					0.09
Sediment Total								2.7E-06					0.09
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0078	NA	NA	0.0078
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00056	NA	NA	0.00056
				Manganese	NA	NA	NA	NA	CNS	0.0021	NA	NA	0.0021
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0069	NA	NA	0.0069
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0041	NA	NA	0.0041
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.052	NA	NA	0.052
			PCBs	PCBs (total Aroclors)	1.2E-06	NA	NA	1.2E-06	Immunological, Dermal, Ocular	0.17	NA	NA	0.17
				Chemical Total	1.2E-06	NA	NA	1.2E-06		0.24	NA	NA	0.24
		Exposure Point Total						1.2E-06					0.24
	Exposure Medium Total							1.2E-06					0.24
	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	NA	9.6E-09	NA	9.6E-09	Cardiovascular, Dermal	NA	0.00012	NA	0.00012
				Thallium	NA	NA	NA	NA	Hair	NA	0.00055	NA	0.00055
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	9.6E-09	NA	9.6E-09		NA	0.00067	NA	0.00067
		Exposure Point Total						9.6E-09					0.00067
	Exposure Medium Total							9.6E-09					0.00067
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0024	0.0024
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0024	0.0024
		Exposure Point Total						NA					0.0024
	Exposure Medium Total							NA					0.0024
Surface Water Total								1.2E-06					0.25
Total Receptor Risks								4E-06					0.3

Notes:

BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.38 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.013	NA	NA	0.013
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00091	NA	NA	0.00091
				Manganese	NA	NA	NA	NA	CNS	0.0034	NA	NA	0.0034
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.011	NA	NA	0.011
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0066	NA	NA	0.0066
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.084	NA	NA	0.084
			PCBs	PCBs (total Aroclors)	9.5E-07	NA	NA	9.5E-07	Immunological, Dermal, Ocular	0.28	NA	NA	0.28
				Chemical Total	9.5E-07	NA	NA	9.5E-07		0.39	NA	NA	0.39
		Exposure Point Total						9.5E-07					0.39
	Exposure Medium Total							9.5E-07					0.39
Surface Water Total								9.5E-07					0.39
Total Receptor Risks								9E-07					0.4

Notes:
BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PCBs = polychlorinated biphenyls

TABLE 9.39 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00066	NA	NA	0.00066
				Arsenic	1.1E-07	7.5E-08	NA	1.8E-07	Cardiovascular, Dermal	0.002	0.0015	NA	0.0035
				Cadmium	NA	NA	NA	NA	Kidney	0.00012	0.000068	NA	0.00019
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.002	NA	NA	0.002
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00016	NA	NA	0.00016
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0024	NA	NA	0.0024
				Manganese	NA	NA	NA	NA	CNS	0.00017	NA	NA	0.00017
				Mercury	NA	NA	NA	NA	Immunological	0.0017	NA	NA	0.0017
				Nickel	NA	NA	NA	NA	Body	0.00011	NA	NA	0.00011
				Thallium	NA	NA	NA	NA	Hair	0.021	NA	NA	0.021
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000063	NA	NA	0.000063
			PAHs	Benz[a]anthracene	5.2E-09	9.7E-09	NA	1.5E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	4.2E-08	7.8E-08	NA	1.2E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	5.9E-09	1.1E-08	NA	1.7E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.4E-08	2.6E-08	NA	3.9E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	2.7E-09	5.0E-09	NA	7.7E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	7.6E-10	NA	NA	7.6E-10	Liver	0.000013	NA	NA	0.000013
				Heptachlor epoxide	3.3E-10	NA	NA	3.3E-10	Liver	0.000024	NA	NA	0.000024
			PCBs	PCBs (total Aroclors)	8.3E-09	1.7E-08	NA	2.5E-08	Immunological, Dermal, Ocular	0.0018	0.0037	NA	0.0055
				Chemical Total	1.8E-07	2.2E-07	NA	4.0E-07		0.032	0.0052	NA	0.038
		Exposure Point Total						4.0E-07					0.038
	Exposure Medium Total							4.0E-07					0.038
Sediment Total								4.0E-07					0.038
Surface Water	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	4.4E-09	1.8E-09	NA	6.2E-09	Cardiovascular, Dermal	0.000085	0.000035	NA	0.00012
				Thallium	NA	NA	NA	NA	Hair	0.00037	0.00016	NA	0.00053
			PAHs	Benzo[a]pyrene	5.6E-10	NA	NA	5.6E-10	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.4E-09	NA	NA	1.4E-09	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	6.3E-09	1.8E-09	NA	8.2E-09		0.00046	0.00019	NA	0.00065
		Exposure Point Total						8.2E-09					0.00065
	Exposure Medium Total							8.2E-09					0.00065
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00067	0.00067
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00067	0.00067
		Exposure Point Total						NA					0.00067
	Exposure Medium Total							NA					0.00067
Surface Water Total								8.2E-09					0.0013
Total Receptor Risks								4E-07					0.04

Notes:
BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.40 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.0011	NA	NA	0.0011
				Arsenic	2.6E-07	8.1E-08	NA	3.4E-07	Cardiovascular, Dermal	0.0034	0.001	NA	0.0044
				Cadmium	NA	NA	NA	NA	Kidney	0.00019	0.000048	NA	0.00024
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0033	NA	NA	0.0033
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00027	NA	NA	0.00027
				Iron	NA	NA	NA	NA	Gastrointestinal	0.004	NA	NA	0.004
				Manganese	NA	NA	NA	NA	CNS	0.00028	NA	NA	0.00028
				Mercury	NA	NA	NA	NA	Immunological	0.0028	NA	NA	0.0028
				Nickel	NA	NA	NA	NA	Body	0.00019	NA	NA	0.00019
				Thallium	NA	NA	NA	NA	Hair	0.034	NA	NA	0.034
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0001	NA	NA	0.0001
			PAHs	Benz[a]anthracene	3.5E-08	2.8E-08	NA	6.3E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	2.8E-07	2.2E-07	NA	5.0E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	3.9E-08	3.1E-08	NA	7.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	9.2E-08	7.4E-08	NA	1.7E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.8E-08	1.4E-08	NA	3.2E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.9E-09	NA	NA	1.9E-09	Liver	0.000021	NA	NA	0.000021
				Heptachlor epoxide	8.0E-10	NA	NA	8.0E-10	Liver	0.000039	NA	NA	0.000039
			PCBs	PCBs (total Aroclors)	2.1E-08	1.8E-08	NA	3.8E-08	Immunological, Dermal, Ocular	0.003	0.0026	NA	0.0056
				Chemical Total	7.4E-07	4.7E-07	NA	1.2E-06		0.053	0.0037	NA	0.057
		Exposure Point Total						1.2E-06					0.057
	Exposure Medium Total							1.2E-06					0.057
Sediment Total								1.2E-06					0.057
Surface Water	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	1.1E-08	3.0E-09	NA	1.4E-08	Cardiovascular, Dermal	0.00014	0.000039	NA	0.00018
				Thallium	NA	NA	NA	NA	Hair	0.00061	0.00017	NA	0.00079
			PAHs	Benzo[a]pyrene	3.7E-09	NA	NA	3.7E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	9.4E-09	NA	NA	9.4E-09	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	2.4E-08	3.0E-09	NA	2.7E-08		0.00075	0.00021	NA	0.00096
		Exposure Point Total						2.7E-08					0.00096
	Exposure Medium Total							2.7E-08					0.00096
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00067	0.00067
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00067	0.00067
		Exposure Point Total						NA					0.00067
	Exposure Medium Total							NA					0.00067
Surface Water Total								2.7E-08					0.0016
Total Receptor Risks								1E-06					0.06

Notes:
BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.41 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.0014	NA	NA	0.0014
				Arsenic	2.3E-07	1.6E-07	NA	3.9E-07	Cardiovascular, Dermal	0.0044	0.0032	NA	0.0076
				Cadmium	NA	NA	NA	NA	Kidney	0.00026	0.00015	NA	0.0004
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0044	NA	NA	0.0044
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00035	NA	NA	0.00035
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0052	NA	NA	0.0052
				Manganese	NA	NA	NA	NA	CNS	0.00037	NA	NA	0.00037
				Mercury	NA	NA	NA	NA	Immunological	0.0038	NA	NA	0.0038
				Nickel	NA	NA	NA	NA	Body	0.00025	NA	NA	0.00025
				Thallium	NA	NA	NA	NA	Hair	0.045	NA	NA	0.045
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00014	NA	NA	0.00014
			PAHs	Benz[a]anthracene	1.1E-08	2.1E-08	NA	3.2E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	9.1E-08	1.7E-07	NA	2.6E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.3E-08	2.4E-08	NA	3.6E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.0E-08	5.6E-08	NA	8.6E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	5.8E-09	1.1E-08	NA	1.7E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.6E-09	NA	NA	1.6E-09	Liver	0.000028	NA	NA	0.000028
				Heptachlor epoxide	7.1E-10	NA	NA	7.1E-10	Liver	0.000052	NA	NA	0.000052
			PCBs	PCBs (total Aroclors)	1.8E-08	3.6E-08	NA	5.4E-08	Immunological, Dermal, Ocular	0.004	0.0079	NA	0.012
				Chemical Total	4.0E-07	4.8E-07	NA	8.8E-07		0.07	0.011	NA	0.081
		Exposure Point Total						8.8E-07					0.081
	Exposure Medium Total							8.8E-07					0.081
Sediment Total								8.8E-07					0.081
Surface Water	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	9.5E-09	4.0E-09	NA	1.3E-08	Cardiovascular, Dermal	0.00018	0.000077	NA	0.00026
				Thallium	NA	NA	NA	NA	Hair	0.00081	0.00034	NA	0.0011
			PAHs	Benzo[a]pyrene	1.2E-09	NA	NA	1.2E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.1E-09	NA	NA	3.1E-09	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	1.4E-08	4.0E-09	NA	1.8E-08		0.00099	0.00042	NA	0.0014
		Exposure Point Total						1.8E-08					0.0014
	Exposure Medium Total							1.8E-08					0.0014
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0014	0.0014
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0014	0.0014
		Exposure Point Total						NA					0.0014
	Exposure Medium Total							NA					0.0014
Surface Water Total								1.8E-08					0.0029
Total Receptor Risks								9E-07					0.08

Notes:

BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.42 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.0024	NA	NA	0.0024
				Arsenic	5.6E-07	1.7E-07	NA	7.4E-07	Cardiovascular, Dermal	0.0073	0.0023	NA	0.0095
				Cadmium	NA	NA	NA	NA	Kidney	0.00042	0.0001	NA	0.00053
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0072	NA	NA	0.0072
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00058	NA	NA	0.00058
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0086	NA	NA	0.0086
				Manganese	NA	NA	NA	NA	CNS	0.0006	NA	NA	0.0006
				Mercury	NA	NA	NA	NA	Immunological	0.0062	NA	NA	0.0062
				Nickel	NA	NA	NA	NA	Body	0.0004	NA	NA	0.0004
				Thallium	NA	NA	NA	NA	Hair	0.074	NA	NA	0.074
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00022	NA	NA	0.00022
			PAHs	Benz[a]anthracene	7.5E-08	6.1E-08	NA	1.4E-07	NA	NA	NA	NA	NA
				Benzo[a]pyrene	6.0E-07	4.9E-07	NA	1.1E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	8.4E-08	6.8E-08	NA	1.5E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.0E-07	1.6E-07	NA	3.6E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	3.9E-08	3.1E-08	NA	7.0E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.0E-09	NA	NA	4.0E-09	Liver	0.000046	NA	NA	0.000046
				Heptachlor epoxide	1.7E-09	NA	NA	1.7E-09	Liver	0.000086	NA	NA	0.000086
			PCBs	PCBs (total Aroclors)	4.4E-08	3.9E-08	NA	8.3E-08	Immunological, Dermal, Ocular	0.0065	0.0056	NA	0.012
				Chemical Total	1.6E-06	1.0E-06	NA	2.6E-06		0.11	0.008	NA	0.12
		Exposure Point Total						2.6E-06					0.12
	Exposure Medium Total							2.6E-06					0.12
Sediment Total								2.6E-06					0.12
Surface Water	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	2.3E-08	6.6E-09	NA	3.0E-08	Cardiovascular, Dermal	0.0003	0.000085	NA	0.00039
				Thallium	NA	NA	NA	NA	Hair	0.0013	0.00038	NA	0.0017
			PAHs	Benzo[a]pyrene	8.0E-09	NA	NA	8.0E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.0E-08	NA	NA	2.0E-08	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	5.2E-08	6.6E-09	NA	5.8E-08		0.0016	0.00046	NA	0.0021
		Exposure Point Total						5.8E-08					0.0021
	Exposure Medium Total							5.8E-08					0.0021
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0014	0.0014
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0014	0.0014
		Exposure Point Total						NA					0.0014
	Exposure Medium Total							NA					0.0014
Surface Water Total								5.8E-08					0.0035
Total Receptor Risks								3E-06					0.1

Notes:
BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.43 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in BCC	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0066	NA	NA	0.0066
				Antimony	NA	NA	NA	NA	Hematological	0.0021	NA	NA	0.0021
				Arsenic	1.3E-07	2.1E-08	NA	1.5E-07	Cardiovascular, Dermal	0.02	0.0032	NA	0.024
				Cadmium	NA	NA	NA	NA	Kidney	0.0048	0.00061	NA	0.0054
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.02	NA	NA	0.02
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0024	NA	NA	0.0024
				Iron	NA	NA	NA	NA	Gastrointestinal	0.025	NA	NA	0.025
				Manganese	NA	NA	NA	NA	CNS	0.0018	NA	NA	0.0018
				Mercury	NA	NA	NA	NA	Immunological	0.04	NA	NA	0.04
				Nickel	NA	NA	NA	NA	Body	0.0013	NA	NA	0.0013
				Thallium	NA	NA	NA	NA	Hair	0.13	NA	NA	0.13
				Vanadium	NA	NA	NA	NA	Dermal	0.0043	NA	NA	0.0043
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0011	NA	NA	0.0011
			PAHs	Benzo[a]pyrene	5.9E-08	2.4E-08	NA	8.3E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.0E-08	4.1E-09	NA	1.4E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.9E-09	NA	NA	2.9E-09	Liver	0.0004	NA	NA	0.0004
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	1.2E-09	NA	NA	1.2E-09	Liver	0.00071	NA	NA	0.00071
			PCBs	PCBs (total Aroclors)	3.2E-08	1.4E-08	NA	4.6E-08	Immunological, Dermal, Ocular	0.056	0.025	NA	0.08
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	2.4E-07	6.3E-08	NA	3.0E-07		0.31	0.028	NA	0.34
		Exposure Point Total						3.0E-07					0.34
	Exposure Medium Total							3.0E-07					0.34
Sediment Total								3.0E-07					0.34
Surface Water	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.003	0.003
				Chemical Total	NA	NA	NA	NA		NA	NA	0.003	0.003
		Exposure Point Total						NA					0.003
	Exposure Medium Total							NA					0.003
Surface Water Total								NA					0.003
Total Receptor Risks								3E-07					0.3

Notes:
BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.44 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00041	NA	NA	0.00041
				Arsenic	1.4E-07	1.0E-07	NA	2.4E-07	Cardiovascular, Dermal	0.0028	0.002	NA	0.0048
				Cadmium	NA	NA	NA	NA	Kidney	0.00017	0.000096	NA	0.00026
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0041	NA	NA	0.0041
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00026	NA	NA	0.00026
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0047	NA	NA	0.0047
				Manganese	NA	NA	NA	NA	CNS	0.00034	NA	NA	0.00034
				Mercury	NA	NA	NA	NA	Immunological	0.0014	NA	NA	0.0014
				Nickel	NA	NA	NA	NA	Body	0.00021	NA	NA	0.00021
				Thallium	NA	NA	NA	NA	Hair	0.016	NA	NA	0.016
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000089	NA	NA	0.000089
			PAHs	Benz[a]anthracene	4.6E-09	8.6E-09	NA	1.3E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	5.4E-08	1.0E-07	NA	1.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	7.0E-09	1.3E-08	NA	2.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.3E-08	2.4E-08	NA	3.7E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	4.0E-09	7.4E-09	NA	1.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	7.2E-10	NA	NA	7.2E-10	Liver	0.000012	NA	NA	0.000012
				Heptachlor epoxide	1.6E-10	NA	NA	1.6E-10	Liver	0.000011	NA	NA	0.000011
			PCBs	PCBs (total Aroclors)	9.0E-09	1.8E-08	NA	2.7E-08	Immunological, Dermal, Ocular	0.002	0.0039	NA	0.0059
				Chemical Total	2.3E-07	2.7E-07	NA	5.1E-07		0.032	0.006	NA	0.038
		Exposure Point Total						5.1E-07					0.038
	Exposure Medium Total							5.1E-07					0.038
Sediment Total								5.1E-07					0.038
Surface Water	White Perch Fillet	White Perch Fillet in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00056	NA	NA	0.00056
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00026	NA	NA	0.00026
				Manganese	NA	NA	NA	NA	CNS	0.000086	NA	NA	0.000086
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0096	NA	NA	0.0096
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.003	NA	NA	0.003
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.07	NA	NA	0.07
			PCBs	PCBs (total Aroclors)	3.0E-06	NA	NA	3.0E-06	Immunological, Dermal, Ocular	0.65	NA	NA	0.65
				Chemical Total	3.0E-06	NA	NA	3.0E-06		0.74	NA	NA	0.74
		Exposure Point Total						3.0E-06					0.74
	Exposure Medium Total							3.0E-06					0.74
	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	NA	6.6E-09	NA	6.6E-09	Cardiovascular, Dermal	NA	0.00013	NA	0.00013
				Thallium	NA	NA	NA	NA	Hair	NA	0.0058	NA	0.0058
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	6.6E-09	NA	6.6E-09		NA	0.0059	NA	0.0059
		Exposure Point Total						6.6E-09					0.0059
	Exposure Medium Total							6.6E-09					0.0059
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.033	0.033
				Chemical Total	NA	NA	NA	NA		NA	NA	0.033	0.033
		Exposure Point Total						NA					0.033
	Exposure Medium Total							NA					0.033
Surface Water Total								3.0E-06					0.78
Total Receptor Risks								4E-06					0.8

Notes:
CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.45 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00067	NA	NA	0.00067
				Arsenic	3.5E-07	1.1E-07	NA	4.6E-07	Cardiovascular, Dermal	0.0046	0.0014	NA	0.006
				Cadmium	NA	NA	NA	NA	Kidney	0.00027	0.000068	NA	0.00034
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0067	NA	NA	0.0067
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00042	NA	NA	0.00042
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0077	NA	NA	0.0077
				Manganese	NA	NA	NA	NA	CNS	0.00055	NA	NA	0.00055
				Mercury	NA	NA	NA	NA	Immunological	0.0023	NA	NA	0.0023
				Nickel	NA	NA	NA	NA	Body	0.00034	NA	NA	0.00034
				Thallium	NA	NA	NA	NA	Hair	0.026	NA	NA	0.026
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00015	NA	NA	0.00015
			PAHs	Benz[a]anthracene	3.1E-08	2.5E-08	NA	5.6E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	3.6E-07	2.9E-07	NA	6.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	4.6E-08	3.7E-08	NA	8.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	8.6E-08	6.9E-08	NA	1.5E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	2.6E-08	2.1E-08	NA	4.8E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.8E-09	NA	NA	1.8E-09	Liver	0.00002	NA	NA	0.00002
				Heptachlor epoxide	3.8E-10	NA	NA	3.8E-10	Liver	0.000019	NA	NA	0.000019
			PCBs	PCBs (total Aroclors)	2.2E-08	1.9E-08	NA	4.1E-08	Immunological, Dermal, Ocular	0.0032	0.0028	NA	0.006
				Chemical Total	9.2E-07	5.7E-07	NA	1.5E-06		0.053	0.0043	NA	0.057
		Exposure Point Total						1.5E-06					0.057
	Exposure Medium Total							1.5E-06					0.057
Sediment Total								1.5E-06					0.057
Surface Water	White Perch Fillet	White Perch Fillet in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00061	NA	NA	0.00061
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00029	NA	NA	0.00029
				Manganese	NA	NA	NA	NA	CNS	0.000094	NA	NA	0.000094
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.011	NA	NA	0.011
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0033	NA	NA	0.0033
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.077	NA	NA	0.077
			PCBs	PCBs (total Aroclors)	4.9E-06	NA	NA	4.9E-06	Immunological, Dermal, Ocular	0.72	NA	NA	0.72
				Chemical Total	4.9E-06	NA	NA	4.9E-06		0.81	NA	NA	0.81
		Exposure Point Total						4.9E-06					0.81
	Exposure Medium Total							4.9E-06					0.81
	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	NA	1.1E-08	NA	1.1E-08	Cardiovascular, Dermal	NA	0.00014	NA	0.00014
				Thallium	NA	NA	NA	NA	Hair	NA	0.0062	NA	0.0062
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	1.1E-08	NA	1.1E-08		NA	0.0064	NA	0.0064
		Exposure Point Total						1.1E-08					0.0064
	Exposure Medium Total							1.1E-08					0.0064
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.033	0.033
				Chemical Total	NA	NA	NA	NA		NA	NA	0.033	0.033
		Exposure Point Total						NA					0.033
	Exposure Medium Total							NA					0.033
Surface Water Total								4.9E-06					0.85
Total Receptor Risks								6E-06					0.9

Notes:
CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.46 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	White Perch Fillet	White Perch Fillet in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00099	NA	NA	0.00099
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00046	NA	NA	0.00046
				Manganese	NA	NA	NA	NA	CNS	0.00015	NA	NA	0.00015
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.017	NA	NA	0.017
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0054	NA	NA	0.0054
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.12	NA	NA	0.12
			PCBs	PCBs (total Aroclors)	4.0E-06	NA	NA	4.0E-06	Immunological, Dermal, Ocular	1.2	NA	NA	1.2
				Chemical Total	4.0E-06	NA	NA	4.0E-06		1.3	NA	NA	1.3
		Exposure Point Total						4.0E-06					1.3
	Exposure Medium Total							4.0E-06					1.3
Surface Water Total								4.0E-06					1.3
Total Receptor Risks								4E-06					1

Notes:
CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PCBs = polychlorinated biphenyls

TABLE 9.47 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00041	NA	NA	0.00041
				Arsenic	1.4E-07	1.0E-07	NA	2.4E-07	Cardiovascular, Dermal	0.0028	0.002	NA	0.0048
				Cadmium	NA	NA	NA	NA	Kidney	0.00017	0.000096	NA	0.00026
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0041	NA	NA	0.0041
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00026	NA	NA	0.00026
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0047	NA	NA	0.0047
				Manganese	NA	NA	NA	NA	CNS	0.00034	NA	NA	0.00034
				Mercury	NA	NA	NA	NA	Immunological	0.0014	NA	NA	0.0014
				Nickel	NA	NA	NA	NA	Body	0.00021	NA	NA	0.00021
				Thallium	NA	NA	NA	NA	Hair	0.016	NA	NA	0.016
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000089	NA	NA	0.000089
			PAHs	Benz[a]anthracene	4.6E-09	8.6E-09	NA	1.3E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	5.4E-08	1.0E-07	NA	1.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	7.0E-09	1.3E-08	NA	2.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.3E-08	2.4E-08	NA	3.7E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	4.0E-09	7.4E-09	NA	1.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	7.2E-10	NA	NA	7.2E-10	Liver	0.000012	NA	NA	0.000012
				Heptachlor epoxide	1.6E-10	NA	NA	1.6E-10	Liver	0.000011	NA	NA	0.000011
			PCBs	PCBs (total Aroclors)	9.0E-09	1.8E-08	NA	2.7E-08	Immunological, Dermal, Ocular	0.002	0.0039	NA	0.0059
				Chemical Total	2.3E-07	2.7E-07	NA	5.1E-07		0.032	0.006	NA	0.038
		Exposure Point Total						5.1E-07					0.038
	Exposure Medium Total							5.1E-07					0.038
Sediment Total								5.1E-07					0.038
Surface Water	Blue Crab Muscle	Blue Crab Muscle in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.01	NA	NA	0.01
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0074	NA	NA	0.0074
				Manganese	NA	NA	NA	NA	CNS	0.00087	NA	NA	0.00087
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0054	NA	NA	0.0054
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0061	NA	NA	0.0061
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.05	NA	NA	0.05
			PCBs	PCBs (total Aroclors)	9.0E-08	NA	NA	9.0E-08	Immunological, Dermal, Ocular	0.02	NA	NA	0.02
				Chemical Total	9.0E-08	NA	NA	9.0E-08		0.099	NA	NA	0.099
		Exposure Point Total						9.0E-08					0.099
	Exposure Medium Total							9.0E-08					0.099
	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	NA	6.6E-09	NA	6.6E-09	Cardiovascular, Dermal	NA	0.00013	NA	0.00013
				Thallium	NA	NA	NA	NA	Hair	NA	0.0058	NA	0.0058
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	6.6E-09	NA	6.6E-09		NA	0.0059	NA	0.0059
		Exposure Point Total						6.6E-09					0.0059
	Exposure Medium Total							6.6E-09					0.0059
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.033	0.033
				Chemical Total	NA	NA	NA	NA		NA	NA	0.033	0.033
		Exposure Point Total						NA					0.033
	Exposure Medium Total							NA					0.033
Surface Water Total								9.7E-08					0.14
Total Receptor Risks								6E-07					0.2

Notes:
CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.48 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00067	NA	NA	0.00067
				Arsenic	3.5E-07	1.1E-07	NA	4.6E-07	Cardiovascular, Dermal	0.0046	0.0014	NA	0.006
				Cadmium	NA	NA	NA	NA	Kidney	0.00027	0.000068	NA	0.00034
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0067	NA	NA	0.0067
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00042	NA	NA	0.00042
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0077	NA	NA	0.0077
				Manganese	NA	NA	NA	NA	CNS	0.00055	NA	NA	0.00055
				Mercury	NA	NA	NA	NA	Immunological	0.0023	NA	NA	0.0023
				Nickel	NA	NA	NA	NA	Body	0.00034	NA	NA	0.00034
				Thallium	NA	NA	NA	NA	Hair	0.026	NA	NA	0.026
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00015	NA	NA	0.00015
			PAHs	Benz[a]anthracene	3.1E-08	2.5E-08	NA	5.6E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	3.6E-07	2.9E-07	NA	6.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	4.6E-08	3.7E-08	NA	8.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	8.6E-08	6.9E-08	NA	1.5E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	2.6E-08	2.1E-08	NA	4.8E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.8E-09	NA	NA	1.8E-09	Liver	0.00002	NA	NA	0.00002
				Heptachlor epoxide	3.8E-10	NA	NA	3.8E-10	Liver	0.000019	NA	NA	0.000019
			PCBs	PCBs (total Aroclors)	2.2E-08	1.9E-08	NA	4.1E-08	Immunological, Dermal, Ocular	0.0032	0.0028	NA	0.006
				Chemical Total	9.2E-07	5.7E-07	NA	1.5E-06		0.053	0.0043	NA	0.057
		Exposure Point Total						1.5E-06					0.057
	Exposure Medium Total							1.5E-06					0.057
Sediment Total								1.5E-06					0.057
Surface Water	Blue Crab Muscle	Blue Crab Muscle in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.011	NA	NA	0.011
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0081	NA	NA	0.0081
				Manganese	NA	NA	NA	NA	CNS	0.00095	NA	NA	0.00095
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0059	NA	NA	0.0059
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0067	NA	NA	0.0067
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.054	NA	NA	0.054
			PCBs	PCBs (total Aroclors)	1.5E-07	NA	NA	1.5E-07	Immunological, Dermal, Ocular	0.022	NA	NA	0.022
				Chemical Total	1.5E-07	NA	NA	1.5E-07		0.11	NA	NA	0.11
		Exposure Point Total						1.5E-07					0.11
	Exposure Medium Total							1.5E-07					0.11
	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	NA	1.1E-08	NA	1.1E-08	Cardiovascular, Dermal	NA	0.00014	NA	0.00014
				Thallium	NA	NA	NA	NA	Hair	NA	0.0062	NA	0.0062
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	1.1E-08	NA	1.1E-08		NA	0.0064	NA	0.0064
		Exposure Point Total						1.1E-08					0.0064
	Exposure Medium Total							1.1E-08					0.0064
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.033	0.033
				Chemical Total	NA	NA	NA	NA		NA	NA	0.033	0.033
		Exposure Point Total						NA					0.033
	Exposure Medium Total							NA					0.033
Surface Water Total								1.6E-07					0.15
Total Receptor Risks								2E-06					0.2

Notes:

CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.49 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	Blue Crab Muscle	Blue Crab Muscle in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.018	NA	NA	0.018
				Iron	NA	NA	NA	NA	Gastrointestinal	0.013	NA	NA	0.013
				Manganese	NA	NA	NA	NA	CNS	0.0015	NA	NA	0.0015
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0095	NA	NA	0.0095
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.011	NA	NA	0.011
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.088	NA	NA	0.088
			PCBs	PCBs (total Aroclors)	1.2E-07	NA	NA	1.2E-07	Immunological, Dermal, Ocular	0.035	NA	NA	0.035
				Chemical Total	1.2E-07	NA	NA	1.2E-07		0.18	NA	NA	0.18
		Exposure Point Total						1.2E-07					0.18
	Exposure Medium Total							1.2E-07					0.18
Surface Water Total								1.2E-07					0.18
Total Receptor Risks								1E-07					0.2

Notes:
CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PCBs = polychlorinated biphenyls

TABLE 9.50 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00041	NA	NA	0.00041
				Arsenic	1.4E-07	1.0E-07	NA	2.4E-07	Cardiovascular, Dermal	0.0028	0.002	NA	0.0048
				Cadmium	NA	NA	NA	NA	Kidney	0.00017	0.000096	NA	0.00026
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0041	NA	NA	0.0041
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00026	NA	NA	0.00026
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0047	NA	NA	0.0047
				Manganese	NA	NA	NA	NA	CNS	0.00034	NA	NA	0.00034
				Mercury	NA	NA	NA	NA	Immunological	0.0014	NA	NA	0.0014
				Nickel	NA	NA	NA	NA	Body	0.00021	NA	NA	0.00021
				Thallium	NA	NA	NA	NA	Hair	0.016	NA	NA	0.016
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000089	NA	NA	0.000089
			PAHs	Benz[a]anthracene	4.6E-09	8.6E-09	NA	1.3E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	5.4E-08	1.0E-07	NA	1.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	7.0E-09	1.3E-08	NA	2.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.3E-08	2.4E-08	NA	3.7E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	4.0E-09	7.4E-09	NA	1.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	7.2E-10	NA	NA	7.2E-10	Liver	0.000012	NA	NA	0.000012
				Heptachlor epoxide	1.6E-10	NA	NA	1.6E-10	Liver	0.000011	NA	NA	0.000011
			PCBs	PCBs (total Aroclors)	9.0E-09	1.8E-08	NA	2.7E-08	Immunological, Dermal, Ocular	0.002	0.0039	NA	0.0059
				Chemical Total	2.3E-07	2.7E-07	NA	5.1E-07		0.032	0.006	NA	0.038
		Exposure Point Total						5.1E-07					0.038
	Exposure Medium Total							5.1E-07					0.038
Sediment Total								5.1E-07					0.038
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.01	NA	NA	0.01
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0074	NA	NA	0.0074
				Manganese	NA	NA	NA	NA	CNS	0.00087	NA	NA	0.00087
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0015	NA	NA	0.0015
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0061	NA	NA	0.0061
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.042	NA	NA	0.042
			PCBs	PCBs (total Aroclors)	1.5E-06	NA	NA	1.5E-06	Immunological, Dermal, Ocular	0.33	NA	NA	0.33
				Chemical Total	1.5E-06	NA	NA	1.5E-06		0.4	NA	NA	0.4
		Exposure Point Total						1.5E-06					0.4
	Exposure Medium Total							1.5E-06					0.4
	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	NA	6.6E-09	NA	6.6E-09	Cardiovascular, Dermal	NA	0.00013	NA	0.00013
				Thallium	NA	NA	NA	NA	Hair	NA	0.0058	NA	0.0058
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	6.6E-09	NA	6.6E-09		NA	0.0059	NA	0.0059
		Exposure Point Total						6.6E-09					0.0059
	Exposure Medium Total							6.6E-09					0.0059
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.033	0.033
				Chemical Total	NA	NA	NA	NA		NA	NA	0.033	0.033
		Exposure Point Total						NA					0.033
	Exposure Medium Total							NA					0.033
Surface Water Total								1.5E-06					0.44
Total Receptor Risks								2E-06					0.5

Notes:

CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.51 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00067	NA	NA	0.00067
				Arsenic	3.5E-07	1.1E-07	NA	4.6E-07	Cardiovascular, Dermal	0.0046	0.0014	NA	0.006
				Cadmium	NA	NA	NA	NA	Kidney	0.00027	0.000068	NA	0.00034
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0067	NA	NA	0.0067
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00042	NA	NA	0.00042
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0077	NA	NA	0.0077
				Manganese	NA	NA	NA	NA	CNS	0.00055	NA	NA	0.00055
				Mercury	NA	NA	NA	NA	Immunological	0.0023	NA	NA	0.0023
				Nickel	NA	NA	NA	NA	Body	0.00034	NA	NA	0.00034
				Thallium	NA	NA	NA	NA	Hair	0.026	NA	NA	0.026
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00015	NA	NA	0.00015
			PAHs	Benz[a]anthracene	3.1E-08	2.5E-08	NA	5.6E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	3.6E-07	2.9E-07	NA	6.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	4.6E-08	3.7E-08	NA	8.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	8.6E-08	6.9E-08	NA	1.5E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	2.6E-08	2.1E-08	NA	4.8E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.8E-09	NA	NA	1.8E-09	Liver	0.00002	NA	NA	0.00002
				Heptachlor epoxide	3.8E-10	NA	NA	3.8E-10	Liver	0.000019	NA	NA	0.000019
			PCBs	PCBs (total Aroclors)	2.2E-08	1.9E-08	NA	4.1E-08	Immunological, Dermal, Ocular	0.0032	0.0028	NA	0.006
				Chemical Total	9.2E-07	5.7E-07	NA	1.5E-06		0.053	0.0043	NA	0.057
		Exposure Point Total						1.5E-06					0.057
	Exposure Medium Total							1.5E-06					0.057
Sediment Total								1.5E-06					0.057
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.011	NA	NA	0.011
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0081	NA	NA	0.0081
				Manganese	NA	NA	NA	NA	CNS	0.00095	NA	NA	0.00095
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0016	NA	NA	0.0016
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0067	NA	NA	0.0067
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.046	NA	NA	0.046
			PCBs	PCBs (total Aroclors)	2.5E-06	NA	NA	2.5E-06	Immunological, Dermal, Ocular	0.36	NA	NA	0.36
				Chemical Total	2.5E-06	NA	NA	2.5E-06		0.44	NA	NA	0.44
		Exposure Point Total						2.5E-06					0.44
	Exposure Medium Total							2.5E-06					0.44
	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	NA	1.1E-08	NA	1.1E-08	Cardiovascular, Dermal	NA	0.00014	NA	0.00014
				Thallium	NA	NA	NA	NA	Hair	NA	0.0062	NA	0.0062
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	1.1E-08	NA	1.1E-08		NA	0.0064	NA	0.0064
		Exposure Point Total						1.1E-08					0.0064
	Exposure Medium Total							1.1E-08					0.0064
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.033	0.033
				Chemical Total	NA	NA	NA	NA		NA	NA	0.033	0.033
		Exposure Point Total						NA					0.033
	Exposure Medium Total							NA					0.033
Surface Water Total								2.5E-06					0.48
Total Receptor Risks								4E-06					0.5

Notes:

CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.52 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.018	NA	NA	0.018
				Iron	NA	NA	NA	NA	Gastrointestinal	0.013	NA	NA	0.013
				Manganese	NA	NA	NA	NA	CNS	0.0015	NA	NA	0.0015
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0026	NA	NA	0.0026
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.011	NA	NA	0.011
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.074	NA	NA	0.074
			PCBs	PCBs (total Aroclors)	2.0E-06	NA	NA	2.0E-06	Immunological, Dermal, Ocular	0.59	NA	NA	0.59
				Chemical Total	2.0E-06	NA	NA	2.0E-06		0.71	NA	NA	0.71
		Exposure Point Total						2.0E-06					0.71
	Exposure Medium Total							2.0E-06					0.71
Surface Water Total								2.0E-06					0.71
Total Receptor Risks								2E-06					0.7

Notes:
CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PCBs = polychlorinated biphenyls

TABLE 9.53 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00039	NA	NA	0.00039
				Arsenic	9.5E-08	6.8E-08	NA	1.6E-07	Cardiovascular, Dermal	0.0018	0.0013	NA	0.0032
				Cadmium	NA	NA	NA	NA	Kidney	0.00011	0.000064	NA	0.00018
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0027	NA	NA	0.0027
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00017	NA	NA	0.00017
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0031	NA	NA	0.0031
				Manganese	NA	NA	NA	NA	CNS	0.00022	NA	NA	0.00022
				Mercury	NA	NA	NA	NA	Immunological	0.0014	NA	NA	0.0014
				Nickel	NA	NA	NA	NA	Body	0.00013	NA	NA	0.00013
				Thallium	NA	NA	NA	NA	Hair	0.0096	NA	NA	0.0096
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000059	NA	NA	0.000059
			PAHs	Benz[a]anthracene	3.1E-09	5.8E-09	NA	8.9E-09	NA	NA	NA	NA	NA
				Benzo[a]pyrene	3.4E-08	6.3E-08	NA	9.8E-08	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	4.4E-09	8.3E-09	NA	1.3E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	7.9E-09	1.5E-08	NA	2.2E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	2.5E-09	4.7E-09	NA	7.2E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.6E-10	NA	NA	4.6E-10	Liver	0.0000079	NA	NA	0.0000079
				Heptachlor epoxide	6.5E-11	NA	NA	6.5E-11	Liver	0.0000048	NA	NA	0.0000048
			PCBs	PCBs (total Aroclors)	7.3E-09	1.5E-08	NA	2.2E-08	Immunological, Dermal, Ocular	0.0016	0.0032	NA	0.0048
				Chemical Total	1.5E-07	1.8E-07	NA	3.3E-07		0.021	0.0046	NA	0.026
		Exposure Point Total						3.3E-07					0.026
	Exposure Medium Total							3.3E-07					0.026
Sediment Total								3.3E-07					0.026
Surface Water	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	4.8E-09	2.0E-09	NA	6.8E-09	Cardiovascular, Dermal	0.000094	0.000039	NA	0.00013
				Thallium	NA	NA	NA	NA	Hair	0.0042	0.0018	NA	0.006
			PAHs	Benzo[a]pyrene	5.9E-10	NA	NA	5.9E-10	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	8.3E-10	NA	NA	8.3E-10	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	6.2E-09	2.0E-09	NA	8.3E-09		0.0043	0.0018	NA	0.0061
		Exposure Point Total						8.3E-09					0.0061
	Exposure Medium Total							8.3E-09					0.0061
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0094	0.0094
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0094	0.0094
		Exposure Point Total						NA					0.0094
	Exposure Medium Total							NA					0.0094
Surface Water Total								8.3E-09					0.016
Total Receptor Risks								3E-07					0.04

Notes:
CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.54 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00063	NA	NA	0.00063
				Arsenic	2.3E-07	7.3E-08	NA	3.1E-07	Cardiovascular, Dermal	0.003	0.00094	NA	0.004
				Cadmium	NA	NA	NA	NA	Kidney	0.00018	0.000046	NA	0.00023
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0044	NA	NA	0.0044
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00028	NA	NA	0.00028
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0052	NA	NA	0.0052
				Manganese	NA	NA	NA	NA	CNS	0.00035	NA	NA	0.00035
				Mercury	NA	NA	NA	NA	Immunological	0.0023	NA	NA	0.0023
				Nickel	NA	NA	NA	NA	Body	0.00021	NA	NA	0.00021
				Thallium	NA	NA	NA	NA	Hair	0.016	NA	NA	0.016
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000096	NA	NA	0.000096
			PAHs	Benz[a]anthracene	2.1E-08	1.7E-08	NA	3.7E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	2.3E-07	1.8E-07	NA	4.1E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	3.0E-08	2.4E-08	NA	5.3E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	5.2E-08	4.2E-08	NA	9.4E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.7E-08	1.4E-08	NA	3.0E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.1E-09	NA	NA	1.1E-09	Liver	0.000013	NA	NA	0.000013
				Heptachlor epoxide	1.6E-10	NA	NA	1.6E-10	Liver	0.0000079	NA	NA	0.0000079
			PCBs	PCBs (total Aroclors)	1.8E-08	1.6E-08	NA	3.4E-08	Immunological, Dermal, Ocular	0.0026	0.0023	NA	0.0049
				Chemical Total	6.0E-07	3.7E-07	NA	9.7E-07		0.035	0.0033	NA	0.038
		Exposure Point Total						9.7E-07					0.038
	Exposure Medium Total							9.7E-07					0.038
Sediment Total								9.7E-07					0.038
Surface Water	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	1.2E-08	3.4E-09	NA	1.5E-08	Cardiovascular, Dermal	0.00015	0.000044	NA	0.0002
				Thallium	NA	NA	NA	NA	Hair	0.0069	0.002	NA	0.0089
			PAHs	Benzo[a]pyrene	3.9E-09	NA	NA	3.9E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	5.5E-09	NA	NA	5.5E-09	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	2.1E-08	3.4E-09	NA	2.5E-08		0.0071	0.002	NA	0.0091
		Exposure Point Total						2.5E-08					0.0091
	Exposure Medium Total							2.5E-08					0.0091
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0094	0.0094
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0094	0.0094
		Exposure Point Total						NA					0.0094
	Exposure Medium Total							NA					0.0094
Surface Water Total								2.5E-08					0.018
Total Receptor Risks								1E-06					0.06

Notes:

CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.55 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00083	NA	NA	0.00083
				Arsenic	2.1E-07	1.5E-07	NA	3.5E-07	Cardiovascular, Dermal	0.004	0.0029	NA	0.0069
				Cadmium	NA	NA	NA	NA	Kidney	0.00024	0.00014	NA	0.00038
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0058	NA	NA	0.0058
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00037	NA	NA	0.00037
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0068	NA	NA	0.0068
				Manganese	NA	NA	NA	NA	CNS	0.00047	NA	NA	0.00047
				Mercury	NA	NA	NA	NA	Immunological	0.003	NA	NA	0.003
				Nickel	NA	NA	NA	NA	Body	0.00028	NA	NA	0.00028
				Thallium	NA	NA	NA	NA	Hair	0.021	NA	NA	0.021
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00013	NA	NA	0.00013
			PAHs	Benz[a]anthracene	6.8E-09	1.3E-08	NA	1.9E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	7.4E-08	1.4E-07	NA	2.1E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	9.6E-09	1.8E-08	NA	2.8E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.7E-08	3.2E-08	NA	4.9E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	5.5E-09	1.0E-08	NA	1.6E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.0E-09	NA	NA	1.0E-09	Liver	0.000017	NA	NA	0.000017
				Heptachlor epoxide	1.4E-10	NA	NA	1.4E-10	Liver	0.00001	NA	NA	0.00001
			PCBs	PCBs (total Aroclors)	1.6E-08	3.2E-08	NA	4.7E-08	Immunological, Dermal, Ocular	0.0035	0.0069	NA	0.01
				Chemical Total	3.4E-07	3.9E-07	NA	7.2E-07		0.046	0.0099	NA	0.056
		Exposure Point Total						7.2E-07					0.056
	Exposure Medium Total							7.2E-07					0.056
Sediment Total								7.2E-07					0.056
Surface Water	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	1.0E-08	4.4E-09	NA	1.5E-08	Cardiovascular, Dermal	0.0002	0.000085	NA	0.00029
				Thallium	NA	NA	NA	NA	Hair	0.0092	0.0038	NA	0.013
			PAHs	Benzo[a]pyrene	1.3E-09	NA	NA	1.3E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.8E-09	NA	NA	1.8E-09	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	1.4E-08	4.4E-09	NA	1.8E-08		0.0094	0.0039	NA	0.013
		Exposure Point Total						1.8E-08					0.013
	Exposure Medium Total							1.8E-08					0.013
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.02	0.02
				Chemical Total	NA	NA	NA	NA		NA	NA	0.02	0.02
		Exposure Point Total						NA					0.02
	Exposure Medium Total							NA					0.02
Surface Water Total								1.8E-08					0.034
Total Receptor Risks								7E-07					0.09

Notes:
CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.56 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.0014	NA	NA	0.0014
				Arsenic	5.1E-07	1.6E-07	NA	6.6E-07	Cardiovascular, Dermal	0.0066	0.002	NA	0.0086
				Cadmium	NA	NA	NA	NA	Kidney	0.0004	0.000099	NA	0.0005
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0096	NA	NA	0.0096
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00061	NA	NA	0.00061
				Iron	NA	NA	NA	NA	Gastrointestinal	0.011	NA	NA	0.011
				Manganese	NA	NA	NA	NA	CNS	0.00077	NA	NA	0.00077
				Mercury	NA	NA	NA	NA	Immunological	0.0049	NA	NA	0.0049
				Nickel	NA	NA	NA	NA	Body	0.00047	NA	NA	0.00047
				Thallium	NA	NA	NA	NA	Hair	0.034	NA	NA	0.034
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00021	NA	NA	0.00021
			PAHs	Benz[a]anthracene	4.5E-08	3.6E-08	NA	8.1E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	4.9E-07	4.0E-07	NA	8.9E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	6.4E-08	5.2E-08	NA	1.2E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.1E-07	9.1E-08	NA	2.0E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	3.6E-08	2.9E-08	NA	6.5E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.4E-09	NA	NA	2.4E-09	Liver	0.000028	NA	NA	0.000028
				Heptachlor epoxide	3.5E-10	NA	NA	3.5E-10	Liver	0.000017	NA	NA	0.000017
			PCBs	PCBs (total Aroclors)	3.9E-08	3.4E-08	NA	7.3E-08	Immunological, Dermal, Ocular	0.0057	0.0049	NA	0.011
				Chemical Total	1.3E-06	8.0E-07	NA	2.1E-06		0.076	0.0071	NA	0.083
		Exposure Point Total						2.1E-06					0.083
	Exposure Medium Total							2.1E-06					0.083
Sediment Total								2.1E-06					0.083
Surface Water	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	2.6E-08	7.3E-09	NA	3.3E-08	Cardiovascular, Dermal	0.00033	0.000094	NA	0.00043
				Thallium	NA	NA	NA	NA	Hair	0.015	0.0043	NA	0.019
			PAHs	Benzo[a]pyrene	8.5E-09	NA	NA	8.5E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.2E-08	NA	NA	1.2E-08	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	4.6E-08	7.3E-09	NA	5.3E-08		0.015	0.0044	NA	0.02
		Exposure Point Total						5.3E-08					0.02
	Exposure Medium Total							5.3E-08					0.02
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.02	0.02
				Chemical Total	NA	NA	NA	NA		NA	NA	0.02	0.02
		Exposure Point Total						NA					0.02
	Exposure Medium Total							NA					0.02
Surface Water Total								5.3E-08					0.04
Total Receptor Risks								2E-06					0.1

Notes:
CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.57 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in LBC	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0065	NA	NA	0.0065
				Antimony	NA	NA	NA	NA	Hematological	0.0012	NA	NA	0.0012
				Arsenic	1.4E-07	2.2E-08	NA	1.6E-07	Cardiovascular, Dermal	0.022	0.0034	NA	0.025
				Cadmium	NA	NA	NA	NA	Kidney	0.003	0.00038	NA	0.0033
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.024	NA	NA	0.024
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0017	NA	NA	0.0017
				Iron	NA	NA	NA	NA	Gastrointestinal	0.029	NA	NA	0.029
				Manganese	NA	NA	NA	NA	CNS	0.0021	NA	NA	0.0021
				Mercury	NA	NA	NA	NA	Immunological	0.018	NA	NA	0.018
				Nickel	NA	NA	NA	NA	Body	0.0013	NA	NA	0.0013
				Thallium	NA	NA	NA	NA	Hair	0.1	NA	NA	0.1
				Vanadium	NA	NA	NA	NA	Dermal	0.0042	NA	NA	0.0042
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00062	NA	NA	0.00062
			PAHs	Benzo[a]pyrene	6.8E-08	2.8E-08	NA	9.5E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	7.3E-09	3.0E-09	NA	1.0E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	9.8E-10	NA	NA	9.8E-10	Liver	0.00013	NA	NA	0.00013
				Heptachlor	3.3E-11	NA	NA	3.3E-11	Liver	0.000001	NA	NA	0.000001
				Heptachlor epoxide	9.0E-11	NA	NA	9.0E-11	Liver	0.000053	NA	NA	0.000053
			PCBs	PCBs (total Aroclors)	1.2E-08	5.1E-09	NA	1.7E-08	Immunological, Dermal, Ocular	0.02	0.0089	NA	0.029
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	2.3E-07	5.8E-08	NA	2.8E-07		0.24	0.013	NA	0.25
		Exposure Point Total						2.8E-07					0.25
	Exposure Medium Total							2.8E-07					0.25
Sediment Total								2.8E-07					0.25
Surface Water	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.042	0.042
				Chemical Total	NA	NA	NA	NA		NA	NA	0.042	0.042
		Exposure Point Total						NA					0.042
	Exposure Medium Total							NA					0.042
Surface Water Total								NA					0.042
Total Receptor Risks								3E-07					0.3

Notes:
CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.58 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Nevertouch Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0078	NA	NA	0.0078
				Antimony	NA	NA	NA	NA	Hematological	0.0046	NA	NA	0.0046
				Arsenic	3.9E-07	6.1E-08	NA	4.5E-07	Cardiovascular, Dermal	0.061	0.0096	NA	0.07
				Cadmium	NA	NA	NA	NA	Kidney	0.014	0.0018	NA	0.016
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.044	NA	NA	0.044
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0062	NA	NA	0.0062
				Iron	NA	NA	NA	NA	Gastrointestinal	0.018	NA	NA	0.018
				Manganese	NA	NA	NA	NA	CNS	0.011	NA	NA	0.011
				Mercury	NA	NA	NA	NA	Immunological	0.27	NA	NA	0.27
				Nickel	NA	NA	NA	NA	Body	0.0046	NA	NA	0.0046
				Thallium	NA	NA	NA	NA	Hair	0.18	NA	NA	0.18
				Vanadium	NA	NA	NA	NA	Dermal	0.0084	NA	NA	0.0084
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.025	NA	NA	0.025
			PAHs	Benzo[a]pyrene	6.8E-09	2.8E-09	NA	9.6E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.0E-09	4.3E-10	NA	1.5E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.8E-08	NA	NA	2.8E-08	Liver	0.0039	NA	NA	0.0039
				Heptachlor	6.2E-09	NA	NA	6.2E-09	Liver	0.00019	NA	NA	0.00019
				Heptachlor epoxide	1.7E-08	NA	NA	1.7E-08	Liver	0.01	NA	NA	0.01
			PCBs	PCBs (total Aroclors)	1.4E-07	6.2E-08	NA	2.0E-07	Immunological, Dermal, Ocular	0.25	0.11	NA	0.35
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	5.9E-07	1.3E-07	NA	7.2E-07		0.91	0.12	NA	1
		Exposure Point Total						7.2E-07					1
	Exposure Medium Total							7.2E-07					1
Sediment Total								7.2E-07					1
Total Receptor Risks								7E-07					1

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.59 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Eight Day Swamp	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0059	NA	NA	0.0059
				Antimony	NA	NA	NA	NA	Hematological	0.003	NA	NA	0.003
				Arsenic	2.4E-07	3.7E-08	NA	2.7E-07	Cardiovascular, Dermal	0.037	0.0058	NA	0.043
				Cadmium	NA	NA	NA	NA	Kidney	0.0071	0.0009	NA	0.008
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.035	NA	NA	0.035
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0065	NA	NA	0.0065
				Iron	NA	NA	NA	NA	Gastrointestinal	0.014	NA	NA	0.014
				Manganese	NA	NA	NA	NA	CNS	0.0088	NA	NA	0.0088
				Mercury	NA	NA	NA	NA	Immunological	0.085	NA	NA	0.085
				Nickel	NA	NA	NA	NA	Body	0.0041	NA	NA	0.0041
				Thallium	NA	NA	NA	NA	Hair	0.27	NA	NA	0.27
				Vanadium	NA	NA	NA	NA	Dermal	0.0068	NA	NA	0.0068
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0021	NA	NA	0.0021
			PAHs	Benzo[a]pyrene	8.5E-09	3.5E-09	NA	1.2E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.4E-09	5.8E-10	NA	2.0E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.2E-09	NA	NA	2.2E-09	Liver	0.00031	NA	NA	0.00031
				Heptachlor	3.4E-10	NA	NA	3.4E-10	Liver	0.000011	NA	NA	0.000011
				Heptachlor epoxide	9.3E-10	NA	NA	9.3E-10	Liver	0.00055	NA	NA	0.00055
			PCBs	PCBs (total Aroclors)	6.6E-08	2.9E-08	NA	9.4E-08	Immunological, Dermal, Ocular	0.11	0.051	NA	0.17
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	3.2E-07	7.0E-08	NA	3.9E-07		0.6	0.057	NA	0.66
		Exposure Point Total						3.9E-07					0.66
	Exposure Medium Total							3.9E-07					0.66
Sediment Total								3.9E-07					0.66
Total Receptor Risks								4E-07					0.7

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.60 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Paterson Plank Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0048	NA	NA	0.0048
				Antimony	NA	NA	NA	NA	Hematological	0.0036	NA	NA	0.0036
				Arsenic	2.3E-07	3.6E-08	NA	2.7E-07	Cardiovascular, Dermal	0.036	0.0056	NA	0.041
				Cadmium	NA	NA	NA	NA	Kidney	0.004	0.0005	NA	0.0045
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.058	NA	NA	0.058
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0026	NA	NA	0.0026
				Iron	NA	NA	NA	NA	Gastrointestinal	0.016	NA	NA	0.016
				Manganese	NA	NA	NA	NA	CNS	0.022	NA	NA	0.022
				Mercury	NA	NA	NA	NA	Immunological	0.066	NA	NA	0.066
				Nickel	NA	NA	NA	NA	Body	0.0045	NA	NA	0.0045
				Thallium	NA	NA	NA	NA	Hair	0.26	NA	NA	0.26
				Vanadium	NA	NA	NA	NA	Dermal	0.0082	NA	NA	0.0082
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0019	NA	NA	0.0019
			PAHs	Benzo[a]pyrene	2.0E-08	8.1E-09	NA	2.8E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.0E-09	1.6E-09	NA	5.7E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	5.5E-10	NA	NA	5.5E-10	Liver	0.000075	NA	NA	0.000075
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			PCBs	PCBs (total Aroclors)	4.3E-08	1.9E-08	NA	6.1E-08	Immunological, Dermal, Ocular	0.075	0.033	NA	0.11
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	3.0E-07	6.5E-08	NA	3.6E-07		0.57	0.039	NA	0.61
		Exposure Point Total						3.6E-07					0.61
	Exposure Medium Total							3.6E-07					0.61
Sediment Total								3.6E-07					0.61
Total Receptor Risks								4E-07					0.6

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.61 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Upper Peach Island Creek Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0073	NA	NA	0.0073
				Antimony	NA	NA	NA	NA	Hematological	0.019	NA	NA	0.019
				Arsenic	1.1E-06	1.7E-07	NA	1.3E-06	Cardiovascular, Dermal	0.17	0.027	NA	0.2
				Cadmium	NA	NA	NA	NA	Kidney	0.014	0.0017	NA	0.015
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.18	NA	NA	0.18
				Copper	NA	NA	NA	NA	Gastrointestinal	0.046	NA	NA	0.046
				Iron	NA	NA	NA	NA	Gastrointestinal	0.019	NA	NA	0.019
				Manganese	NA	NA	NA	NA	CNS	0.012	NA	NA	0.012
				Mercury	NA	NA	NA	NA	Immunological	0.49	NA	NA	0.49
				Nickel	NA	NA	NA	NA	Body	0.019	NA	NA	0.019
				Thallium	NA	NA	NA	NA	Hair	0.3	NA	NA	0.3
				Vanadium	NA	NA	NA	NA	Dermal	0.014	NA	NA	0.014
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00076	NA	NA	0.00076
			PAHs	Benzo[a]pyrene	2.6E-08	1.1E-08	NA	3.6E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	5.2E-09	2.1E-09	NA	7.3E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.9E-09	NA	NA	4.9E-09	Liver	0.00068	NA	NA	0.00068
				Heptachlor	6.1E-10	NA	NA	6.1E-10	Liver	0.000019	NA	NA	0.000019
				Heptachlor epoxide	5.3E-10	NA	NA	5.3E-10	Liver	0.00032	NA	NA	0.00032
			PCBs	PCBs (total Aroclors)	2.2E-08	9.8E-09	NA	3.2E-08	Immunological, Dermal, Ocular	0.039	0.017	NA	0.056
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	1.2E-06	1.9E-07	NA	1.3E-06		1.3	0.046	NA	1.4
		Exposure Point Total						1.3E-06					1.4
	Exposure Medium Total							1.3E-06					1.4
Sediment Total								1.3E-06					1.4
Total Receptor Risks								1E-06					1

Notes:

BCSA = Berry's Creek Study Area
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

Upper Peach Island Creek is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

TABLE 9.62 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Walden Swamp	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0039	NA	NA	0.0039
				Antimony	NA	NA	NA	NA	Hematological	0.0062	NA	NA	0.0062
				Arsenic	2.8E-07	4.3E-08	NA	3.2E-07	Cardiovascular, Dermal	0.043	0.0068	NA	0.05
				Cadmium	NA	NA	NA	NA	Kidney	0.0049	0.00062	NA	0.0055
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.057	NA	NA	0.057
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0021	NA	NA	0.0021
				Iron	NA	NA	NA	NA	Gastrointestinal	0.015	NA	NA	0.015
				Manganese	NA	NA	NA	NA	CNS	0.041	NA	NA	0.041
				Mercury	NA	NA	NA	NA	Immunological	0.11	NA	NA	0.11
				Nickel	NA	NA	NA	NA	Body	0.007	NA	NA	0.007
				Thallium	NA	NA	NA	NA	Hair	0.26	NA	NA	0.26
				Vanadium	NA	NA	NA	NA	Dermal	0.011	NA	NA	0.011
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0031	NA	NA	0.0031
			PAHs	Benzo[a]pyrene	6.7E-09	2.8E-09	NA	9.5E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.4E-09	5.9E-10	NA	2.0E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.0E-09	NA	NA	2.0E-09	Liver	0.00027	NA	NA	0.00027
				Heptachlor	1.7E-10	NA	NA	1.7E-10	Liver	0.0000053	NA	NA	0.0000053
				Heptachlor epoxide	2.0E-10	NA	NA	2.0E-10	Liver	0.00012	NA	NA	0.00012
			PCBs	PCBs (total Aroclors)	5.9E-08	2.6E-08	NA	8.4E-08	Immunological, Dermal, Ocular	0.1	0.045	NA	0.15
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	3.4E-07	7.3E-08	NA	4.2E-07		0.67	0.053	NA	0.72
		Exposure Point Total						4.2E-07					0.72
	Exposure Medium Total							4.2E-07					0.72
Sediment Total								4.2E-07					0.72
Total Receptor Risks								4E-07					0.7

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.63 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Ackerman's East Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0081	NA	NA	0.0081
				Antimony	NA	NA	NA	NA	Hematological	0.0054	NA	NA	0.0054
				Arsenic	1.3E-07	2.1E-08	NA	1.5E-07	Cardiovascular, Dermal	0.02	0.0032	NA	0.024
				Cadmium	NA	NA	NA	NA	Kidney	0.0023	0.00028	NA	0.0025
				Chromium (VI)	5.4E-08	NA	NA	5.4E-08	NA	0.0025	NA	NA	0.0025
				Cobalt	NA	NA	NA	NA	Thyroid	0.041	NA	NA	0.041
				Copper	NA	NA	NA	NA	Gastrointestinal	0.001	NA	NA	0.001
				Iron	NA	NA	NA	NA	Gastrointestinal	0.018	NA	NA	0.018
				Manganese	NA	NA	NA	NA	CNS	0.0088	NA	NA	0.0088
				Mercury	NA	NA	NA	NA	Immunological	0.092	NA	NA	0.092
				Nickel	NA	NA	NA	NA	Body	0.0015	NA	NA	0.0015
				Thallium	NA	NA	NA	NA	Hair	NA	NA	NA	NA
				Vanadium	NA	NA	NA	NA	Dermal	0.0051	NA	NA	0.0051
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00063	NA	NA	0.00063
			PAHs	Benzo[a]pyrene	2.8E-09	1.2E-09	NA	4.0E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	7.2E-10	3.0E-10	NA	1.0E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.8E-10	NA	NA	4.8E-10	Liver	0.000066	NA	NA	0.000066
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			PCBs	PCBs (total Aroclors)	7.5E-09	3.3E-09	NA	1.1E-08	Immunological, Dermal, Ocular	0.013	0.0058	NA	0.019
			Volatiles	Trichloroethene	9.8E-12	NA	NA	9.8E-12	pmental, Cardiovascular, Immun	0.00003	NA	NA	0.00003
				Chemical Total	2.0E-07	2.5E-08	NA	2.2E-07		0.22	0.0093	NA	0.23
		Exposure Point Total						2.2E-07					0.23
	Exposure Medium Total							2.2E-07					0.23
Sediment Total								2.2E-07					0.23
Total Receptor Risks								2E-07					0.2

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.64 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Rutherford Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.006	NA	NA	0.006
				Antimony	NA	NA	NA	NA	Hematological	0.0014	NA	NA	0.0014
				Arsenic	9.1E-08	1.4E-08	NA	1.1E-07	Cardiovascular, Dermal	0.014	0.0022	NA	0.016
				Cadmium	NA	NA	NA	NA	Kidney	0.00074	0.000094	NA	0.00084
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.021	NA	NA	0.021
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0016	NA	NA	0.0016
				Iron	NA	NA	NA	NA	Gastrointestinal	0.014	NA	NA	0.014
				Manganese	NA	NA	NA	NA	CNS	0.015	NA	NA	0.015
				Mercury	NA	NA	NA	NA	Immunological	0.021	NA	NA	0.021
				Nickel	NA	NA	NA	NA	Body	0.0016	NA	NA	0.0016
				Thallium	NA	NA	NA	NA	Hair	0.25	NA	NA	0.25
				Vanadium	NA	NA	NA	NA	Dermal	0.0049	NA	NA	0.0049
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00054	NA	NA	0.00054
			PAHs	Benzo[a]pyrene	1.5E-08	6.2E-09	NA	2.1E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.8E-09	1.1E-09	NA	3.9E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	6.1E-10	NA	NA	6.1E-10	Liver	0.000084	NA	NA	0.000084
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	1.6E-10	NA	NA	1.6E-10	Liver	0.000094	NA	NA	0.000094
			PCBs	PCBs (total Aroclors)	6.5E-09	2.9E-09	NA	9.4E-09	Immunological, Dermal, Ocular	0.011	0.005	NA	0.016
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	1.2E-07	2.5E-08	NA	1.4E-07		0.37	0.0074	NA	0.37
		Exposure Point Total						1.4E-07					0.37
	Exposure Medium Total							1.4E-07					0.37
Sediment Total								1.4E-07					0.37
Total Receptor Risks								1E-07					0.4

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.65 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Tollgate Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0048	NA	NA	0.0048
				Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Arsenic	5.4E-08	8.5E-09	NA	6.2E-08	Cardiovascular, Dermal	0.0083	0.0013	NA	0.0097
				Cadmium	NA	NA	NA	NA	Kidney	0.00025	0.000032	NA	0.00028
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.016	NA	NA	0.016
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00075	NA	NA	0.00075
				Iron	NA	NA	NA	NA	Gastrointestinal	0.018	NA	NA	0.018
				Manganese	NA	NA	NA	NA	CNS	0.0035	NA	NA	0.0035
				Mercury	NA	NA	NA	NA	Immunological	0.02	NA	NA	0.02
				Nickel	NA	NA	NA	NA	Body	0.00085	NA	NA	0.00085
				Thallium	NA	NA	NA	NA	Hair	0.11	NA	NA	0.11
				Vanadium	NA	NA	NA	NA	Dermal	0.0026	NA	NA	0.0026
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00026	NA	NA	0.00026
			PAHs	Benzo[a]pyrene	1.3E-08	5.2E-09	NA	1.8E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.9E-09	1.2E-09	NA	4.1E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	8.6E-10	NA	NA	8.6E-10	Liver	0.00012	NA	NA	0.00012
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			PCBs	PCBs (total Aroclors)	5.7E-09	2.5E-09	NA	8.2E-09	Immunological, Dermal, Ocular	0.01	0.0044	NA	0.014
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	7.6E-08	1.7E-08	NA	9.3E-08		0.19	0.0058	NA	0.2
		Exposure Point Total						9.3E-08					0.2
	Exposure Medium Total							9.3E-08					0.2
Sediment Total								9.3E-08					0.2
Total Receptor Risks								9E-08					0.2

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.66 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Oritani Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0062	NA	NA	0.0062
				Antimony	NA	NA	NA	NA	Hematological	0.0036	NA	NA	0.0036
				Arsenic	1.3E-07	2.1E-08	NA	1.6E-07	Cardiovascular, Dermal	0.021	0.0033	NA	0.024
				Cadmium	NA	NA	NA	NA	Kidney	0.00015	0.000019	NA	0.00017
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.024	NA	NA	0.024
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00076	NA	NA	0.00076
				Iron	NA	NA	NA	NA	Gastrointestinal	0.022	NA	NA	0.022
				Manganese	NA	NA	NA	NA	CNS	0.0017	NA	NA	0.0017
				Mercury	NA	NA	NA	NA	Immunological	0.0037	NA	NA	0.0037
				Nickel	NA	NA	NA	NA	Body	0.00091	NA	NA	0.00091
				Thallium	NA	NA	NA	NA	Hair	NA	NA	NA	NA
				Vanadium	NA	NA	NA	NA	Dermal	0.0057	NA	NA	0.0057
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00025	NA	NA	0.00025
			PAHs	Benzo[a]pyrene	9.4E-09	3.9E-09	NA	1.3E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Pesticides	Aldrin	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor	3.5E-11	NA	NA	3.5E-11	Liver	0.0000011	NA	NA	0.0000011
				Heptachlor epoxide	1.4E-10	NA	NA	1.4E-10	Liver	0.00008	NA	NA	0.00008
			PCBs	PCBs (total Aroclors)	2.0E-10	8.9E-11	NA	2.9E-10	Immunological, Dermal, Ocular	0.00035	0.00016	NA	0.00051
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	1.4E-07	2.5E-08	NA	1.7E-07		0.091	0.0035	NA	0.094
		Exposure Point Total						1.7E-07					0.094
	Exposure Medium Total							1.7E-07					0.094
Sediment Total								1.7E-07					0.094
Total Receptor Risks								2E-07					0.09

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.67 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Berry's Creek Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0061	NA	NA	0.0061
				Antimony	NA	NA	NA	NA	Hematological	0.0024	NA	NA	0.0024
				Arsenic	1.6E-07	2.4E-08	NA	1.8E-07	Cardiovascular, Dermal	0.024	0.0038	NA	0.028
				Cadmium	NA	NA	NA	NA	Kidney	0.00056	0.000071	NA	0.00063
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.027	NA	NA	0.027
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0014	NA	NA	0.0014
				Iron	NA	NA	NA	NA	Gastrointestinal	0.019	NA	NA	0.019
				Manganese	NA	NA	NA	NA	CNS	0.0026	NA	NA	0.0026
				Mercury	NA	NA	NA	NA	Immunological	0.0093	NA	NA	0.0093
				Nickel	NA	NA	NA	NA	Body	0.0021	NA	NA	0.0021
				Thallium	NA	NA	NA	NA	Hair	0.12	NA	NA	0.12
				Vanadium	NA	NA	NA	NA	Dermal	0.006	NA	NA	0.006
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00059	NA	NA	0.00059
			PAHs	Benzo[a]pyrene	1.4E-08	5.8E-09	NA	2.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.6E-09	1.5E-09	NA	5.1E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	8.8E-11	NA	NA	8.8E-11	Liver	0.000052	NA	NA	0.000052
			PCBs	PCBs (total Aroclors)	1.8E-09	7.7E-10	NA	2.5E-09	Immunological, Dermal, Ocular	0.0031	0.0014	NA	0.0044
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	1.7E-07	3.3E-08	NA	2.1E-07		0.22	0.0052	NA	0.23
		Exposure Point Total						2.1E-07					0.23
	Exposure Medium Total							2.1E-07					0.23
Sediment Total								2.1E-07					0.23
Total Receptor Risks								2E-07					0.2

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.68 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Former ENCAP Restoration Area	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0039	NA	NA	0.0039
				Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Arsenic	8.7E-08	1.4E-08	NA	1.0E-07	Cardiovascular, Dermal	0.014	0.0021	NA	0.016
				Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.01	NA	NA	0.01
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0013	NA	NA	0.0013
				Iron	NA	NA	NA	NA	Gastrointestinal	0.009	NA	NA	0.009
				Manganese	NA	NA	NA	NA	CNS	0.0005	NA	NA	0.0005
				Mercury	NA	NA	NA	NA	Immunological	0.0056	NA	NA	0.0056
				Nickel	NA	NA	NA	NA	Body	0.00096	NA	NA	0.00096
				Thallium	NA	NA	NA	NA	Hair	NA	NA	NA	NA
				Vanadium	NA	NA	NA	NA	Dermal	0.0071	NA	NA	0.0071
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00022	NA	NA	0.00022
			PAHs	Benzo[a]pyrene	1.7E-08	6.8E-09	NA	2.3E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.8E-10	NA	NA	1.8E-10	Liver	0.000024	NA	NA	0.000024
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	1.2E-10	NA	NA	1.2E-10	Liver	0.00007	NA	NA	0.00007
			PCBs	PCBs (total Aroclors)	2.6E-09	1.2E-09	NA	3.8E-09	Immunological, Dermal, Ocular	0.0046	0.002	NA	0.0066
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	1.1E-07	2.2E-08	NA	1.3E-07		0.057	0.0042	NA	0.061
		Exposure Point Total						1.3E-07					0.061
	Exposure Medium Total							1.3E-07					0.061
Sediment Total								1.3E-07					0.061
Total Receptor Risks								1E-07					0.06

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.69 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.0013	NA	NA	0.0013
				Arsenic	3.2E-07	2.3E-07	NA	5.5E-07	Cardiovascular, Dermal	0.0062	0.0045	NA	0.011
				Cadmium	NA	NA	NA	NA	Kidney	0.00028	0.00016	NA	0.00044
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0074	NA	NA	0.0074
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00075	NA	NA	0.00075
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0038	NA	NA	0.0038
				Manganese	NA	NA	NA	NA	CNS	0.0011	NA	NA	0.0011
				Mercury	NA	NA	NA	NA	Immunological	0.001	NA	NA	0.001
				Nickel	NA	NA	NA	NA	Body	0.00049	NA	NA	0.00049
				Thallium	NA	NA	NA	NA	Hair	0.018	NA	NA	0.018
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00014	NA	NA	0.00014
			PAHs	Benz[a]anthracene	9.9E-09	1.8E-08	NA	2.8E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	9.2E-08	1.7E-07	NA	2.6E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-08	2.2E-08	NA	3.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.2E-08	4.2E-08	NA	6.4E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	5.9E-09	1.1E-08	NA	1.7E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	7.5E-10	NA	NA	7.5E-10	Liver	0.000013	NA	NA	0.000013
				Heptachlor epoxide	2.5E-09	NA	NA	2.5E-09	Liver	0.00019	NA	NA	0.00019
			PCBs	PCBs (total Aroclors)	2.3E-08	4.6E-08	NA	6.9E-08	Immunological, Dermal, Ocular	0.005	0.01	NA	0.015
				Chemical Total	4.9E-07	5.4E-07	NA	1.0E-06		0.046	0.015	NA	0.061
		Exposure Point Total						1.0E-06					0.061
	Exposure Medium Total							1.0E-06					0.061
Sediment Total								1.0E-06					0.061
Surface Water	White Perch Fillet	White Perch Fillet in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Iron	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.003	NA	NA	0.003
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0033	NA	NA	0.0033
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.053	NA	NA	0.053
			PCBs	PCBs (total Aroclors)	3.1E-06	NA	NA	3.1E-06	Immunological, Dermal, Ocular	0.67	NA	NA	0.67
				Chemical Total	3.1E-06	NA	NA	3.1E-06		0.73	NA	NA	0.73
		Exposure Point Total						3.1E-06					0.73
	Exposure Medium Total							3.1E-06					0.73
Surface Water Total								3.1E-06					0.73
Total Receptor Risks								4E-06					0.8

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.70 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.0022	NA	NA	0.0022
				Arsenic	7.9E-07	2.5E-07	NA	1.0E-06	Cardiovascular, Dermal	0.01	0.0032	NA	0.013
				Cadmium	NA	NA	NA	NA	Kidney	0.00046	0.00011	NA	0.00058
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.012	NA	NA	0.012
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0012	NA	NA	0.0012
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0063	NA	NA	0.0063
				Manganese	NA	NA	NA	NA	CNS	0.0018	NA	NA	0.0018
				Mercury	NA	NA	NA	NA	Immunological	0.0017	NA	NA	0.0017
				Nickel	NA	NA	NA	NA	Body	0.0008	NA	NA	0.0008
				Thallium	NA	NA	NA	NA	Hair	0.03	NA	NA	0.03
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00023	NA	NA	0.00023
			PAHs	Benz[a]anthracene	6.6E-08	5.3E-08	NA	1.2E-07	NA	NA	NA	NA	NA
				Benzo[a]pyrene	6.1E-07	4.9E-07	NA	1.1E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	8.0E-08	6.5E-08	NA	1.4E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.5E-07	1.2E-07	NA	2.7E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	3.9E-08	3.2E-08	NA	7.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.8E-09	NA	NA	1.8E-09	Liver	0.000021	NA	NA	0.000021
				Heptachlor epoxide	6.2E-09	NA	NA	6.2E-09	Liver	0.00031	NA	NA	0.00031
			PCBs	PCBs (total Aroclors)	5.7E-08	4.9E-08	NA	1.1E-07	Immunological, Dermal, Ocular	0.0083	0.0072	NA	0.015
				Chemical Total	1.8E-06	1.1E-06	NA	2.9E-06		0.075	0.01	NA	0.086
		Exposure Point Total						2.9E-06					0.086
	Exposure Medium Total							2.9E-06					0.086
Sediment Total								2.9E-06					0.086
Surface Water	White Perch Fillet	White Perch Fillet in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Iron	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0033	NA	NA	0.0033
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0036	NA	NA	0.0036
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.058	NA	NA	0.058
			PCBs	PCBs (total Aroclors)	5.0E-06	NA	NA	5.0E-06	Immunological, Dermal, Ocular	0.73	NA	NA	0.73
				Chemical Total	5.0E-06	NA	NA	5.0E-06		0.8	NA	NA	0.8
		Exposure Point Total						5.0E-06					0.8
	Exposure Medium Total							5.0E-06					0.8
Surface Water Total								5.0E-06					0.8
Total Receptor Risks								8E-06					0.9

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.71 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	White Perch Fillet	White Perch Fillet in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Iron	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0054	NA	NA	0.0054
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.0059	NA	NA	0.0059
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.094	NA	NA	0.094
			PCBs	PCBs (total Aroclors)	4.1E-06	NA	NA	4.1E-06	Immunological, Dermal, Ocular	1.2	NA	NA	1.2
				Chemical Total	4.1E-06	NA	NA	4.1E-06		1.3	NA	NA	1.3
		Exposure Point Total						4.1E-06					1.3
	Exposure Medium Total							4.1E-06					1.3
Surface Water Total								4.1E-06					1.3
Total Receptor Risks								4E-06					1

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PCBs = polychlorinated biphenyls

TABLE 9.72 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.0013	NA	NA	0.0013
				Arsenic	3.2E-07	2.3E-07	NA	5.5E-07	Cardiovascular, Dermal	0.0062	0.0045	NA	0.011
				Cadmium	NA	NA	NA	NA	Kidney	0.00028	0.00016	NA	0.00044
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0074	NA	NA	0.0074
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00075	NA	NA	0.00075
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0038	NA	NA	0.0038
				Manganese	NA	NA	NA	NA	CNS	0.0011	NA	NA	0.0011
				Mercury	NA	NA	NA	NA	Immunological	0.001	NA	NA	0.001
				Nickel	NA	NA	NA	NA	Body	0.00049	NA	NA	0.00049
				Thallium	NA	NA	NA	NA	Hair	0.018	NA	NA	0.018
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00014	NA	NA	0.00014
			PAHs	Benz[a]anthracene	9.9E-09	1.8E-08	NA	2.8E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	9.2E-08	1.7E-07	NA	2.6E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-08	2.2E-08	NA	3.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.2E-08	4.2E-08	NA	6.4E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	5.9E-09	1.1E-08	NA	1.7E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	7.5E-10	NA	NA	7.5E-10	Liver	0.000013	NA	NA	0.000013
				Heptachlor epoxide	2.5E-09	NA	NA	2.5E-09	Liver	0.00019	NA	NA	0.00019
			PCBs	PCBs (total Aroclors)	2.3E-08	4.6E-08	NA	6.9E-08	Immunological, Dermal, Ocular	0.005	0.01	NA	0.015
				Chemical Total	4.9E-07	5.4E-07	NA	1.0E-06		0.046	0.015	NA	0.061
		Exposure Point Total						1.0E-06					0.061
	Exposure Medium Total							1.0E-06					0.061
Sediment Total								1.0E-06					0.061
Surface Water	Blue Crab Muscle	Blue Crab Muscle in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Iron	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0014	NA	NA	0.0014
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	NA	NA	NA	NA
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.042	NA	NA	0.042
			PCBs	PCBs (total Aroclors)	2.7E-08	NA	NA	2.7E-08	Immunological, Dermal, Ocular	0.006	NA	NA	0.006
				Chemical Total	2.7E-08	NA	NA	2.7E-08		0.049	NA	NA	0.049
		Exposure Point Total						2.7E-08					0.049
	Exposure Medium Total							2.7E-08					0.049
Surface Water Total								2.7E-08					0.049
Total Receptor Risks								1E-06					0.1

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.73 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.0022	NA	NA	0.0022
				Arsenic	7.9E-07	2.5E-07	NA	1.0E-06	Cardiovascular, Dermal	0.01	0.0032	NA	0.013
				Cadmium	NA	NA	NA	NA	Kidney	0.00046	0.00011	NA	0.00058
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.012	NA	NA	0.012
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0012	NA	NA	0.0012
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0063	NA	NA	0.0063
				Manganese	NA	NA	NA	NA	CNS	0.0018	NA	NA	0.0018
				Mercury	NA	NA	NA	NA	Immunological	0.0017	NA	NA	0.0017
				Nickel	NA	NA	NA	NA	Body	0.0008	NA	NA	0.0008
				Thallium	NA	NA	NA	NA	Hair	0.03	NA	NA	0.03
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00023	NA	NA	0.00023
			PAHs	Benz[a]anthracene	6.6E-08	5.3E-08	NA	1.2E-07	NA	NA	NA	NA	NA
				Benzo[a]pyrene	6.1E-07	4.9E-07	NA	1.1E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	8.0E-08	6.5E-08	NA	1.4E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.5E-07	1.2E-07	NA	2.7E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	3.9E-08	3.2E-08	NA	7.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.8E-09	NA	NA	1.8E-09	Liver	0.000021	NA	NA	0.000021
				Heptachlor epoxide	6.2E-09	NA	NA	6.2E-09	Liver	0.00031	NA	NA	0.00031
			PCBs	PCBs (total Aroclors)	5.7E-08	4.9E-08	NA	1.1E-07	Immunological, Dermal, Ocular	0.0083	0.0072	NA	0.015
				Chemical Total	1.8E-06	1.1E-06	NA	2.9E-06		0.075	0.01	NA	0.086
		Exposure Point Total						2.9E-06					0.086
	Exposure Medium Total							2.9E-06					0.086
Sediment Total								2.9E-06					0.086
Surface Water	Blue Crab Muscle	Blue Crab Muscle in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Iron	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0015	NA	NA	0.0015
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	NA	NA	NA	NA
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.046	NA	NA	0.046
			PCBs	PCBs (total Aroclors)	4.5E-08	NA	NA	4.5E-08	Immunological, Dermal, Ocular	0.0066	NA	NA	0.0066
				Chemical Total	4.5E-08	NA	NA	4.5E-08		0.054	NA	NA	0.054
		Exposure Point Total						4.5E-08					0.054
	Exposure Medium Total							4.5E-08					0.054
Surface Water Total								4.5E-08					0.054
Total Receptor Risks								3E-06					0.1

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.74 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	Blue Crab Muscle	Blue Crab Muscle in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Iron	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0024	NA	NA	0.0024
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	NA	NA	NA	NA
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.074	NA	NA	0.074
			PCBs	PCBs (total Aroclors)	3.6E-08	NA	NA	3.6E-08	Immunological, Dermal, Ocular	0.011	NA	NA	0.011
				Chemical Total	3.6E-08	NA	NA	3.6E-08		0.087	NA	NA	0.087
		Exposure Point Total						3.6E-08					0.087
	Exposure Medium Total							3.6E-08					0.087
Surface Water Total								3.6E-08					0.087
Total Receptor Risks								4E-08					0.09

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PCBs = polychlorinated biphenyls

TABLE 9.75 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.0013	NA	NA	0.0013
				Arsenic	3.2E-07	2.3E-07	NA	5.5E-07	Cardiovascular, Dermal	0.0062	0.0045	NA	0.011
				Cadmium	NA	NA	NA	NA	Kidney	0.00028	0.00016	NA	0.00044
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0074	NA	NA	0.0074
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00075	NA	NA	0.00075
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0038	NA	NA	0.0038
				Manganese	NA	NA	NA	NA	CNS	0.0011	NA	NA	0.0011
				Mercury	NA	NA	NA	NA	Immunological	0.001	NA	NA	0.001
				Nickel	NA	NA	NA	NA	Body	0.00049	NA	NA	0.00049
				Thallium	NA	NA	NA	NA	Hair	0.018	NA	NA	0.018
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00014	NA	NA	0.00014
			PAHs	Benz[a]anthracene	9.9E-09	1.8E-08	NA	2.8E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	9.2E-08	1.7E-07	NA	2.6E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-08	2.2E-08	NA	3.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.2E-08	4.2E-08	NA	6.4E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	5.9E-09	1.1E-08	NA	1.7E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	7.5E-10	NA	NA	7.5E-10	Liver	0.000013	NA	NA	0.000013
				Heptachlor epoxide	2.5E-09	NA	NA	2.5E-09	Liver	0.00019	NA	NA	0.00019
			PCBs	PCBs (total Aroclors)	2.3E-08	4.6E-08	NA	6.9E-08	Immunological, Dermal, Ocular	0.005	0.01	NA	0.015
				Chemical Total	4.9E-07	5.4E-07	NA	1.0E-06		0.046	0.015	NA	0.061
		Exposure Point Total						1.0E-06					0.061
	Exposure Medium Total							1.0E-06					0.061
Sediment Total								1.0E-06					0.061
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Iron	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.002	NA	NA	0.002
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	NA	NA	NA	NA
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.038	NA	NA	0.038
			PCBs	PCBs (total Aroclors)	6.0E-07	NA	NA	6.0E-07	Immunological, Dermal, Ocular	0.13	NA	NA	0.13
				Chemical Total	6.0E-07	NA	NA	6.0E-07		0.17	NA	NA	0.17
		Exposure Point Total						6.0E-07					0.17
	Exposure Medium Total							6.0E-07					0.17
Surface Water Total								6.0E-07					0.17
Total Receptor Risks								2E-06					0.2

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.76 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.0022	NA	NA	0.0022
				Arsenic	7.9E-07	2.5E-07	NA	1.0E-06	Cardiovascular, Dermal	0.01	0.0032	NA	0.013
				Cadmium	NA	NA	NA	NA	Kidney	0.00046	0.00011	NA	0.00058
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.012	NA	NA	0.012
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0012	NA	NA	0.0012
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0063	NA	NA	0.0063
				Manganese	NA	NA	NA	NA	CNS	0.0018	NA	NA	0.0018
				Mercury	NA	NA	NA	NA	Immunological	0.0017	NA	NA	0.0017
				Nickel	NA	NA	NA	NA	Body	0.0008	NA	NA	0.0008
				Thallium	NA	NA	NA	NA	Hair	0.03	NA	NA	0.03
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00023	NA	NA	0.00023
			PAHs	Benz[a]anthracene	6.6E-08	5.3E-08	NA	1.2E-07	NA	NA	NA	NA	NA
				Benzo[a]pyrene	6.1E-07	4.9E-07	NA	1.1E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	8.0E-08	6.5E-08	NA	1.4E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.5E-07	1.2E-07	NA	2.7E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	3.9E-08	3.2E-08	NA	7.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.8E-09	NA	NA	1.8E-09	Liver	0.000021	NA	NA	0.000021
				Heptachlor epoxide	6.2E-09	NA	NA	6.2E-09	Liver	0.00031	NA	NA	0.00031
			PCBs	PCBs (total Aroclors)	5.7E-08	4.9E-08	NA	1.1E-07	Immunological, Dermal, Ocular	0.0083	0.0072	NA	0.015
				Chemical Total	1.8E-06	1.1E-06	NA	2.9E-06		0.075	0.01	NA	0.086
		Exposure Point Total						2.9E-06					0.086
	Exposure Medium Total							2.9E-06					0.086
Sediment Total								2.9E-06					0.086
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Iron	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0022	NA	NA	0.0022
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	NA	NA	NA	NA
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.042	NA	NA	0.042
			PCBs	PCBs (total Aroclors)	9.8E-07	NA	NA	9.8E-07	Immunological, Dermal, Ocular	0.14	NA	NA	0.14
				Chemical Total	9.8E-07	NA	NA	9.8E-07		0.19	NA	NA	0.19
		Exposure Point Total						9.8E-07					0.19
	Exposure Medium Total							9.8E-07					0.19
Surface Water Total								9.8E-07					0.19
Total Receptor Risks								4E-06					0.3

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.77 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Younger Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Iron	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0035	NA	NA	0.0035
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	NA	NA	NA	NA
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.068	NA	NA	0.068
			PCBs	PCBs (total Aroclors)	7.9E-07	NA	NA	7.9E-07	Immunological, Dermal, Ocular	0.23	NA	NA	0.23
				Chemical Total	7.9E-07	NA	NA	7.9E-07		0.3	NA	NA	0.3
		Exposure Point Total						7.9E-07					0.3
	Exposure Medium Total							7.9E-07					0.3
Surface Water Total								7.9E-07					0.3
Total Receptor Risks								8E-07					0.3

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PCBs = polychlorinated biphenyls

TABLE 9.78 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00087	NA	NA	0.00087
				Arsenic	2.1E-07	1.5E-07	NA	3.7E-07	Cardiovascular, Dermal	0.0042	0.003	NA	0.0071
				Cadmium	NA	NA	NA	NA	Kidney	0.00019	0.00011	NA	0.00029
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0049	NA	NA	0.0049
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0005	NA	NA	0.0005
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0026	NA	NA	0.0026
				Manganese	NA	NA	NA	NA	CNS	0.00075	NA	NA	0.00075
				Mercury	NA	NA	NA	NA	Immunological	0.00068	NA	NA	0.00068
				Nickel	NA	NA	NA	NA	Body	0.00033	NA	NA	0.00033
				Thallium	NA	NA	NA	NA	Hair	0.012	NA	NA	0.012
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000093	NA	NA	0.000093
			PAHs	Benz[a]anthracene	6.6E-09	1.2E-08	NA	1.9E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	6.1E-08	1.1E-07	NA	1.7E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	8.0E-09	1.5E-08	NA	2.3E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.5E-08	2.8E-08	NA	4.3E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	3.9E-09	7.3E-09	NA	1.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.9E-10	NA	NA	4.9E-10	Liver	0.0000085	NA	NA	0.0000085
				Heptachlor epoxide	1.7E-09	NA	NA	1.7E-09	Liver	0.00012	NA	NA	0.00012
			PCBs	PCBs (total Aroclors)	1.5E-08	3.1E-08	NA	4.6E-08	Immunological, Dermal, Ocular	0.0034	0.0067	NA	0.01
				Chemical Total	3.3E-07	3.6E-07	NA	6.9E-07		0.031	0.0098	NA	0.04
		Exposure Point Total						6.9E-07					0.04
	Exposure Medium Total							6.9E-07					0.04
Sediment Total								6.9E-07					0.04
Total Receptor Risks								7E-07					0.04

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.79 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.0014	NA	NA	0.0014
				Arsenic	5.3E-07	1.6E-07	NA	6.9E-07	Cardiovascular, Dermal	0.0068	0.0021	NA	0.0089
				Cadmium	NA	NA	NA	NA	Kidney	0.00031	0.000076	NA	0.00038
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0081	NA	NA	0.0081
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00082	NA	NA	0.00082
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0042	NA	NA	0.0042
				Manganese	NA	NA	NA	NA	CNS	0.0012	NA	NA	0.0012
				Mercury	NA	NA	NA	NA	Immunological	0.0011	NA	NA	0.0011
				Nickel	NA	NA	NA	NA	Body	0.00054	NA	NA	0.00054
				Thallium	NA	NA	NA	NA	Hair	0.02	NA	NA	0.02
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00015	NA	NA	0.00015
			PAHs	Benz[a]anthracene	4.4E-08	3.6E-08	NA	8.0E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	4.1E-07	3.3E-07	NA	7.4E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	5.3E-08	4.3E-08	NA	9.6E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	9.9E-08	8.0E-08	NA	1.8E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	2.6E-08	2.1E-08	NA	4.7E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.2E-09	NA	NA	1.2E-09	Liver	0.000014	NA	NA	0.000014
				Heptachlor epoxide	4.1E-09	NA	NA	4.1E-09	Liver	0.0002	NA	NA	0.0002
			PCBs	PCBs (total Aroclors)	3.8E-08	3.3E-08	NA	7.1E-08	Immunological, Dermal, Ocular	0.0055	0.0048	NA	0.01
				Chemical Total	1.2E-06	7.0E-07	NA	1.9E-06		0.05	0.007	NA	0.057
		Exposure Point Total						1.9E-06					0.057
	Exposure Medium Total							1.9E-06					0.057
Sediment Total								1.9E-06					0.057
Total Receptor Risks								2E-06					0.06

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.80 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.0019	NA	NA	0.0019
				Arsenic	4.6E-07	3.3E-07	NA	7.9E-07	Cardiovascular, Dermal	0.009	0.0064	NA	0.015
				Cadmium	NA	NA	NA	NA	Kidney	0.00041	0.00023	NA	0.00064
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.011	NA	NA	0.011
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0011	NA	NA	0.0011
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0056	NA	NA	0.0056
				Manganese	NA	NA	NA	NA	CNS	0.0016	NA	NA	0.0016
				Mercury	NA	NA	NA	NA	Immunological	0.0015	NA	NA	0.0015
				Nickel	NA	NA	NA	NA	Body	0.00071	NA	NA	0.00071
				Thallium	NA	NA	NA	NA	Hair	0.026	NA	NA	0.026
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0002	NA	NA	0.0002
			PAHs	Benz[a]anthracene	1.4E-08	2.7E-08	NA	4.1E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.3E-07	2.5E-07	NA	3.8E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.7E-08	3.2E-08	NA	5.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.2E-08	6.0E-08	NA	9.2E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	8.5E-09	1.6E-08	NA	2.4E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.1E-09	NA	NA	1.1E-09	Liver	0.000018	NA	NA	0.000018
				Heptachlor epoxide	3.6E-09	NA	NA	3.6E-09	Liver	0.00027	NA	NA	0.00027
			PCBs	PCBs (total Aroclors)	3.3E-08	6.6E-08	NA	1.0E-07	Immunological, Dermal, Ocular	0.0073	0.015	NA	0.022
				Chemical Total	7.1E-07	7.8E-07	NA	1.5E-06		0.066	0.021	NA	0.087
		Exposure Point Total						1.5E-06					0.087
	Exposure Medium Total							1.5E-06					0.087
Sediment Total								1.5E-06					0.087
Total Receptor Risks								1E-06					0.09

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.81 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Older Child

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.0031	NA	NA	0.0031
				Arsenic	1.1E-06	3.5E-07	NA	1.5E-06	Cardiovascular, Dermal	0.015	0.0046	NA	0.019
				Cadmium	NA	NA	NA	NA	Kidney	0.00067	0.00017	NA	0.00083
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.018	NA	NA	0.018
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0018	NA	NA	0.0018
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0091	NA	NA	0.0091
				Manganese	NA	NA	NA	NA	CNS	0.0027	NA	NA	0.0027
				Mercury	NA	NA	NA	NA	Immunological	0.0024	NA	NA	0.0024
				Nickel	NA	NA	NA	NA	Body	0.0012	NA	NA	0.0012
				Thallium	NA	NA	NA	NA	Hair	0.043	NA	NA	0.043
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00033	NA	NA	0.00033
			PAHs	Benz[a]anthracene	9.5E-08	7.7E-08	NA	1.7E-07	NA	NA	NA	NA	NA
				Benzo[a]pyrene	8.8E-07	7.1E-07	NA	1.6E-06	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-07	9.3E-08	NA	2.1E-07	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.1E-07	1.7E-07	NA	3.9E-07	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	5.7E-08	4.6E-08	NA	1.0E-07	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.6E-09	NA	NA	2.6E-09	Liver	0.00003	NA	NA	0.00003
				Heptachlor epoxide	9.0E-09	NA	NA	9.0E-09	Liver	0.00044	NA	NA	0.00044
			PCBs	PCBs (total Aroclors)	8.2E-08	7.1E-08	NA	1.5E-07	Immunological, Dermal, Ocular	0.012	0.01	NA	0.022
				Chemical Total	2.6E-06	1.5E-06	NA	4.1E-06		0.11	0.015	NA	0.12
		Exposure Point Total						4.1E-06					0.12
	Exposure Medium Total							4.1E-06					0.12
Sediment Total								4.1E-06					0.12
Total Receptor Risks								4E-06					0.1

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.82 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000034	NA	NA	0.000034
				Arsenic	8.0E-08	2.9E-07	NA	3.7E-07	Cardiovascular, Dermal	0.001	0.0037	NA	0.0047
				Cadmium	NA	NA	NA	NA	Kidney	0.00035	0.001	NA	0.0014
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00053	NA	NA	0.00053
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00009	NA	NA	0.00009
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00043	NA	NA	0.00043
				Manganese	NA	NA	NA	NA	CNS	0.00019	NA	NA	0.00019
				Mercury	NA	NA	NA	NA	Immunological	0.0097	NA	NA	0.0097
				Nickel	NA	NA	NA	NA	Body	0.000045	NA	NA	0.000045
				Thallium	NA	NA	NA	NA	Hair	0.0032	NA	NA	0.0032
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00011	NA	NA	0.00011
			PAHs	Benz[a]anthracene	1.5E-09	1.4E-08	NA	1.5E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	2.3E-08	2.1E-07	NA	2.4E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.9E-09	2.7E-08	NA	3.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	8.8E-09	8.2E-08	NA	9.0E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.7E-09	1.6E-08	NA	1.8E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	8.0E-10	NA	NA	8.0E-10	Liver	0.0000091	NA	NA	0.0000091
				Heptachlor epoxide	1.9E-09	NA	NA	1.9E-09	Liver	0.000095	NA	NA	0.000095
			PCBs	PCBs (total Aroclors)	2.2E-08	2.2E-07	NA	2.4E-07	Immunological, Dermal, Ocular	0.0032	0.032	NA	0.035
				Chemical Total	1.4E-07	8.5E-07	NA	1.0E-06		0.019	0.036	NA	0.055
		Exposure Point Total						1.0E-06					0.055
	Exposure Medium Total							1.0E-06					0.055
Sediment Total								1.0E-06					0.055
Surface Water	White Perch Fillet	White Perch Fillet in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00012	NA	NA	0.00012
				Iron	NA	NA	NA	NA	Gastrointestinal	0.000058	NA	NA	0.000058
				Manganese	NA	NA	NA	NA	CNS	0.0000092	NA	NA	0.0000092
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.00087	NA	NA	0.00087
				Selenium	NA	NA	NA	NA	CNS, Dermal, Hematological	0.0004	NA	NA	0.0004
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.012	NA	NA	0.012
			PCBs	PCBs (total Aroclors)	9.0E-07	NA	NA	9.0E-07	Immunological, Dermal, Ocular	0.13	NA	NA	0.13
				Chemical Total	9.0E-07	NA	NA	9.0E-07		0.15	NA	NA	0.15
		Exposure Point Total						9.0E-07					0.15
	Exposure Medium Total							9.0E-07					0.15
	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	NA	1.0E-09	NA	1.0E-09	Cardiovascular, Dermal	NA	0.000013	NA	0.000013
				Thallium	NA	NA	NA	NA	Hair	NA	0.000043	NA	0.000043
			Volatiles	Vinyl chloride	NA	5.4E-10	NA	5.4E-10	Liver	NA	0.0000015	NA	0.0000015
				Chemical Total	NA	1.6E-09	NA	1.6E-09		NA	0.000057	NA	0.000057
		Exposure Point Total						1.6E-09					0.000057
	Exposure Medium Total							1.6E-09					0.000057
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00082	0.00082
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00082	0.00082
		Exposure Point Total						NA					0.00082
	Exposure Medium Total							NA					0.00082
Surface Water Total								9.0E-07					0.15
Total Receptor Risks								2E-06					0.2

Notes:

CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.83 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000034	NA	NA	0.000034
				Arsenic	8.0E-08	2.9E-07	NA	3.7E-07	Cardiovascular, Dermal	0.001	0.0037	NA	0.0047
				Cadmium	NA	NA	NA	NA	Kidney	0.00035	0.001	NA	0.0014
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00053	NA	NA	0.00053
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00009	NA	NA	0.00009
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00043	NA	NA	0.00043
				Manganese	NA	NA	NA	NA	CNS	0.00019	NA	NA	0.00019
				Mercury	NA	NA	NA	NA	Immunological	0.0097	NA	NA	0.0097
				Nickel	NA	NA	NA	NA	Body	0.000045	NA	NA	0.000045
				Thallium	NA	NA	NA	NA	Hair	0.0032	NA	NA	0.0032
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00011	NA	NA	0.00011
			PAHs	Benz[a]anthracene	1.5E-09	1.4E-08	NA	1.5E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	2.3E-08	2.1E-07	NA	2.4E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.9E-09	2.7E-08	NA	3.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	8.8E-09	8.2E-08	NA	9.0E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.7E-09	1.6E-08	NA	1.8E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	8.0E-10	NA	NA	8.0E-10	Liver	0.0000091	NA	NA	0.0000091
				Heptachlor epoxide	1.9E-09	NA	NA	1.9E-09	Liver	0.000095	NA	NA	0.000095
			PCBs	PCBs (total Aroclors)	2.2E-08	2.2E-07	NA	2.4E-07	Immunological, Dermal, Ocular	0.0032	0.032	NA	0.035
				Chemical Total	1.4E-07	8.5E-07	NA	1.0E-06		0.019	0.036	NA	0.055
		Exposure Point Total						1.0E-06					0.055
	Exposure Medium Total							1.0E-06					0.055
Sediment Total								1.0E-06					0.055
Surface Water	Blue Crab Muscle	Blue Crab Muscle in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00087	NA	NA	0.00087
				Iron	NA	NA	NA	NA	Gastrointestinal	0.000042	NA	NA	0.000042
				Manganese	NA	NA	NA	NA	CNS	0.00064	NA	NA	0.00064
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.000086	NA	NA	0.000086
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.00051	NA	NA	0.00051
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.0066	NA	NA	0.0066
			PCBs	PCBs (total Aroclors)	8.9E-09	NA	NA	8.9E-09	Immunological, Dermal, Ocular	0.0013	NA	NA	0.0013
				Chemical Total	8.9E-09	NA	NA	8.9E-09		0.01	NA	NA	0.01
		Exposure Point Total						8.9E-09					0.01
	Exposure Medium Total							8.9E-09					0.01
	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	NA	1.0E-09	NA	1.0E-09	Cardiovascular, Dermal	NA	0.000013	NA	0.000013
				Thallium	NA	NA	NA	NA	Hair	NA	0.000043	NA	0.000043
			Volatiles	Vinyl chloride	NA	5.4E-10	NA	5.4E-10	Liver	NA	0.0000015	NA	0.0000015
				Chemical Total	NA	1.6E-09	NA	1.6E-09		NA	0.000057	NA	0.000057
		Exposure Point Total						1.6E-09					0.000057
	Exposure Medium Total							1.6E-09					0.000057
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00082	0.00082
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00082	0.00082
		Exposure Point Total						NA					0.00082
	Exposure Medium Total							NA					0.00082
Surface Water Total								1.0E-08					0.011
Total Receptor Risks								1E-06					0.07

Notes:

CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.84 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000034	NA	NA	0.000034
				Arsenic	8.0E-08	2.9E-07	NA	3.7E-07	Cardiovascular, Dermal	0.001	0.0037	NA	0.0047
				Cadmium	NA	NA	NA	NA	Kidney	0.00035	0.001	NA	0.0014
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00053	NA	NA	0.00053
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00009	NA	NA	0.00009
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00043	NA	NA	0.00043
				Manganese	NA	NA	NA	NA	CNS	0.00019	NA	NA	0.00019
				Mercury	NA	NA	NA	NA	Immunological	0.0097	NA	NA	0.0097
				Nickel	NA	NA	NA	NA	Body	0.000045	NA	NA	0.000045
				Thallium	NA	NA	NA	NA	Hair	0.0032	NA	NA	0.0032
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00011	NA	NA	0.00011
			PAHs	Benz[a]anthracene	1.5E-09	1.4E-08	NA	1.5E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	2.3E-08	2.1E-07	NA	2.4E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.9E-09	2.7E-08	NA	3.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	8.8E-09	8.2E-08	NA	9.0E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.7E-09	1.6E-08	NA	1.8E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	8.0E-10	NA	NA	8.0E-10	Liver	0.0000091	NA	NA	0.0000091
				Heptachlor epoxide	1.9E-09	NA	NA	1.9E-09	Liver	0.000095	NA	NA	0.000095
			PCBs	PCBs (total Aroclors)	2.2E-08	2.2E-07	NA	2.4E-07	Immunological, Dermal, Ocular	0.0032	0.032	NA	0.035
				Chemical Total	1.4E-07	8.5E-07	NA	1.0E-06		0.019	0.036	NA	0.055
		Exposure Point Total						1.0E-06					0.055
	Exposure Medium Total							1.0E-06					0.055
Sediment Total								1.0E-06					0.055
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00087	NA	NA	0.00087
				Iron	NA	NA	NA	NA	Gastrointestinal	0.000042	NA	NA	0.000042
				Manganese	NA	NA	NA	NA	CNS	0.00064	NA	NA	0.00064
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.00011	NA	NA	0.00011
				Selenium	NA	NA	NA	NA	CNS, Dermal, Hematological	0.00051	NA	NA	0.00051
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.0064	NA	NA	0.0064
			PCBs	PCBs (total Aroclors)	1.3E-07	NA	NA	1.3E-07	Immunological, Dermal, Ocular	0.018	NA	NA	0.018
				Chemical Total	1.3E-07	NA	NA	1.3E-07		0.027	NA	NA	0.027
		Exposure Point Total						1.3E-07					0.027
	Exposure Medium Total							1.3E-07					0.027
	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	NA	1.0E-09	NA	1.0E-09	Cardiovascular, Dermal	NA	0.000013	NA	0.000013
				Thallium	NA	NA	NA	NA	Hair	NA	0.000043	NA	0.000043
			Volatiles	Vinyl chloride	NA	5.4E-10	NA	5.4E-10	Liver	NA	0.0000015	NA	0.0000015
				Chemical Total	NA	1.6E-09	NA	1.6E-09		NA	0.000057	NA	0.000057
		Exposure Point Total						1.6E-09					0.000057
	Exposure Medium Total							1.6E-09					0.000057
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00082	0.00082
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00082	0.00082
		Exposure Point Total						NA					0.00082
	Exposure Medium Total							NA					0.00082
Surface Water Total								1.3E-07					0.028
Total Receptor Risks								1E-06					0.08

Notes:

CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.85 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000019	NA	NA	0.000019
				Arsenic	4.3E-08	1.5E-07	NA	2.0E-07	Cardiovascular, Dermal	0.00055	0.002	NA	0.0025
				Cadmium	NA	NA	NA	NA	Kidney	0.00019	0.00053	NA	0.00072
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0003	NA	NA	0.0003
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000051	NA	NA	0.000051
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00026	NA	NA	0.00026
				Manganese	NA	NA	NA	NA	CNS	0.000094	NA	NA	0.000094
				Mercury	NA	NA	NA	NA	Immunological	0.0053	NA	NA	0.0053
				Nickel	NA	NA	NA	NA	Body	0.000025	NA	NA	0.000025
				Thallium	NA	NA	NA	NA	Hair	0.0017	NA	NA	0.0017
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000056	NA	NA	0.000056
			PAHs	Benz[a]anthracene	7.8E-10	7.2E-09	NA	8.0E-09	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.1E-08	1.0E-07	NA	1.2E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-09	1.1E-08	NA	1.2E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.1E-09	3.8E-08	NA	4.2E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	8.9E-10	8.2E-09	NA	9.1E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	7.3E-10	NA	NA	7.3E-10	Liver	0.0000084	NA	NA	0.0000084
				Heptachlor epoxide	8.4E-10	NA	NA	8.4E-10	Liver	0.000041	NA	NA	0.000041
			PCBs	PCBs (total Aroclors)	1.2E-08	1.2E-07	NA	1.3E-07	Immunological, Dermal, Ocular	0.0018	0.018	NA	0.019
				Chemical Total	7.5E-08	4.4E-07	NA	5.2E-07		0.01	0.02	NA	0.03
		Exposure Point Total						5.2E-07					0.03
	Exposure Medium Total							5.2E-07					0.03
Sediment Total								5.2E-07					0.03
Surface Water	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	1.3E-09	5.3E-10	NA	1.8E-09	Cardiovascular, Dermal	0.000017	0.0000069	NA	0.000023
				Thallium	NA	NA	NA	NA	Hair	0.000054	0.000023	NA	0.000077
			PAHs	Benzo[a]pyrene	1.0E-09	NA	NA	1.0E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.6E-09	NA	NA	4.6E-09	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	3.9E-11	6.4E-10	NA	6.8E-10	Liver	0.0000001	0.0000017	NA	0.0000018
				Chemical Total	7.0E-09	1.2E-09	NA	8.1E-09		0.000071	0.000031	NA	0.0001
		Exposure Point Total						8.1E-09					0.0001
	Exposure Medium Total							8.1E-09					0.0001
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00028	0.00028
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00028	0.00028
		Exposure Point Total						NA					0.00028
	Exposure Medium Total							NA					0.00028
Surface Water Total								8.1E-09					0.00038
Total Receptor Risks								5E-07					0.03

Notes:

CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.86 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in UBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00004	NA	NA	0.00004
				Arsenic	9.0E-08	3.2E-07	NA	4.1E-07	Cardiovascular, Dermal	0.0012	0.0042	NA	0.0053
				Cadmium	NA	NA	NA	NA	Kidney	0.00039	0.0011	NA	0.0015
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00064	NA	NA	0.00064
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00011	NA	NA	0.00011
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00054	NA	NA	0.00054
				Manganese	NA	NA	NA	NA	CNS	0.0002	NA	NA	0.0002
				Mercury	NA	NA	NA	NA	Immunological	0.011	NA	NA	0.011
				Nickel	NA	NA	NA	NA	Body	0.000052	NA	NA	0.000052
				Thallium	NA	NA	NA	NA	Hair	0.0036	NA	NA	0.0036
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00012	NA	NA	0.00012
			PAHs	Benz[a]anthracene	1.6E-09	1.5E-08	NA	1.7E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	2.4E-08	2.2E-07	NA	2.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.4E-09	2.3E-08	NA	2.5E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	8.7E-09	8.1E-08	NA	9.0E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.9E-09	1.7E-08	NA	1.9E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.5E-09	NA	NA	1.5E-09	Liver	0.000018	NA	NA	0.000018
				Heptachlor epoxide	1.8E-09	NA	NA	1.8E-09	Liver	0.000087	NA	NA	0.000087
			PCBs	PCBs (total Aroclors)	2.5E-08	2.5E-07	NA	2.8E-07	Immunological, Dermal, Ocular	0.0037	0.037	NA	0.041
				Chemical Total	1.6E-07	9.3E-07	NA	1.1E-06		0.022	0.042	NA	0.064
		Exposure Point Total						1.1E-06					0.064
	Exposure Medium Total							1.1E-06					0.064
Sediment Total								1.1E-06					0.064
Surface Water	Surface Water Total	Surface Water Total in UBC	Metals	Arsenic	2.7E-09	1.1E-09	NA	3.8E-09	Cardiovascular, Dermal	0.000035	0.000015	NA	0.00005
				Thallium	NA	NA	NA	NA	Hair	0.00011	0.000048	NA	0.00016
			PAHs	Benzo[a]pyrene	2.1E-09	NA	NA	2.1E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	9.8E-09	NA	NA	9.8E-09	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	8.1E-11	1.4E-09	NA	1.4E-09	Liver	2.2E-07	0.0000037	NA	0.0000039
				Chemical Total	1.5E-08	2.5E-09	NA	1.7E-08		0.00015	0.000066	NA	0.00022
		Exposure Point Total						1.7E-08					0.00022
	Exposure Medium Total							1.7E-08					0.00022
	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00059	0.00059
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00059	0.00059
		Exposure Point Total						NA					0.00059
	Exposure Medium Total							NA					0.00059
Surface Water Total								1.7E-08					0.00081
Total Receptor Risks								1E-06					0.07

Notes:

CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.87 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in UBC	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00038	NA	NA	0.00038
				Antimony	NA	NA	NA	NA	Hematological	0.00021	NA	NA	0.00021
				Arsenic	1.6E-08	8.5E-09	NA	2.5E-08	Cardiovascular, Dermal	0.0025	0.0013	NA	0.0038
				Cadmium	NA	NA	NA	NA	Kidney	0.00072	0.0003	NA	0.001
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0014	NA	NA	0.0014
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00033	NA	NA	0.00033
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0013	NA	NA	0.0013
				Manganese	NA	NA	NA	NA	CNS	0.00019	NA	NA	0.00019
				Mercury	NA	NA	NA	NA	Immunological	0.023	NA	NA	0.023
				Nickel	NA	NA	NA	NA	Body	0.00012	NA	NA	0.00012
				Thallium	NA	NA	NA	NA	Hair	0.0084	NA	NA	0.0084
				Vanadium	NA	NA	NA	NA	Dermal	0.00028	NA	NA	0.00028
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00024	NA	NA	0.00024
			PAHs	Benzo[a]pyrene	3.7E-09	5.1E-09	NA	8.8E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	7.4E-10	1.0E-09	NA	1.7E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	5.2E-10	NA	NA	5.2E-10	Liver	0.000072	NA	NA	0.000072
				Heptachlor	4.1E-11	NA	NA	4.1E-11	Liver	0.0000013	NA	NA	0.0000013
				Heptachlor epoxide	3.4E-10	NA	NA	3.4E-10	Liver	0.0002	NA	NA	0.0002
			PCBs	PCBs (total Aroclors)	3.5E-09	5.1E-09	NA	8.6E-09	Immunological, Dermal, Ocular	0.0061	0.0089	NA	0.015
			Volatiles	Trichloroethene	3.4E-14	NA	NA	3.4E-14	pmental, Cardiovascular, Immun	0.0000001	NA	NA	0.0000001
				Chemical Total	2.5E-08	2.0E-08	NA	4.5E-08		0.046	0.011	NA	0.056
		Exposure Point Total						4.5E-08					0.056
	Exposure Medium Total							4.5E-08					0.056
Sediment Total								4.5E-08					0.056
Surface Water	Ambient Air	Ambient Air in UBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0012	0.0012
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0012	0.0012
		Exposure Point Total						NA					0.0012
	Exposure Medium Total							NA					0.0012
Surface Water Total								NA					0.0012
Total Receptor Risks								4E-08					0.06

Notes:

CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
UBC = Upper Berry's Creek

TABLE 9.88 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in Upper Peach Island Creek	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00055	NA	NA	0.00055
				Antimony	NA	NA	NA	NA	Hematological	0.00019	NA	NA	0.00019
				Arsenic	2.7E-08	1.4E-08	NA	4.1E-08	Cardiovascular, Dermal	0.0042	0.0022	NA	0.0063
				Cadmium	NA	NA	NA	NA	Kidney	0.0044	0.0018	NA	0.0062
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0022	NA	NA	0.0022
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0023	NA	NA	0.0023
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0016	NA	NA	0.0016
				Manganese	NA	NA	NA	NA	CNS	0.00017	NA	NA	0.00017
				Mercury	NA	NA	NA	NA	Immunological	0.032	NA	NA	0.032
				Nickel	NA	NA	NA	NA	Body	0.00073	NA	NA	0.00073
				Thallium	NA	NA	NA	NA	Hair	0.013	NA	NA	0.013
				Vanadium	NA	NA	NA	NA	Dermal	0.00042	NA	NA	0.00042
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0004	NA	NA	0.0004
			PAHs	Benzo[a]pyrene	4.3E-09	5.9E-09	NA	1.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.3E-09	1.8E-09	NA	3.1E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.2E-10	NA	NA	4.2E-10	Liver	0.000057	NA	NA	0.000057
				Heptachlor	6.4E-11	NA	NA	6.4E-11	Liver	0.000002	NA	NA	0.000002
				Heptachlor epoxide	4.9E-10	NA	NA	4.9E-10	Liver	0.00029	NA	NA	0.00029
			PCBs	PCBs (total Aroclors)	1.1E-08	1.5E-08	NA	2.6E-08	Immunological, Dermal, Ocular	0.019	0.027	NA	0.046
			Volatiles	Trichloroethene	6.1E-10	NA	NA	6.1E-10	pmental, Cardiovascular, Immun	0.0019	NA	NA	0.0019
				Chemical Total	4.5E-08	3.7E-08	NA	8.2E-08		0.083	0.031	NA	0.11
		Exposure Point Total						8.2E-08					0.11
	Exposure Medium Total							8.2E-08					0.11
Sediment Total								8.2E-08					0.11
Total Receptor Risks								8E-08					0.1

Notes:

BCSA = Berry's Creek Study Area
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

Upper Peach Island Creek is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

TABLE 9.89 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00003	NA	NA	0.00003
				Arsenic	3.0E-08	1.1E-07	NA	1.4E-07	Cardiovascular, Dermal	0.00038	0.0014	NA	0.0018
				Cadmium	NA	NA	NA	NA	Kidney	0.000036	0.0001	NA	0.00014
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00064	NA	NA	0.00064
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000033	NA	NA	0.000033
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00051	NA	NA	0.00051
				Manganese	NA	NA	NA	NA	CNS	0.00065	NA	NA	0.00065
				Mercury	NA	NA	NA	NA	Immunological	0.00081	NA	NA	0.00081
				Nickel	NA	NA	NA	NA	Body	0.000028	NA	NA	0.000028
				Thallium	NA	NA	NA	NA	Hair	0.01	NA	NA	0.01
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000018	NA	NA	0.000018
			PAHs	Benz[a]anthracene	1.4E-09	1.3E-08	NA	1.4E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.4E-08	1.3E-07	NA	1.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.0E-09	1.8E-08	NA	2.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.7E-09	4.4E-08	NA	4.9E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.0E-09	9.7E-09	NA	1.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.4E-09	NA	NA	1.4E-09	Liver	0.000016	NA	NA	0.000016
				Heptachlor epoxide	2.5E-10	NA	NA	2.5E-10	Liver	0.000012	NA	NA	0.000012
			PCBs	PCBs (total Aroclors)	5.6E-09	5.6E-08	NA	6.1E-08	Immunological, Dermal, Ocular	0.00081	0.0081	NA	0.009
				Chemical Total	6.0E-08	3.8E-07	NA	4.4E-07		0.014	0.0096	NA	0.024
		Exposure Point Total						4.4E-07					0.024
	Exposure Medium Total							4.4E-07					0.024
Sediment Total								4.4E-07					0.024
Surface Water	White Perch Fillet	White Perch Fillet in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000083	NA	NA	0.000083
				Iron	NA	NA	NA	NA	Gastrointestinal	0.000039	NA	NA	0.000039
				Manganese	NA	NA	NA	NA	CNS	0.0000097	NA	NA	0.0000097
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0018	NA	NA	0.0018
				Selenium	NA	NA	NA	NA	CNS, Dermal, Hematological	0.00043	NA	NA	0.00043
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.011	NA	NA	0.011
			PCBs	PCBs (total Aroclors)	7.1E-07	NA	NA	7.1E-07	Immunological, Dermal, Ocular	0.1	NA	NA	0.1
				Chemical Total	7.1E-07	NA	NA	7.1E-07		0.12	NA	NA	0.12
		Exposure Point Total						7.1E-07					0.12
	Exposure Medium Total							7.1E-07					0.12
	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	NA	9.0E-10	NA	9.0E-10	Cardiovascular, Dermal	NA	0.000012	NA	0.000012
				Thallium	NA	NA	NA	NA	Hair	NA	0.000055	NA	0.000055
			Volatiles	Vinyl chloride	NA	5.9E-10	NA	5.9E-10	Liver	NA	0.0000016	NA	0.0000016
				Chemical Total	NA	1.5E-09	NA	1.5E-09		NA	0.000069	NA	0.000069
		Exposure Point Total						1.5E-09					0.000069
	Exposure Medium Total							1.5E-09					0.000069
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0005	0.0005
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0005	0.0005
		Exposure Point Total						NA					0.0005
	Exposure Medium Total							NA					0.0005
Surface Water Total								7.1E-07					0.12
Total Receptor Risks								1E-06					0.1

Notes:

CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.90 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00003	NA	NA	0.00003
				Arsenic	3.0E-08	1.1E-07	NA	1.4E-07	Cardiovascular, Dermal	0.00038	0.0014	NA	0.0018
				Cadmium	NA	NA	NA	NA	Kidney	0.000036	0.0001	NA	0.00014
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00064	NA	NA	0.00064
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000033	NA	NA	0.000033
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00051	NA	NA	0.00051
				Manganese	NA	NA	NA	NA	CNS	0.00065	NA	NA	0.00065
				Mercury	NA	NA	NA	NA	Immunological	0.00081	NA	NA	0.00081
				Nickel	NA	NA	NA	NA	Body	0.000028	NA	NA	0.000028
				Thallium	NA	NA	NA	NA	Hair	0.01	NA	NA	0.01
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000018	NA	NA	0.000018
			PAHs	Benz[a]anthracene	1.4E-09	1.3E-08	NA	1.4E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.4E-08	1.3E-07	NA	1.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.0E-09	1.8E-08	NA	2.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.7E-09	4.4E-08	NA	4.9E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.0E-09	9.7E-09	NA	1.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.4E-09	NA	NA	1.4E-09	Liver	0.000016	NA	NA	0.000016
				Heptachlor epoxide	2.5E-10	NA	NA	2.5E-10	Liver	0.000012	NA	NA	0.000012
			PCBs	PCBs (total Aroclors)	5.6E-09	5.6E-08	NA	6.1E-08	Immunological, Dermal, Ocular	0.00081	0.0081	NA	0.009
				Chemical Total	6.0E-08	3.8E-07	NA	4.4E-07		0.014	0.0096	NA	0.024
		Exposure Point Total						4.4E-07					0.024
	Exposure Medium Total							4.4E-07					0.024
Sediment Total								4.4E-07					0.024
Surface Water	Blue Crab Muscle	Blue Crab Muscle in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0011	NA	NA	0.0011
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00013	NA	NA	0.00013
				Manganese	NA	NA	NA	NA	CNS	0.0011	NA	NA	0.0011
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0012	NA	NA	0.0012
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.00077	NA	NA	0.00077
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.0071	NA	NA	0.0071
			PCBs	PCBs (total Aroclors)	2.8E-08	NA	NA	2.8E-08	Immunological, Dermal, Ocular	0.0041	NA	NA	0.0041
				Chemical Total	2.8E-08	NA	NA	2.8E-08		0.015	NA	NA	0.015
		Exposure Point Total						2.8E-08					0.015
	Exposure Medium Total							2.8E-08					0.015
	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	NA	9.0E-10	NA	9.0E-10	Cardiovascular, Dermal	NA	0.000012	NA	0.000012
				Thallium	NA	NA	NA	NA	Hair	NA	0.000055	NA	0.000055
			Volatiles	Vinyl chloride	NA	5.9E-10	NA	5.9E-10	Liver	NA	0.0000016	NA	0.0000016
				Chemical Total	NA	1.5E-09	NA	1.5E-09		NA	0.000069	NA	0.000069
		Exposure Point Total						1.5E-09					0.000069
	Exposure Medium Total							1.5E-09					0.000069
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0005	0.0005
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0005	0.0005
		Exposure Point Total						NA					0.0005
	Exposure Medium Total							NA					0.0005
Surface Water Total								3.0E-08					0.016
Total Receptor Risks								5E-07					0.04

Notes:

CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.91 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00003	NA	NA	0.00003
				Arsenic	3.0E-08	1.1E-07	NA	1.4E-07	Cardiovascular, Dermal	0.00038	0.0014	NA	0.0018
				Cadmium	NA	NA	NA	NA	Kidney	0.000036	0.0001	NA	0.00014
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00064	NA	NA	0.00064
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000033	NA	NA	0.000033
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00051	NA	NA	0.00051
				Manganese	NA	NA	NA	NA	CNS	0.00065	NA	NA	0.00065
				Mercury	NA	NA	NA	NA	Immunological	0.00081	NA	NA	0.00081
				Nickel	NA	NA	NA	NA	Body	0.000028	NA	NA	0.000028
				Thallium	NA	NA	NA	NA	Hair	0.01	NA	NA	0.01
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000018	NA	NA	0.000018
			PAHs	Benz[a]anthracene	1.4E-09	1.3E-08	NA	1.4E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.4E-08	1.3E-07	NA	1.5E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.0E-09	1.8E-08	NA	2.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.7E-09	4.4E-08	NA	4.9E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.0E-09	9.7E-09	NA	1.1E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.4E-09	NA	NA	1.4E-09	Liver	0.000016	NA	NA	0.000016
				Heptachlor epoxide	2.5E-10	NA	NA	2.5E-10	Liver	0.000012	NA	NA	0.000012
			PCBs	PCBs (total Aroclors)	5.6E-09	5.6E-08	NA	6.1E-08	Immunological, Dermal, Ocular	0.00081	0.0081	NA	0.009
				Chemical Total	6.0E-08	3.8E-07	NA	4.4E-07		0.014	0.0096	NA	0.024
		Exposure Point Total						4.4E-07					0.024
	Exposure Medium Total							4.4E-07					0.024
Sediment Total								4.4E-07					0.024
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0011	NA	NA	0.0011
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00013	NA	NA	0.00013
				Manganese	NA	NA	NA	NA	CNS	0.0011	NA	NA	0.0011
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.001	NA	NA	0.001
				Selenium	NA	NA	NA	NA	CNS, Dermal, Hematological	0.00077	NA	NA	0.00077
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.0049	NA	NA	0.0049
			PCBs	PCBs (total Aroclors)	9.0E-08	NA	NA	9.0E-08	Immunological, Dermal, Ocular	0.013	NA	NA	0.013
				Chemical Total	9.0E-08	NA	NA	9.0E-08		0.022	NA	NA	0.022
		Exposure Point Total						9.0E-08					0.022
	Exposure Medium Total							9.0E-08					0.022
	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	NA	9.0E-10	NA	9.0E-10	Cardiovascular, Dermal	NA	0.000012	NA	0.000012
				Thallium	NA	NA	NA	NA	Hair	NA	0.000055	NA	0.000055
			Volatiles	Vinyl chloride	NA	5.9E-10	NA	5.9E-10	Liver	NA	0.0000016	NA	0.0000016
				Chemical Total	NA	1.5E-09	NA	1.5E-09		NA	0.000069	NA	0.000069
		Exposure Point Total						1.5E-09					0.000069
	Exposure Medium Total							1.5E-09					0.000069
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0005	0.0005
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0005	0.0005
		Exposure Point Total						NA					0.0005
	Exposure Medium Total							NA					0.0005
Surface Water Total								9.2E-08					0.023
Total Receptor Risks								5E-07					0.05

Notes:

CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.92 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000016	NA	NA	0.000016
				Arsenic	1.7E-08	6.0E-08	NA	7.6E-08	Cardiovascular, Dermal	0.00022	0.00077	NA	0.00099
				Cadmium	NA	NA	NA	NA	Kidney	0.000022	0.000062	NA	0.000084
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00033	NA	NA	0.00033
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00002	NA	NA	0.00002
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0003	NA	NA	0.0003
				Manganese	NA	NA	NA	NA	CNS	0.00029	NA	NA	0.00029
				Mercury	NA	NA	NA	NA	Immunological	0.00044	NA	NA	0.00044
				Nickel	NA	NA	NA	NA	Body	0.000015	NA	NA	0.000015
				Thallium	NA	NA	NA	NA	Hair	0.0047	NA	NA	0.0047
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00001	NA	NA	0.00001
			PAHs	Benz[a]anthracene	7.3E-10	6.8E-09	NA	7.5E-09	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.1E-08	9.8E-08	NA	1.1E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.1E-09	1.0E-08	NA	1.1E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.0E-09	2.8E-08	NA	3.1E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	6.0E-10	5.6E-09	NA	6.2E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.5E-10	NA	NA	2.5E-10	Liver	0.0000028	NA	NA	0.0000028
				Heptachlor epoxide	1.4E-10	NA	NA	1.4E-10	Liver	0.0000068	NA	NA	0.0000068
			PCBs	PCBs (total Aroclors)	3.0E-09	3.0E-08	NA	3.4E-08	Immunological, Dermal, Ocular	0.00044	0.0044	NA	0.0049
				Chemical Total	3.6E-08	2.4E-07	NA	2.7E-07		0.0068	0.0053	NA	0.012
		Exposure Point Total						2.7E-07					0.012
	Exposure Medium Total							2.7E-07					0.012
Sediment Total								2.7E-07					0.012
Surface Water	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	1.1E-09	4.7E-10	NA	1.6E-09	Cardiovascular, Dermal	0.000015	0.0000061	NA	0.000021
				Thallium	NA	NA	NA	NA	Hair	0.00007	0.000029	NA	0.000099
			PAHs	Benzo[a]pyrene	1.1E-09	NA	NA	1.1E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	7.3E-09	NA	NA	7.3E-09	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	4.2E-11	7.0E-10	NA	7.4E-10	Liver	1.1E-07	0.0000019	NA	0.000002
				Chemical Total	9.6E-09	1.2E-09	NA	1.1E-08		0.000084	0.000037	NA	0.00012
		Exposure Point Total						1.1E-08					0.00012
	Exposure Medium Total							1.1E-08					0.00012
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00017	0.00017
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00017	0.00017
		Exposure Point Total						NA					0.00017
	Exposure Medium Total							NA					0.00017
Surface Water Total								1.1E-08					0.00029
Total Receptor Risks								3E-07					0.01

Notes:
CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.93 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in MBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000034	NA	NA	0.000034
				Arsenic	3.5E-08	1.3E-07	NA	1.6E-07	Cardiovascular, Dermal	0.00046	0.0016	NA	0.0021
				Cadmium	NA	NA	NA	NA	Kidney	0.000046	0.00013	NA	0.00018
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00071	NA	NA	0.00071
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000042	NA	NA	0.000042
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00063	NA	NA	0.00063
				Manganese	NA	NA	NA	NA	CNS	0.00062	NA	NA	0.00062
				Mercury	NA	NA	NA	NA	Immunological	0.00093	NA	NA	0.00093
				Nickel	NA	NA	NA	NA	Body	0.000033	NA	NA	0.000033
				Thallium	NA	NA	NA	NA	Hair	0.0099	NA	NA	0.0099
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000022	NA	NA	0.000022
			PAHs	Benz[a]anthracene	1.5E-09	1.4E-08	NA	1.6E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	2.2E-08	2.1E-07	NA	2.3E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.3E-09	2.1E-08	NA	2.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	6.3E-09	5.9E-08	NA	6.5E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.3E-09	1.2E-08	NA	1.3E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	5.2E-10	NA	NA	5.2E-10	Liver	0.000006	NA	NA	0.000006
				Heptachlor epoxide	2.9E-10	NA	NA	2.9E-10	Liver	0.000014	NA	NA	0.000014
			PCBs	PCBs (total Aroclors)	6.4E-09	6.4E-08	NA	7.1E-08	Immunological, Dermal, Ocular	0.00094	0.0094	NA	0.01
				Chemical Total	7.6E-08	5.0E-07	NA	5.8E-07		0.014	0.011	NA	0.026
		Exposure Point Total						5.8E-07					0.026
	Exposure Medium Total							5.8E-07					0.026
Sediment Total								5.8E-07					0.026
Surface Water	Surface Water Total	Surface Water Total in MBC	Metals	Arsenic	2.4E-09	1.0E-09	NA	3.4E-09	Cardiovascular, Dermal	0.000031	0.000013	NA	0.000044
				Thallium	NA	NA	NA	NA	Hair	0.00015	0.000061	NA	0.00021
			PAHs	Benzo[a]pyrene	2.4E-09	NA	NA	2.4E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.5E-08	NA	NA	1.5E-08	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	8.9E-11	1.5E-09	NA	1.6E-09	Liver	2.4E-07	0.000004	NA	0.0000042
				Chemical Total	2.0E-08	2.5E-09	NA	2.3E-08		0.00018	0.000078	NA	0.00026
		Exposure Point Total						2.3E-08					0.00026
	Exposure Medium Total							2.3E-08					0.00026
	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00036	0.00036
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00036	0.00036
		Exposure Point Total						NA					0.00036
	Exposure Medium Total							NA					0.00036
Surface Water Total								2.3E-08					0.00062
Total Receptor Risks								6E-07					0.03

Notes:
CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.94 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in MBC	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00051	NA	NA	0.00051
				Antimony	NA	NA	NA	NA	Hematological	0.00014	NA	NA	0.00014
				Arsenic	8.7E-09	4.5E-09	NA	1.3E-08	Cardiovascular, Dermal	0.0014	0.0007	NA	0.0021
				Cadmium	NA	NA	NA	NA	Kidney	0.00023	0.000094	NA	0.00032
				Chromium (VI)	9.4E-10	NA	NA	9.4E-10	NA	0.000044	NA	NA	0.000044
				Cobalt	NA	NA	NA	NA	Thyroid	0.0016	NA	NA	0.0016
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00014	NA	NA	0.00014
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0018	NA	NA	0.0018
				Manganese	NA	NA	NA	NA	CNS	0.00028	NA	NA	0.00028
				Mercury	NA	NA	NA	NA	Immunological	0.0079	NA	NA	0.0079
				Nickel	NA	NA	NA	NA	Body	0.000073	NA	NA	0.000073
				Thallium	NA	NA	NA	NA	Hair	0.0046	NA	NA	0.0046
				Vanadium	NA	NA	NA	NA	Dermal	0.00027	NA	NA	0.00027
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000095	NA	NA	0.000095
			PAHs	Benzo[a]pyrene	7.8E-09	1.1E-08	NA	1.8E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.2E-09	1.7E-09	NA	2.9E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	3.9E-10	NA	NA	3.9E-10	Liver	0.000054	NA	NA	0.000054
				Heptachlor	1.0E-11	NA	NA	1.0E-11	Liver	3.3E-07	NA	NA	0.00000033
				Heptachlor epoxide	4.8E-11	NA	NA	4.8E-11	Liver	0.000028	NA	NA	0.000028
			PCBs	PCBs (total Aroclors)	8.5E-09	1.2E-08	NA	2.1E-08	Immunological, Dermal, Ocular	0.015	0.022	NA	0.036
			Volatiles	Trichloroethene	2.7E-14	NA	NA	2.7E-14	pmental, Cardiovascular, Immun	8.2E-08	NA	NA	0.000000082
				Chemical Total	2.8E-08	2.9E-08	NA	5.7E-08		0.034	0.022	NA	0.056
		Exposure Point Total						5.7E-08					0.056
	Exposure Medium Total							5.7E-08					0.056
Sediment Total								5.7E-08					0.056
Surface Water	Ambient Air	Ambient Air in MBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00076	0.00076
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00076	0.00076
		Exposure Point Total						NA					0.00076
	Exposure Medium Total							NA					0.00076
Surface Water Total								NA					0.00076
Total Receptor Risks								6E-08					0.06

Notes:

CNS = central nervous system
COPC =chemical of potential concern
MBC = Middle Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.95 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000047	NA	NA	0.000047
				Arsenic	2.0E-08	7.0E-08	NA	8.9E-08	Cardiovascular, Dermal	0.00025	0.0009	NA	0.0012
				Cadmium	NA	NA	NA	NA	Kidney	0.000021	0.000061	NA	0.000083
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00039	NA	NA	0.00039
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000031	NA	NA	0.000031
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00046	NA	NA	0.00046
				Manganese	NA	NA	NA	NA	CNS	0.000028	NA	NA	0.000028
				Mercury	NA	NA	NA	NA	Immunological	0.00044	NA	NA	0.00044
				Nickel	NA	NA	NA	NA	Body	0.00002	NA	NA	0.00002
				Thallium	NA	NA	NA	NA	Hair	0.0035	NA	NA	0.0035
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000011	NA	NA	0.000011
			PAHs	Benz[a]anthracene	1.7E-09	1.6E-08	NA	1.8E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.8E-08	1.7E-07	NA	1.9E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.6E-09	2.4E-08	NA	2.6E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	7.1E-09	6.6E-08	NA	7.3E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.2E-09	1.1E-08	NA	1.3E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	3.0E-10	NA	NA	3.0E-10	Liver	0.0000034	NA	NA	0.0000034
				Heptachlor epoxide	1.1E-10	NA	NA	1.1E-10	Liver	0.0000056	NA	NA	0.0000056
			PCBs	PCBs (total Aroclors)	2.9E-09	2.9E-08	NA	3.2E-08	Immunological, Dermal, Ocular	0.00042	0.0042	NA	0.0046
				Chemical Total	5.4E-08	3.9E-07	NA	4.4E-07		0.0056	0.0052	NA	0.011
		Exposure Point Total						4.4E-07					0.011
	Exposure Medium Total							4.4E-07					0.011
Sediment Total								4.4E-07					0.011
Surface Water	White Perch Fillet	White Perch Fillet in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.003	NA	NA	0.003
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000077	NA	NA	0.000077
				Iron	NA	NA	NA	NA	Gastrointestinal	0.000047	NA	NA	0.000047
				Manganese	NA	NA	NA	NA	CNS	0.000013	NA	NA	0.000013
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0011	NA	NA	0.0011
				Selenium	NA	NA	NA	NA	CNS, Dermal, Hematological	0.00049	NA	NA	0.00049
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.0099	NA	NA	0.0099
			PCBs	PCBs (total Aroclors)	7.2E-07	NA	NA	7.2E-07	Immunological, Dermal, Ocular	0.11	NA	NA	0.11
				Chemical Total	7.2E-07	NA	NA	7.2E-07		0.12	NA	NA	0.12
		Exposure Point Total						7.2E-07					0.12
	Exposure Medium Total							7.2E-07					0.12
	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	NA	8.3E-10	NA	8.3E-10	Cardiovascular, Dermal	NA	0.000011	NA	0.000011
				Thallium	NA	NA	NA	NA	Hair	NA	0.000047	NA	0.000047
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	8.3E-10	NA	8.3E-10		NA	0.000058	NA	0.000058
		Exposure Point Total						8.3E-10					0.000058
	Exposure Medium Total							8.3E-10					0.000058
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00049	0.00049
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00049	0.00049
		Exposure Point Total						NA					0.00049
	Exposure Medium Total							NA					0.00049
Surface Water Total								7.2E-07					0.12
Total Receptor Risks								1E-06					0.1

Notes:

BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.96 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000047	NA	NA	0.000047
				Arsenic	2.0E-08	7.0E-08	NA	8.9E-08	Cardiovascular, Dermal	0.00025	0.0009	NA	0.0012
				Cadmium	NA	NA	NA	NA	Kidney	0.000021	0.000061	NA	0.000083
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00039	NA	NA	0.00039
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000031	NA	NA	0.000031
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00046	NA	NA	0.00046
				Manganese	NA	NA	NA	NA	CNS	0.000028	NA	NA	0.000028
				Mercury	NA	NA	NA	NA	Immunological	0.00044	NA	NA	0.00044
				Nickel	NA	NA	NA	NA	Body	0.00002	NA	NA	0.00002
				Thallium	NA	NA	NA	NA	Hair	0.0035	NA	NA	0.0035
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000011	NA	NA	0.000011
			PAHs	Benz[a]anthracene	1.7E-09	1.6E-08	NA	1.8E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.8E-08	1.7E-07	NA	1.9E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.6E-09	2.4E-08	NA	2.6E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	7.1E-09	6.6E-08	NA	7.3E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.2E-09	1.1E-08	NA	1.3E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	3.0E-10	NA	NA	3.0E-10	Liver	0.0000034	NA	NA	0.0000034
				Heptachlor epoxide	1.1E-10	NA	NA	1.1E-10	Liver	0.0000056	NA	NA	0.0000056
			PCBs	PCBs (total Aroclors)	2.9E-09	2.9E-08	NA	3.2E-08	Immunological, Dermal, Ocular	0.00042	0.0042	NA	0.0046
				Chemical Total	5.4E-08	3.9E-07	NA	4.4E-07		0.0056	0.0052	NA	0.011
		Exposure Point Total						4.4E-07					0.011
	Exposure Medium Total							4.4E-07					0.011
Sediment Total								4.4E-07					0.011
Surface Water	Blue Crab Muscle	Blue Crab Muscle in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0009	NA	NA	0.0009
				Iron	NA	NA	NA	NA	Gastrointestinal	0.000065	NA	NA	0.000065
				Manganese	NA	NA	NA	NA	CNS	0.00024	NA	NA	0.00024
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.00045	NA	NA	0.00045
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.00047	NA	NA	0.00047
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.0066	NA	NA	0.0066
			PCBs	PCBs (total Aroclors)	8.1E-09	NA	NA	8.1E-09	Immunological, Dermal, Ocular	0.0012	NA	NA	0.0012
				Chemical Total	8.1E-09	NA	NA	8.1E-09		0.0099	NA	NA	0.0099
		Exposure Point Total						8.1E-09					0.0099
	Exposure Medium Total							8.1E-09					0.0099
	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	NA	8.3E-10	NA	8.3E-10	Cardiovascular, Dermal	NA	0.000011	NA	0.000011
				Thallium	NA	NA	NA	NA	Hair	NA	0.000047	NA	0.000047
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	8.3E-10	NA	8.3E-10		NA	0.000058	NA	0.000058
		Exposure Point Total						8.3E-10					0.000058
	Exposure Medium Total							8.3E-10					0.000058
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00049	0.00049
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00049	0.00049
		Exposure Point Total						NA					0.00049
	Exposure Medium Total							NA					0.00049
Surface Water Total								8.9E-09					0.01
Total Receptor Risks								4E-07					0.02

Notes:

BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.97 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000047	NA	NA	0.000047
				Arsenic	2.0E-08	7.0E-08	NA	8.9E-08	Cardiovascular, Dermal	0.00025	0.0009	NA	0.0012
				Cadmium	NA	NA	NA	NA	Kidney	0.000021	0.000061	NA	0.000083
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00039	NA	NA	0.00039
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000031	NA	NA	0.000031
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00046	NA	NA	0.00046
				Manganese	NA	NA	NA	NA	CNS	0.000028	NA	NA	0.000028
				Mercury	NA	NA	NA	NA	Immunological	0.00044	NA	NA	0.00044
				Nickel	NA	NA	NA	NA	Body	0.00002	NA	NA	0.00002
				Thallium	NA	NA	NA	NA	Hair	0.0035	NA	NA	0.0035
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000011	NA	NA	0.000011
			PAHs	Benz[a]anthracene	1.7E-09	1.6E-08	NA	1.8E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.8E-08	1.7E-07	NA	1.9E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.6E-09	2.4E-08	NA	2.6E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	7.1E-09	6.6E-08	NA	7.3E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.2E-09	1.1E-08	NA	1.3E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	3.0E-10	NA	NA	3.0E-10	Liver	0.0000034	NA	NA	0.0000034
				Heptachlor epoxide	1.1E-10	NA	NA	1.1E-10	Liver	0.0000056	NA	NA	0.0000056
			PCBs	PCBs (total Aroclors)	2.9E-09	2.9E-08	NA	3.2E-08	Immunological, Dermal, Ocular	0.00042	0.0042	NA	0.0046
				Chemical Total	5.4E-08	3.9E-07	NA	4.4E-07		0.0056	0.0052	NA	0.011
		Exposure Point Total						4.4E-07					0.011
	Exposure Medium Total							4.4E-07					0.011
Sediment Total								4.4E-07					0.011
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0009	NA	NA	0.0009
				Iron	NA	NA	NA	NA	Gastrointestinal	0.000065	NA	NA	0.000065
				Manganese	NA	NA	NA	NA	CNS	0.00024	NA	NA	0.00024
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0008	NA	NA	0.0008
				Selenium	NA	NA	NA	NA	CNS, Dermal, Hematological	0.00047	NA	NA	0.00047
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.006	NA	NA	0.006
			PCBs	PCBs (total Aroclors)	1.1E-07	NA	NA	1.1E-07	Immunological, Dermal, Ocular	0.016	NA	NA	0.016
				Chemical Total	1.1E-07	NA	NA	1.1E-07		0.024	NA	NA	0.024
		Exposure Point Total						1.1E-07					0.024
	Exposure Medium Total							1.1E-07					0.024
	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	NA	8.3E-10	NA	8.3E-10	Cardiovascular, Dermal	NA	0.000011	NA	0.000011
				Thallium	NA	NA	NA	NA	Hair	NA	0.000047	NA	0.000047
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	8.3E-10	NA	8.3E-10		NA	0.000058	NA	0.000058
		Exposure Point Total						8.3E-10					0.000058
	Exposure Medium Total							8.3E-10					0.000058
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00049	0.00049
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00049	0.00049
		Exposure Point Total						NA					0.00049
	Exposure Medium Total							NA					0.00049
Surface Water Total								1.1E-07					0.025
Total Receptor Risks								5E-07					0.04

Notes:

BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.98 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000066	NA	NA	0.000066
				Arsenic	1.6E-08	5.6E-08	NA	7.2E-08	Cardiovascular, Dermal	0.0002	0.00073	NA	0.00094
				Cadmium	NA	NA	NA	NA	Kidney	0.000012	0.000034	NA	0.000046
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0002	NA	NA	0.0002
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000016	NA	NA	0.000016
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00024	NA	NA	0.00024
				Manganese	NA	NA	NA	NA	CNS	0.000017	NA	NA	0.000017
				Mercury	NA	NA	NA	NA	Immunological	0.00017	NA	NA	0.00017
				Nickel	NA	NA	NA	NA	Body	0.000011	NA	NA	0.000011
				Thallium	NA	NA	NA	NA	Hair	0.0021	NA	NA	0.0021
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0000063	NA	NA	0.0000063
			PAHs	Benz[a]anthracene	7.8E-10	7.3E-09	NA	8.0E-09	NA	NA	NA	NA	NA
				Benzo[a]pyrene	6.3E-09	5.8E-08	NA	6.4E-08	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	8.8E-10	8.1E-09	NA	9.0E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.1E-09	1.9E-08	NA	2.1E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	4.0E-10	3.7E-09	NA	4.1E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.1E-10	NA	NA	1.1E-10	Liver	0.0000013	NA	NA	0.0000013
				Heptachlor epoxide	4.9E-11	NA	NA	4.9E-11	Liver	0.0000024	NA	NA	0.0000024
			PCBs	PCBs (total Aroclors)	1.3E-09	1.3E-08	NA	1.4E-08	Immunological, Dermal, Ocular	0.00018	0.0018	NA	0.002
				Chemical Total	2.8E-08	1.7E-07	NA	1.9E-07		0.0032	0.0026	NA	0.0058
		Exposure Point Total						1.9E-07					0.0058
	Exposure Medium Total							1.9E-07					0.0058
Sediment Total								1.9E-07					0.0058
Surface Water	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	1.0E-09	4.4E-10	NA	1.5E-09	Cardiovascular, Dermal	0.000014	0.0000057	NA	0.000019
				Thallium	NA	NA	NA	NA	Hair	0.00006	0.000025	NA	0.000085
			PAHs	Benzo[a]pyrene	1.3E-10	NA	NA	1.3E-10	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.4E-10	NA	NA	3.4E-10	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	1.5E-09	4.4E-10	NA	2.0E-09		0.000073	0.000031	NA	0.0001
		Exposure Point Total						2.0E-09					0.0001
	Exposure Medium Total							2.0E-09					0.0001
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00017	0.00017
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00017	0.00017
		Exposure Point Total						NA					0.00017
	Exposure Medium Total							NA					0.00017
Surface Water Total								2.0E-09					0.00027
Total Receptor Risks								2E-07					0.006

Notes:
BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.99 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in BCC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00014	NA	NA	0.00014
				Arsenic	3.3E-08	1.2E-07	NA	1.5E-07	Cardiovascular, Dermal	0.00043	0.0015	NA	0.002
				Cadmium	NA	NA	NA	NA	Kidney	0.000025	0.000072	NA	0.000097
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00043	NA	NA	0.00043
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000034	NA	NA	0.000034
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00051	NA	NA	0.00051
				Manganese	NA	NA	NA	NA	CNS	0.000036	NA	NA	0.000036
				Mercury	NA	NA	NA	NA	Immunological	0.00037	NA	NA	0.00037
				Nickel	NA	NA	NA	NA	Body	0.000024	NA	NA	0.000024
				Thallium	NA	NA	NA	NA	Hair	0.0044	NA	NA	0.0044
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000013	NA	NA	0.000013
			PAHs	Benz[a]anthracene	1.7E-09	1.5E-08	NA	1.7E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.3E-08	1.2E-07	NA	1.4E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.9E-09	1.7E-08	NA	1.9E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.4E-09	4.1E-08	NA	4.5E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	8.5E-10	7.9E-09	NA	8.7E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.4E-10	NA	NA	2.4E-10	Liver	0.0000027	NA	NA	0.0000027
				Heptachlor epoxide	1.0E-10	NA	NA	1.0E-10	Liver	0.0000051	NA	NA	0.0000051
			PCBs	PCBs (total Aroclors)	2.6E-09	2.6E-08	NA	2.9E-08	Immunological, Dermal, Ocular	0.00039	0.0039	NA	0.0042
				Chemical Total	5.8E-08	3.5E-07	NA	4.1E-07		0.0068	0.0055	NA	0.012
		Exposure Point Total						4.1E-07					0.012
	Exposure Medium Total							4.1E-07					0.012
Sediment Total								4.1E-07					0.012
Surface Water	Surface Water Total	Surface Water Total in BCC	Metals	Arsenic	2.2E-09	9.2E-10	NA	3.1E-09	Cardiovascular, Dermal	0.000029	0.000012	NA	0.000041
				Thallium	NA	NA	NA	NA	Hair	0.00013	0.000053	NA	0.00018
			PAHs	Benzo[a]pyrene	2.8E-10	NA	NA	2.8E-10	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	7.2E-10	NA	NA	7.2E-10	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	3.2E-09	9.2E-10	NA	4.1E-09		0.00015	0.000065	NA	0.00022
		Exposure Point Total						4.1E-09					0.00022
	Exposure Medium Total							4.1E-09					0.00022
	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00035	0.00035
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00035	0.00035
		Exposure Point Total						NA					0.00035
	Exposure Medium Total							NA					0.00035
Surface Water Total								4.1E-09					0.00057
Total Receptor Risks								4E-07					0.01

Notes:
BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.100 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in BCC	Metals	Aluminum	NA	NA	NA	NA	CNS	0.0005	NA	NA	0.0005
				Antimony	NA	NA	NA	NA	Hematological	0.00016	NA	NA	0.00016
				Arsenic	9.9E-09	5.2E-09	NA	1.5E-08	Cardiovascular, Dermal	0.0015	0.0008	NA	0.0023
				Cadmium	NA	NA	NA	NA	Kidney	0.00036	0.00015	NA	0.00051
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0015	NA	NA	0.0015
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00018	NA	NA	0.00018
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0019	NA	NA	0.0019
				Manganese	NA	NA	NA	NA	CNS	0.00014	NA	NA	0.00014
				Mercury	NA	NA	NA	NA	Immunological	0.003	NA	NA	0.003
				Nickel	NA	NA	NA	NA	Body	0.000099	NA	NA	0.000099
				Thallium	NA	NA	NA	NA	Hair	0.0096	NA	NA	0.0096
				Vanadium	NA	NA	NA	NA	Dermal	0.00033	NA	NA	0.00033
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000081	NA	NA	0.000081
			PAHs	Benzo[a]pyrene	4.5E-09	6.0E-09	NA	1.0E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	7.6E-10	1.0E-09	NA	1.8E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.2E-10	NA	NA	2.2E-10	Liver	0.00003	NA	NA	0.00003
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	9.1E-11	NA	NA	9.1E-11	Liver	0.000054	NA	NA	0.000054
			PCBs	PCBs (total Aroclors)	2.4E-09	3.5E-09	NA	5.9E-09	Immunological, Dermal, Ocular	0.0042	0.0061	NA	0.01
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	1.8E-08	1.6E-08	NA	3.4E-08		0.024	0.0071	NA	0.031
		Exposure Point Total						3.4E-08					0.031
	Exposure Medium Total							3.4E-08					0.031
Sediment Total								3.4E-08					0.031
Surface Water	Ambient Air	Ambient Air in BCC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.00074	0.00074
				Chemical Total	NA	NA	NA	NA		NA	NA	0.00074	0.00074
		Exposure Point Total						NA					0.00074
	Exposure Medium Total							NA					0.00074
Surface Water Total								NA					0.00074
Total Receptor Risks								3E-08					0.03

Notes:
BCC = Berry's Creek Canal
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.101 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000045	NA	NA	0.000045
				Arsenic	2.4E-08	8.5E-08	NA	1.1E-07	Cardiovascular, Dermal	0.00031	0.0011	NA	0.0014
				Cadmium	NA	NA	NA	NA	Kidney	0.000019	0.000053	NA	0.000072
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00046	NA	NA	0.00046
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000029	NA	NA	0.000029
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00052	NA	NA	0.00052
				Manganese	NA	NA	NA	NA	CNS	0.000037	NA	NA	0.000037
				Mercury	NA	NA	NA	NA	Immunological	0.00016	NA	NA	0.00016
				Nickel	NA	NA	NA	NA	Body	0.000023	NA	NA	0.000023
				Thallium	NA	NA	NA	NA	Hair	0.0017	NA	NA	0.0017
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0000099	NA	NA	0.0000099
			PAHs	Benz[a]anthracene	7.7E-10	7.2E-09	NA	8.0E-09	NA	NA	NA	NA	NA
				Benzo[a]pyrene	9.0E-09	8.3E-08	NA	9.2E-08	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-09	1.1E-08	NA	1.2E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.1E-09	2.0E-08	NA	2.2E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	6.6E-10	6.2E-09	NA	6.8E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.2E-10	NA	NA	1.2E-10	Liver	0.0000014	NA	NA	0.0000014
				Heptachlor epoxide	2.6E-11	NA	NA	2.6E-11	Liver	0.0000013	NA	NA	0.0000013
			PCBs	PCBs (total Aroclors)	1.5E-09	1.5E-08	NA	1.6E-08	Immunological, Dermal, Ocular	0.00022	0.0022	NA	0.0024
				Chemical Total	3.9E-08	2.3E-07	NA	2.7E-07		0.0036	0.0033	NA	0.0069
		Exposure Point Total						2.7E-07					0.0069
	Exposure Medium Total							2.7E-07					0.0069
Sediment Total								2.7E-07					0.0069
Surface Water	White Perch Fillet	White Perch Fillet in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000071	NA	NA	0.000071
				Iron	NA	NA	NA	NA	Gastrointestinal	0.000033	NA	NA	0.000033
				Manganese	NA	NA	NA	NA	CNS	0.000011	NA	NA	0.000011
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.0012	NA	NA	0.0012
				Selenium	NA	NA	NA	NA	CNS, Dermal, Hematological	0.00038	NA	NA	0.00038
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.0088	NA	NA	0.0088
			PCBs	PCBs (total Aroclors)	4.0E-07	NA	NA	4.0E-07	Immunological, Dermal, Ocular	0.058	NA	NA	0.058
				Chemical Total	4.0E-07	NA	NA	4.0E-07		0.068	NA	NA	0.068
		Exposure Point Total						4.0E-07					0.068
	Exposure Medium Total							4.0E-07					0.068
	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	NA	9.2E-10	NA	9.2E-10	Cardiovascular, Dermal	NA	0.000012	NA	0.000012
				Thallium	NA	NA	NA	NA	Hair	NA	0.00054	NA	0.00054
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	9.2E-10	NA	9.2E-10		NA	0.00055	NA	0.00055
		Exposure Point Total						9.2E-10					0.00055
	Exposure Medium Total							9.2E-10					0.00055
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0068	0.0068
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0068	0.0068
		Exposure Point Total						NA					0.0068
	Exposure Medium Total							NA					0.0068
Surface Water Total								4.0E-07					0.076
Total Receptor Risks								7E-07					0.08

Notes:

CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.102 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000045	NA	NA	0.000045
				Arsenic	2.4E-08	8.5E-08	NA	1.1E-07	Cardiovascular, Dermal	0.00031	0.0011	NA	0.0014
				Cadmium	NA	NA	NA	NA	Kidney	0.000019	0.000053	NA	0.000072
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00046	NA	NA	0.00046
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000029	NA	NA	0.000029
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00052	NA	NA	0.00052
				Manganese	NA	NA	NA	NA	CNS	0.000037	NA	NA	0.000037
				Mercury	NA	NA	NA	NA	Immunological	0.00016	NA	NA	0.00016
				Nickel	NA	NA	NA	NA	Body	0.000023	NA	NA	0.000023
				Thallium	NA	NA	NA	NA	Hair	0.0017	NA	NA	0.0017
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0000099	NA	NA	0.0000099
			PAHs	Benz[a]anthracene	7.7E-10	7.2E-09	NA	8.0E-09	NA	NA	NA	NA	NA
				Benzo[a]pyrene	9.0E-09	8.3E-08	NA	9.2E-08	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-09	1.1E-08	NA	1.2E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.1E-09	2.0E-08	NA	2.2E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	6.6E-10	6.2E-09	NA	6.8E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.2E-10	NA	NA	1.2E-10	Liver	0.0000014	NA	NA	0.0000014
				Heptachlor epoxide	2.6E-11	NA	NA	2.6E-11	Liver	0.0000013	NA	NA	0.0000013
			PCBs	PCBs (total Aroclors)	1.5E-09	1.5E-08	NA	1.6E-08	Immunological, Dermal, Ocular	0.00022	0.0022	NA	0.0024
				Chemical Total	3.9E-08	2.3E-07	NA	2.7E-07		0.0036	0.0033	NA	0.0069
		Exposure Point Total						2.7E-07					0.0069
	Exposure Medium Total							2.7E-07					0.0069
Sediment Total								2.7E-07					0.0069
Surface Water	Blue Crab Muscle	Blue Crab Muscle in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0013	NA	NA	0.0013
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00094	NA	NA	0.00094
				Manganese	NA	NA	NA	NA	CNS	0.00011	NA	NA	0.00011
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.00068	NA	NA	0.00068
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.00077	NA	NA	0.00077
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.0063	NA	NA	0.0063
			PCBs	PCBs (total Aroclors)	1.4E-08	NA	NA	1.4E-08	Immunological, Dermal, Ocular	0.002	NA	NA	0.002
				Chemical Total	1.4E-08	NA	NA	1.4E-08		0.012	NA	NA	0.012
		Exposure Point Total						1.4E-08					0.012
	Exposure Medium Total							1.4E-08					0.012
	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	NA	9.2E-10	NA	9.2E-10	Cardiovascular, Dermal	NA	0.000012	NA	0.000012
				Thallium	NA	NA	NA	NA	Hair	NA	0.00054	NA	0.00054
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	9.2E-10	NA	9.2E-10		NA	0.00055	NA	0.00055
		Exposure Point Total						9.2E-10					0.00055
	Exposure Medium Total							9.2E-10					0.00055
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0068	0.0068
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0068	0.0068
		Exposure Point Total						NA					0.0068
	Exposure Medium Total							NA					0.0068
Surface Water Total								1.5E-08					0.019
Total Receptor Risks								3E-07					0.03

Notes:

CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.103 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000045	NA	NA	0.000045
				Arsenic	2.4E-08	8.5E-08	NA	1.1E-07	Cardiovascular, Dermal	0.00031	0.0011	NA	0.0014
				Cadmium	NA	NA	NA	NA	Kidney	0.000019	0.000053	NA	0.000072
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00046	NA	NA	0.00046
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000029	NA	NA	0.000029
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00052	NA	NA	0.00052
				Manganese	NA	NA	NA	NA	CNS	0.000037	NA	NA	0.000037
				Mercury	NA	NA	NA	NA	Immunological	0.00016	NA	NA	0.00016
				Nickel	NA	NA	NA	NA	Body	0.000023	NA	NA	0.000023
				Thallium	NA	NA	NA	NA	Hair	0.0017	NA	NA	0.0017
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0000099	NA	NA	0.0000099
			PAHs	Benz[a]anthracene	7.7E-10	7.2E-09	NA	8.0E-09	NA	NA	NA	NA	NA
				Benzo[a]pyrene	9.0E-09	8.3E-08	NA	9.2E-08	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-09	1.1E-08	NA	1.2E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.1E-09	2.0E-08	NA	2.2E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	6.6E-10	6.2E-09	NA	6.8E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.2E-10	NA	NA	1.2E-10	Liver	0.0000014	NA	NA	0.0000014
				Heptachlor epoxide	2.6E-11	NA	NA	2.6E-11	Liver	0.0000013	NA	NA	0.0000013
			PCBs	PCBs (total Aroclors)	1.5E-09	1.5E-08	NA	1.6E-08	Immunological, Dermal, Ocular	0.00022	0.0022	NA	0.0024
				Chemical Total	3.9E-08	2.3E-07	NA	2.7E-07		0.0036	0.0033	NA	0.0069
		Exposure Point Total						2.7E-07					0.0069
	Exposure Medium Total							2.7E-07					0.0069
Sediment Total								2.7E-07					0.0069
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0013	NA	NA	0.0013
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00094	NA	NA	0.00094
				Manganese	NA	NA	NA	NA	CNS	0.00011	NA	NA	0.00011
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.00019	NA	NA	0.00019
				Selenium	NA	NA	NA	NA	CNS, Dermal, Hematological	0.00077	NA	NA	0.00077
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.0053	NA	NA	0.0053
			PCBs	PCBs (total Aroclors)	2.3E-07	NA	NA	2.3E-07	Immunological, Dermal, Ocular	0.034	NA	NA	0.034
				Chemical Total	2.3E-07	NA	NA	2.3E-07		0.042	NA	NA	0.042
		Exposure Point Total						2.3E-07					0.042
	Exposure Medium Total							2.3E-07					0.042
	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	NA	9.2E-10	NA	9.2E-10	Cardiovascular, Dermal	NA	0.000012	NA	0.000012
				Thallium	NA	NA	NA	NA	Hair	NA	0.00054	NA	0.00054
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	NA	9.2E-10	NA	9.2E-10		NA	0.00055	NA	0.00055
		Exposure Point Total						9.2E-10					0.00055
	Exposure Medium Total							9.2E-10					0.00055
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0068	0.0068
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0068	0.0068
		Exposure Point Total						NA					0.0068
	Exposure Medium Total							NA					0.0068
Surface Water Total								2.3E-07					0.05
Total Receptor Risks								5E-07					0.06

Notes:
CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.104 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000039	NA	NA	0.000039
				Arsenic	1.4E-08	5.1E-08	NA	6.5E-08	Cardiovascular, Dermal	0.00018	0.00066	NA	0.00084
				Cadmium	NA	NA	NA	NA	Kidney	0.000011	0.000032	NA	0.000043
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00027	NA	NA	0.00027
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000017	NA	NA	0.000017
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00031	NA	NA	0.00031
				Manganese	NA	NA	NA	NA	CNS	0.000022	NA	NA	0.000022
				Mercury	NA	NA	NA	NA	Immunological	0.00014	NA	NA	0.00014
				Nickel	NA	NA	NA	NA	Body	0.000013	NA	NA	0.000013
				Thallium	NA	NA	NA	NA	Hair	0.00096	NA	NA	0.00096
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0000059	NA	NA	0.0000059
			PAHs	Benz[a]anthracene	4.7E-10	4.3E-09	NA	4.8E-09	NA	NA	NA	NA	NA
				Benzo[a]pyrene	5.1E-09	4.8E-08	NA	5.3E-08	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	6.7E-10	6.2E-09	NA	6.9E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.2E-09	1.1E-08	NA	1.2E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	3.8E-10	3.5E-09	NA	3.9E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	6.9E-11	NA	NA	6.9E-11	Liver	7.9E-07	NA	NA	0.00000079
				Heptachlor epoxide	9.7E-12	NA	NA	9.7E-12	Liver	4.8E-07	NA	NA	0.00000048
			PCBs	PCBs (total Aroclors)	1.1E-09	1.1E-08	NA	1.2E-08	Immunological, Dermal, Ocular	0.00016	0.0016	NA	0.0018
				Chemical Total	2.3E-08	1.3E-07	NA	1.6E-07		0.0021	0.0023	NA	0.0044
		Exposure Point Total						1.6E-07					0.0044
	Exposure Medium Total							1.6E-07					0.0044
Sediment Total								1.6E-07					0.0044
Surface Water	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	1.2E-09	4.8E-10	NA	1.6E-09	Cardiovascular, Dermal	0.000015	0.0000063	NA	0.000021
				Thallium	NA	NA	NA	NA	Hair	0.00068	0.00028	NA	0.00096
			PAHs	Benzo[a]pyrene	1.4E-10	NA	NA	1.4E-10	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.0E-10	NA	NA	2.0E-10	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	1.5E-09	4.8E-10	NA	2.0E-09		0.00069	0.00029	NA	0.00098
		Exposure Point Total						2.0E-09					0.00098
	Exposure Medium Total							2.0E-09					0.00098
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0023	0.0023
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0023	0.0023
		Exposure Point Total						NA					0.0023
	Exposure Medium Total							NA					0.0023
Surface Water Total								2.0E-09					0.0033
Total Receptor Risks								2E-07					0.008

Notes:
CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.105 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in LBC	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000081	NA	NA	0.000081
				Arsenic	3.0E-08	1.1E-07	NA	1.4E-07	Cardiovascular, Dermal	0.00039	0.0014	NA	0.0018
				Cadmium	NA	NA	NA	NA	Kidney	0.000024	0.000067	NA	0.000091
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00057	NA	NA	0.00057
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000036	NA	NA	0.000036
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00066	NA	NA	0.00066
				Manganese	NA	NA	NA	NA	CNS	0.000046	NA	NA	0.000046
				Mercury	NA	NA	NA	NA	Immunological	0.00029	NA	NA	0.00029
				Nickel	NA	NA	NA	NA	Body	0.000028	NA	NA	0.000028
				Thallium	NA	NA	NA	NA	Hair	0.002	NA	NA	0.002
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000012	NA	NA	0.000012
			PAHs	Benz[a]anthracene	9.9E-10	9.2E-09	NA	1.0E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.1E-08	1.0E-07	NA	1.1E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.4E-09	1.3E-08	NA	1.4E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.5E-09	2.3E-08	NA	2.6E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	8.0E-10	7.4E-09	NA	8.2E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.5E-10	NA	NA	1.5E-10	Liver	0.0000017	NA	NA	0.0000017
				Heptachlor epoxide	2.1E-11	NA	NA	2.1E-11	Liver	0.000001	NA	NA	0.000001
			PCBs	PCBs (total Aroclors)	2.3E-09	2.3E-08	NA	2.5E-08	Immunological, Dermal, Ocular	0.00034	0.0034	NA	0.0037
				Chemical Total	4.9E-08	2.8E-07	NA	3.3E-07		0.0045	0.0048	NA	0.0093
		Exposure Point Total						3.3E-07					0.0093
	Exposure Medium Total							3.3E-07					0.0093
Sediment Total								3.3E-07					0.0093
Surface Water	Surface Water Total	Surface Water Total in LBC	Metals	Arsenic	2.4E-09	1.0E-09	NA	3.5E-09	Cardiovascular, Dermal	0.000032	0.000013	NA	0.000045
				Thallium	NA	NA	NA	NA	Hair	0.0014	0.0006	NA	0.002
			PAHs	Benzo[a]pyrene	3.0E-10	NA	NA	3.0E-10	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.2E-10	NA	NA	4.2E-10	NA	NA	NA	NA	NA
			Volatiles	Vinyl chloride	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Chemical Total	3.2E-09	1.0E-09	NA	4.2E-09		0.0015	0.00061	NA	0.0021
		Exposure Point Total						4.2E-09					0.0021
	Exposure Medium Total							4.2E-09					0.0021
	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.0049	0.0049
				Chemical Total	NA	NA	NA	NA		NA	NA	0.0049	0.0049
		Exposure Point Total						NA					0.0049
	Exposure Medium Total							NA					0.0049
Surface Water Total								4.2E-09					0.007
Total Receptor Risks								3E-07					0.02

Notes:

CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.106 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Waterway Sediment All Depths	Waterway Sediment All Depths in LBC	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00049	NA	NA	0.00049
				Antimony	NA	NA	NA	NA	Hematological	0.000093	NA	NA	0.000093
				Arsenic	1.1E-08	5.5E-09	NA	1.6E-08	Cardiovascular, Dermal	0.0016	0.00085	NA	0.0025
				Cadmium	NA	NA	NA	NA	Kidney	0.00023	0.000094	NA	0.00032
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0018	NA	NA	0.0018
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00013	NA	NA	0.00013
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0022	NA	NA	0.0022
				Manganese	NA	NA	NA	NA	CNS	0.00016	NA	NA	0.00016
				Mercury	NA	NA	NA	NA	Immunological	0.0014	NA	NA	0.0014
				Nickel	NA	NA	NA	NA	Body	0.000096	NA	NA	0.000096
				Thallium	NA	NA	NA	NA	Hair	0.0079	NA	NA	0.0079
				Vanadium	NA	NA	NA	NA	Dermal	0.00032	NA	NA	0.00032
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000047	NA	NA	0.000047
			PAHs	Benzo[a]pyrene	5.1E-09	6.9E-09	NA	1.2E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	5.5E-10	7.5E-10	NA	1.3E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	7.4E-11	NA	NA	7.4E-11	Liver	0.00001	NA	NA	0.00001
				Heptachlor	2.5E-12	NA	NA	2.5E-12	Liver	7.7E-08	NA	NA	0.000000077
				Heptachlor epoxide	6.8E-12	NA	NA	6.8E-12	Liver	0.000004	NA	NA	0.000004
			PCBs	PCBs (total Aroclors)	8.7E-10	1.3E-09	NA	2.1E-09	Immunological, Dermal, Ocular	0.0015	0.0022	NA	0.0038
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	1.7E-08	1.4E-08	NA	3.2E-08		0.018	0.0032	NA	0.021
		Exposure Point Total						3.2E-08					0.021
	Exposure Medium Total							3.2E-08					0.021
Sediment Total								3.2E-08					0.021
Surface Water	Ambient Air	Ambient Air in LBC	Metals	Mercury Average	NA	NA	NA	NA	CNS	NA	NA	0.01	0.01
				Chemical Total	NA	NA	NA	NA		NA	NA	0.01	0.01
		Exposure Point Total						NA					0.01
	Exposure Medium Total							NA					0.01
Surface Water Total								NA					0.01
Total Receptor Risks								3E-08					0.03

Notes:
CNS = central nervous system
COPC =chemical of potential concern
LBC = Lower Berry's Creek
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.107 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Nevertouch Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00059	NA	NA	0.00059
				Antimony	NA	NA	NA	NA	Hematological	0.00035	NA	NA	0.00035
				Arsenic	3.0E-08	1.5E-08	NA	4.5E-08	Cardiovascular, Dermal	0.0046	0.0024	NA	0.007
				Cadmium	NA	NA	NA	NA	Kidney	0.0011	0.00044	NA	0.0015
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0033	NA	NA	0.0033
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00047	NA	NA	0.00047
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0014	NA	NA	0.0014
				Manganese	NA	NA	NA	NA	CNS	0.0008	NA	NA	0.0008
				Mercury	NA	NA	NA	NA	Immunological	0.02	NA	NA	0.02
				Nickel	NA	NA	NA	NA	Body	0.00035	NA	NA	0.00035
				Thallium	NA	NA	NA	NA	Hair	0.014	NA	NA	0.014
				Vanadium	NA	NA	NA	NA	Dermal	0.00064	NA	NA	0.00064
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0019	NA	NA	0.0019
			PAHs	Benzo[a]pyrene	5.2E-10	7.0E-10	NA	1.2E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	7.9E-11	1.1E-10	NA	1.9E-10	NA	NA	NA	NA	NA
			Pesticides	Aldrin	2.1E-09	NA	NA	2.1E-09	Liver	0.00029	NA	NA	0.00029
				Heptachlor	4.7E-10	NA	NA	4.7E-10	Liver	0.000015	NA	NA	0.000015
				Heptachlor epoxide	1.3E-09	NA	NA	1.3E-09	Liver	0.00076	NA	NA	0.00076
			PCBs	PCBs (total Aroclors)	1.1E-08	1.6E-08	NA	2.6E-08	Immunological, Dermal, Ocular	0.019	0.027	NA	0.046
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	4.5E-08	3.2E-08	NA	7.6E-08		0.069	0.03	NA	0.099
		Exposure Point Total						7.6E-08					0.099
	Exposure Medium Total							7.6E-08					0.099
Sediment Total								7.6E-08					0.099
Total Receptor Risks								8E-08					0.1

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.108 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Eight Day Swamp	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00044	NA	NA	0.00044
				Antimony	NA	NA	NA	NA	Hematological	0.00023	NA	NA	0.00023
				Arsenic	1.8E-08	9.3E-09	NA	2.7E-08	Cardiovascular, Dermal	0.0028	0.0015	NA	0.0042
				Cadmium	NA	NA	NA	NA	Kidney	0.00054	0.00022	NA	0.00076
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0027	NA	NA	0.0027
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00049	NA	NA	0.00049
				Iron	NA	NA	NA	NA	Gastrointestinal	0.001	NA	NA	0.001
				Manganese	NA	NA	NA	NA	CNS	0.00066	NA	NA	0.00066
				Mercury	NA	NA	NA	NA	Immunological	0.0065	NA	NA	0.0065
				Nickel	NA	NA	NA	NA	Body	0.00031	NA	NA	0.00031
				Thallium	NA	NA	NA	NA	Hair	0.02	NA	NA	0.02
				Vanadium	NA	NA	NA	NA	Dermal	0.00051	NA	NA	0.00051
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00016	NA	NA	0.00016
			PAHs	Benzo[a]pyrene	6.4E-10	8.7E-10	NA	1.5E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.1E-10	1.4E-10	NA	2.5E-10	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.7E-10	NA	NA	1.7E-10	Liver	0.000023	NA	NA	0.000023
				Heptachlor	2.6E-11	NA	NA	2.6E-11	Liver	0.0000008	NA	NA	0.0000008
				Heptachlor epoxide	7.1E-11	NA	NA	7.1E-11	Liver	0.000042	NA	NA	0.000042
			PCBs	PCBs (total Aroclors)	5.0E-09	7.2E-09	NA	1.2E-08	Immunological, Dermal, Ocular	0.0087	0.013	NA	0.021
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	2.4E-08	1.8E-08	NA	4.1E-08		0.045	0.014	NA	0.06
		Exposure Point Total						4.1E-08					0.06
	Exposure Medium Total							4.1E-08					0.06
Sediment Total								4.1E-08					0.06
Total Receptor Risks								4E-08					0.06

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.109 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Paterson Plank Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00037	NA	NA	0.00037
				Antimony	NA	NA	NA	NA	Hematological	0.00027	NA	NA	0.00027
				Arsenic	1.7E-08	9.1E-09	NA	2.6E-08	Cardiovascular, Dermal	0.0027	0.0014	NA	0.0041
				Cadmium	NA	NA	NA	NA	Kidney	0.0003	0.00013	NA	0.00043
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0044	NA	NA	0.0044
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0002	NA	NA	0.0002
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0012	NA	NA	0.0012
				Manganese	NA	NA	NA	NA	CNS	0.0017	NA	NA	0.0017
				Mercury	NA	NA	NA	NA	Immunological	0.005	NA	NA	0.005
				Nickel	NA	NA	NA	NA	Body	0.00034	NA	NA	0.00034
				Thallium	NA	NA	NA	NA	Hair	0.02	NA	NA	0.02
				Vanadium	NA	NA	NA	NA	Dermal	0.00062	NA	NA	0.00062
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00015	NA	NA	0.00015
			PAHs	Benzo[a]pyrene	1.5E-09	2.0E-09	NA	3.5E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.0E-10	4.1E-10	NA	7.1E-10	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.2E-11	NA	NA	4.2E-11	Liver	0.0000057	NA	NA	0.0000057
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			PCBs	PCBs (total Aroclors)	3.2E-09	4.7E-09	NA	7.9E-09	Immunological, Dermal, Ocular	0.0057	0.0082	NA	0.014
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	2.2E-08	1.6E-08	NA	3.9E-08		0.043	0.0098	NA	0.053
		Exposure Point Total						3.9E-08					0.053
	Exposure Medium Total							3.9E-08					0.053
Sediment Total								3.9E-08					0.053
Total Receptor Risks								4E-08					0.05

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.110 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Upper Peach Island Creek Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00055	NA	NA	0.00055
				Antimony	NA	NA	NA	NA	Hematological	0.0014	NA	NA	0.0014
				Arsenic	8.3E-08	4.3E-08	NA	1.3E-07	Cardiovascular, Dermal	0.013	0.0067	NA	0.02
				Cadmium	NA	NA	NA	NA	Kidney	0.001	0.00043	NA	0.0015
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.014	NA	NA	0.014
				Copper	NA	NA	NA	NA	Gastrointestinal	0.0035	NA	NA	0.0035
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0015	NA	NA	0.0015
				Manganese	NA	NA	NA	NA	CNS	0.0009	NA	NA	0.0009
				Mercury	NA	NA	NA	NA	Immunological	0.037	NA	NA	0.037
				Nickel	NA	NA	NA	NA	Body	0.0015	NA	NA	0.0015
				Thallium	NA	NA	NA	NA	Hair	0.023	NA	NA	0.023
				Vanadium	NA	NA	NA	NA	Dermal	0.0011	NA	NA	0.0011
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000058	NA	NA	0.000058
			PAHs	Benzo[a]pyrene	2.0E-09	2.6E-09	NA	4.6E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.9E-10	5.3E-10	NA	9.2E-10	NA	NA	NA	NA	NA
			Pesticides	Aldrin	3.7E-10	NA	NA	3.7E-10	Liver	0.000051	NA	NA	0.000051
				Heptachlor	4.6E-11	NA	NA	4.6E-11	Liver	0.0000014	NA	NA	0.0000014
				Heptachlor epoxide	4.1E-11	NA	NA	4.1E-11	Liver	0.000024	NA	NA	0.000024
			PCBs	PCBs (total Aroclors)	1.7E-09	2.5E-09	NA	4.1E-09	Immunological, Dermal, Ocular	0.003	0.0043	NA	0.0073
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	8.7E-08	4.9E-08	NA	1.4E-07		0.1	0.011	NA	0.11
		Exposure Point Total						1.4E-07					0.11
	Exposure Medium Total							1.4E-07					0.11
Sediment Total								1.4E-07					0.11
Total Receptor Risks								1E-07					0.1

Notes:

BCSA = Berry's Creek Study Area
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

Upper Peach Island Creek is separated from the main BCSA tidal zone reaches and marshes by a tide gate.

TABLE 9.111 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Walden Swamp	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00029	NA	NA	0.00029
				Antimony	NA	NA	NA	NA	Hematological	0.00047	NA	NA	0.00047
				Arsenic	2.1E-08	1.1E-08	NA	3.2E-08	Cardiovascular, Dermal	0.0032	0.0017	NA	0.0049
				Cadmium	NA	NA	NA	NA	Kidney	0.00037	0.00016	NA	0.00053
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0043	NA	NA	0.0043
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00016	NA	NA	0.00016
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0012	NA	NA	0.0012
				Manganese	NA	NA	NA	NA	CNS	0.0031	NA	NA	0.0031
				Mercury	NA	NA	NA	NA	Immunological	0.0085	NA	NA	0.0085
				Nickel	NA	NA	NA	NA	Body	0.00053	NA	NA	0.00053
				Thallium	NA	NA	NA	NA	Hair	0.019	NA	NA	0.019
				Vanadium	NA	NA	NA	NA	Dermal	0.00086	NA	NA	0.00086
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00024	NA	NA	0.00024
			PAHs	Benzo[a]pyrene	5.1E-10	6.9E-10	NA	1.2E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	1.1E-10	1.5E-10	NA	2.6E-10	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.5E-10	NA	NA	1.5E-10	Liver	0.000021	NA	NA	0.000021
				Heptachlor	1.3E-11	NA	NA	1.3E-11	Liver	0.0000004	NA	NA	0.0000004
				Heptachlor epoxide	1.5E-11	NA	NA	1.5E-11	Liver	0.0000088	NA	NA	0.0000088
			PCBs	PCBs (total Aroclors)	4.4E-09	6.5E-09	NA	1.1E-08	Immunological, Dermal, Ocular	0.0078	0.011	NA	0.019
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	2.6E-08	1.8E-08	NA	4.4E-08		0.05	0.013	NA	0.064
		Exposure Point Total						4.4E-08					0.064
	Exposure Medium Total							4.4E-08					0.064
Sediment Total								4.4E-08					0.064
Total Receptor Risks								4E-08					0.06

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.112 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Ackerman's East Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00061	NA	NA	0.00061
				Antimony	NA	NA	NA	NA	Hematological	0.00041	NA	NA	0.00041
				Arsenic	9.9E-09	5.2E-09	NA	1.5E-08	Cardiovascular, Dermal	0.0015	0.0008	NA	0.0023
				Cadmium	NA	NA	NA	NA	Kidney	0.00017	0.000071	NA	0.00024
				Chromium (VI)	4.1E-09	NA	NA	4.1E-09	NA	0.00019	NA	NA	0.00019
				Cobalt	NA	NA	NA	NA	Thyroid	0.0031	NA	NA	0.0031
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000077	NA	NA	0.000077
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0014	NA	NA	0.0014
				Manganese	NA	NA	NA	NA	CNS	0.00067	NA	NA	0.00067
				Mercury	NA	NA	NA	NA	Immunological	0.007	NA	NA	0.007
				Nickel	NA	NA	NA	NA	Body	0.00012	NA	NA	0.00012
				Thallium	NA	NA	NA	NA	Hair	NA	NA	NA	NA
				Vanadium	NA	NA	NA	NA	Dermal	0.00039	NA	NA	0.00039
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000048	NA	NA	0.000048
			PAHs	Benzo[a]pyrene	2.1E-10	2.9E-10	NA	5.1E-10	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	5.5E-11	7.4E-11	NA	1.3E-10	NA	NA	NA	NA	NA
			Pesticides	Aldrin	3.7E-11	NA	NA	3.7E-11	Liver	0.000005	NA	NA	0.000005
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			PCBs	PCBs (total Aroclors)	5.7E-10	8.3E-10	NA	1.4E-09	Immunological, Dermal, Ocular	0.001	0.0015	NA	0.0025
			Volatiles	Trichloroethene	7.4E-13	NA	NA	7.4E-13	pmental, Cardiovascular, Immun	0.0000023	NA	NA	0.0000023
				Chemical Total	1.5E-08	6.4E-09	NA	2.1E-08		0.017	0.0023	NA	0.019
		Exposure Point Total						2.1E-08					0.019
	Exposure Medium Total							2.1E-08					0.019
Sediment Total								2.1E-08					0.019
Total Receptor Risks								2E-08					0.02

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.113 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Rutherford Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00046	NA	NA	0.00046
				Antimony	NA	NA	NA	NA	Hematological	0.0001	NA	NA	0.0001
				Arsenic	6.9E-09	3.6E-09	NA	1.1E-08	Cardiovascular, Dermal	0.0011	0.00056	NA	0.0016
				Cadmium	NA	NA	NA	NA	Kidney	0.000056	0.000023	NA	0.00008
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0016	NA	NA	0.0016
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00012	NA	NA	0.00012
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0011	NA	NA	0.0011
				Manganese	NA	NA	NA	NA	CNS	0.0011	NA	NA	0.0011
				Mercury	NA	NA	NA	NA	Immunological	0.0016	NA	NA	0.0016
				Nickel	NA	NA	NA	NA	Body	0.00012	NA	NA	0.00012
				Thallium	NA	NA	NA	NA	Hair	0.019	NA	NA	0.019
				Vanadium	NA	NA	NA	NA	Dermal	0.00037	NA	NA	0.00037
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000041	NA	NA	0.000041
			PAHs	Benzo[a]pyrene	1.1E-09	1.5E-09	NA	2.7E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.1E-10	2.9E-10	NA	5.0E-10	NA	NA	NA	NA	NA
			Pesticides	Aldrin	4.7E-11	NA	NA	4.7E-11	Liver	0.0000064	NA	NA	0.0000064
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	1.2E-11	NA	NA	1.2E-11	Liver	0.0000071	NA	NA	0.0000071
			PCBs	PCBs (total Aroclors)	4.9E-10	7.2E-10	NA	1.2E-09	Immunological, Dermal, Ocular	0.00086	0.0013	NA	0.0021
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	8.8E-09	6.2E-09	NA	1.5E-08		0.028	0.0018	NA	0.03
		Exposure Point Total						1.5E-08					0.03
	Exposure Medium Total							1.5E-08					0.03
Sediment Total								1.5E-08					0.03
Total Receptor Risks								1E-08					0.03

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.114 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Tollgate Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00036	NA	NA	0.00036
				Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Arsenic	4.1E-09	2.1E-09	NA	6.2E-09	Cardiovascular, Dermal	0.00063	0.00033	NA	0.00096
				Cadmium	NA	NA	NA	NA	Kidney	0.000019	0.000008	NA	0.000027
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0012	NA	NA	0.0012
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000056	NA	NA	0.000056
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0014	NA	NA	0.0014
				Manganese	NA	NA	NA	NA	CNS	0.00027	NA	NA	0.00027
				Mercury	NA	NA	NA	NA	Immunological	0.0015	NA	NA	0.0015
				Nickel	NA	NA	NA	NA	Body	0.000065	NA	NA	0.000065
				Thallium	NA	NA	NA	NA	Hair	0.0081	NA	NA	0.0081
				Vanadium	NA	NA	NA	NA	Dermal	0.0002	NA	NA	0.0002
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000019	NA	NA	0.000019
			PAHs	Benzo[a]pyrene	9.6E-10	1.3E-09	NA	2.3E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.2E-10	3.0E-10	NA	5.2E-10	NA	NA	NA	NA	NA
			Pesticides	Aldrin	6.5E-11	NA	NA	6.5E-11	Liver	0.0000089	NA	NA	0.0000089
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			PCBs	PCBs (total Aroclors)	4.3E-10	6.3E-10	NA	1.1E-09	Immunological, Dermal, Ocular	0.00076	0.0011	NA	0.0019
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	5.7E-09	4.3E-09	NA	1.0E-08		0.015	0.0014	NA	0.016
		Exposure Point Total						1.0E-08					0.016
	Exposure Medium Total							1.0E-08					0.016
Sediment Total								1.0E-08					0.016
Total Receptor Risks								1E-08					0.02

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.115 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Oritani Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00047	NA	NA	0.00047
				Antimony	NA	NA	NA	NA	Hematological	0.00027	NA	NA	0.00027
				Arsenic	1.0E-08	5.3E-09	NA	1.5E-08	Cardiovascular, Dermal	0.0016	0.00082	NA	0.0024
				Cadmium	NA	NA	NA	NA	Kidney	0.000011	0.0000048	NA	0.000016
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.0018	NA	NA	0.0018
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000058	NA	NA	0.000058
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0017	NA	NA	0.0017
				Manganese	NA	NA	NA	NA	CNS	0.00013	NA	NA	0.00013
				Mercury	NA	NA	NA	NA	Immunological	0.00028	NA	NA	0.00028
				Nickel	NA	NA	NA	NA	Body	0.000069	NA	NA	0.000069
				Thallium	NA	NA	NA	NA	Hair	NA	NA	NA	NA
				Vanadium	NA	NA	NA	NA	Dermal	0.00043	NA	NA	0.00043
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000019	NA	NA	0.000019
			PAHs	Benzo[a]pyrene	7.1E-10	9.7E-10	NA	1.7E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Pesticides	Aldrin	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor	2.6E-12	NA	NA	2.6E-12	Liver	8.2E-08	NA	NA	0.000000082
				Heptachlor epoxide	1.0E-11	NA	NA	1.0E-11	Liver	0.0000061	NA	NA	0.0000061
			PCBs	PCBs (total Aroclors)	1.5E-11	2.2E-11	NA	3.7E-11	Immunological, Dermal, Ocular	0.000027	0.000039	NA	0.000066
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	1.1E-08	6.3E-09	NA	1.7E-08		0.0069	0.00087	NA	0.0077
		Exposure Point Total						1.7E-08					0.0077
	Exposure Medium Total							1.7E-08					0.0077
Sediment Total								1.7E-08					0.0077
Total Receptor Risks								2E-08					0.008

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.116 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Berry's Creek Marsh	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00046	NA	NA	0.00046
				Antimony	NA	NA	NA	NA	Hematological	0.00018	NA	NA	0.00018
				Arsenic	1.2E-08	6.1E-09	NA	1.8E-08	Cardiovascular, Dermal	0.0018	0.00095	NA	0.0028
				Cadmium	NA	NA	NA	NA	Kidney	0.000043	0.000018	NA	0.00006
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.002	NA	NA	0.002
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00011	NA	NA	0.00011
				Iron	NA	NA	NA	NA	Gastrointestinal	0.0015	NA	NA	0.0015
				Manganese	NA	NA	NA	NA	CNS	0.0002	NA	NA	0.0002
				Mercury	NA	NA	NA	NA	Immunological	0.0007	NA	NA	0.0007
				Nickel	NA	NA	NA	NA	Body	0.00016	NA	NA	0.00016
				Thallium	NA	NA	NA	NA	Hair	0.0089	NA	NA	0.0089
				Vanadium	NA	NA	NA	NA	Dermal	0.00045	NA	NA	0.00045
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000045	NA	NA	0.000045
			PAHs	Benzo[a]pyrene	1.1E-09	1.4E-09	NA	2.5E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.8E-10	3.7E-10	NA	6.5E-10	NA	NA	NA	NA	NA
			Pesticides	Aldrin	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	6.7E-12	NA	NA	6.7E-12	Liver	0.000004	NA	NA	0.000004
			PCBs	PCBs (total Aroclors)	1.3E-10	1.9E-10	NA	3.3E-10	Immunological, Dermal, Ocular	0.00023	0.00034	NA	0.00057
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	1.3E-08	8.1E-09	NA	2.1E-08		0.017	0.0013	NA	0.018
		Exposure Point Total						2.1E-08					0.018
	Exposure Medium Total							2.1E-08					0.018
Sediment Total								2.1E-08					0.018
Total Receptor Risks								2E-08					0.02

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.117 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Marsh Sediment All Depths	Marsh Sediment All Depths in Former ENCAP Restoration Area	Metals	Aluminum	NA	NA	NA	NA	CNS	0.00029	NA	NA	0.00029
				Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Arsenic	6.6E-09	3.4E-09	NA	1.0E-08	Cardiovascular, Dermal	0.001	0.00053	NA	0.0016
				Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00077	NA	NA	0.00077
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000096	NA	NA	0.000096
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00068	NA	NA	0.00068
				Manganese	NA	NA	NA	NA	CNS	0.000038	NA	NA	0.000038
				Mercury	NA	NA	NA	NA	Immunological	0.00043	NA	NA	0.00043
				Nickel	NA	NA	NA	NA	Body	0.000073	NA	NA	0.000073
				Thallium	NA	NA	NA	NA	Hair	NA	NA	NA	NA
				Vanadium	NA	NA	NA	NA	Dermal	0.00053	NA	NA	0.00053
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000016	NA	NA	0.000016
			PAHs	Benzo[a]pyrene	1.3E-09	1.7E-09	NA	2.9E-09	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.3E-11	NA	NA	1.3E-11	Liver	0.0000018	NA	NA	0.0000018
				Heptachlor	NA	NA	NA	NA	Liver	NA	NA	NA	NA
				Heptachlor epoxide	8.9E-12	NA	NA	8.9E-12	Liver	0.0000053	NA	NA	0.0000053
			PCBs	PCBs (total Aroclors)	2.0E-10	2.9E-10	NA	4.9E-10	Immunological, Dermal, Ocular	0.00035	0.0005	NA	0.00085
			Volatiles	Trichloroethene	NA	NA	NA	NA	pmental, Cardiovascular, Immunc	NA	NA	NA	NA
				Chemical Total	8.1E-09	5.4E-09	NA	1.3E-08		0.0043	0.001	NA	0.0054
		Exposure Point Total						1.3E-08					0.0054
	Exposure Medium Total							1.3E-08					0.0054
Sediment Total								1.3E-08					0.0054
Total Receptor Risks								1E-08					0.005

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.118 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00015	NA	NA	0.00015
				Arsenic	5.3E-08	1.9E-07	NA	2.4E-07	Cardiovascular, Dermal	0.00069	0.0025	NA	0.0032
				Cadmium	NA	NA	NA	NA	Kidney	0.000031	0.000089	NA	0.00012
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00082	NA	NA	0.00082
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000084	NA	NA	0.000084
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00043	NA	NA	0.00043
				Manganese	NA	NA	NA	NA	CNS	0.00013	NA	NA	0.00013
				Mercury	NA	NA	NA	NA	Immunological	0.00011	NA	NA	0.00011
				Nickel	NA	NA	NA	NA	Body	0.000054	NA	NA	0.000054
				Thallium	NA	NA	NA	NA	Hair	0.002	NA	NA	0.002
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000016	NA	NA	0.000016
			PAHs	Benz[a]anthracene	1.7E-09	1.5E-08	NA	1.7E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.5E-08	1.4E-07	NA	1.6E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.0E-09	1.9E-08	NA	2.1E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.7E-09	3.5E-08	NA	3.8E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	9.8E-10	9.1E-09	NA	1.0E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.2E-10	NA	NA	1.2E-10	Liver	0.0000014	NA	NA	0.0000014
				Heptachlor epoxide	4.2E-10	NA	NA	4.2E-10	Liver	0.000021	NA	NA	0.000021
			PCBs	PCBs (total Aroclors)	3.8E-09	3.8E-08	NA	4.2E-08	Immunological, Dermal, Ocular	0.00056	0.0056	NA	0.0062
				Chemical Total	8.2E-08	4.5E-07	NA	5.3E-07		0.0051	0.0082	NA	0.013
		Exposure Point Total						5.3E-07					0.013
	Exposure Medium Total							5.3E-07					0.013
Sediment Total								5.3E-07					0.013
Surface Water	White Perch Fillet	White Perch Fillet in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Iron	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.00038	NA	NA	0.00038
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	0.00042	NA	NA	0.00042
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.0067	NA	NA	0.0067
			PCBs	PCBs (total Aroclors)	4.1E-07	NA	NA	4.1E-07	Immunological, Dermal, Ocular	0.059	NA	NA	0.059
				Chemical Total	4.1E-07	NA	NA	4.1E-07		0.067	NA	NA	0.067
		Exposure Point Total						4.1E-07					0.067
	Exposure Medium Total							4.1E-07					0.067
Surface Water Total								4.1E-07					0.067
Total Receptor Risks								9E-07					0.08

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.119 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00015	NA	NA	0.00015
				Arsenic	5.3E-08	1.9E-07	NA	2.4E-07	Cardiovascular, Dermal	0.00069	0.0025	NA	0.0032
				Cadmium	NA	NA	NA	NA	Kidney	0.000031	0.000089	NA	0.00012
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00082	NA	NA	0.00082
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000084	NA	NA	0.000084
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00043	NA	NA	0.00043
				Manganese	NA	NA	NA	NA	CNS	0.00013	NA	NA	0.00013
				Mercury	NA	NA	NA	NA	Immunological	0.00011	NA	NA	0.00011
				Nickel	NA	NA	NA	NA	Body	0.000054	NA	NA	0.000054
				Thallium	NA	NA	NA	NA	Hair	0.002	NA	NA	0.002
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000016	NA	NA	0.000016
			PAHs	Benz[a]anthracene	1.7E-09	1.5E-08	NA	1.7E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.5E-08	1.4E-07	NA	1.6E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.0E-09	1.9E-08	NA	2.1E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.7E-09	3.5E-08	NA	3.8E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	9.8E-10	9.1E-09	NA	1.0E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.2E-10	NA	NA	1.2E-10	Liver	0.0000014	NA	NA	0.0000014
				Heptachlor epoxide	4.2E-10	NA	NA	4.2E-10	Liver	0.000021	NA	NA	0.000021
			PCBs	PCBs (total Aroclors)	3.8E-09	3.8E-08	NA	4.2E-08	Immunological, Dermal, Ocular	0.00056	0.0056	NA	0.0062
				Chemical Total	8.2E-08	4.5E-07	NA	5.3E-07		0.0051	0.0082	NA	0.013
		Exposure Point Total						5.3E-07					0.013
	Exposure Medium Total							5.3E-07					0.013
Sediment Total								5.3E-07					0.013
Surface Water	Blue Crab Muscle	Blue Crab Muscle in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Iron	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.00017	NA	NA	0.00017
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	NA	NA	NA	NA
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.0053	NA	NA	0.0053
			PCBs	PCBs (total Aroclors)	4.2E-09	NA	NA	4.2E-09	Immunological, Dermal, Ocular	0.00061	NA	NA	0.00061
				Chemical Total	4.2E-09	NA	NA	4.2E-09		0.0061	NA	NA	0.0061
		Exposure Point Total						4.2E-09					0.0061
	Exposure Medium Total							4.2E-09					0.0061
Surface Water Total								4.2E-09					0.0061
Total Receptor Risks								5E-07					0.02

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.120 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current/Future
Receptor Population: Crabber
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points	Surface Sediment (0-15 cm) Marsh and Mudflat at Access Points in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00015	NA	NA	0.00015
				Arsenic	5.3E-08	1.9E-07	NA	2.4E-07	Cardiovascular, Dermal	0.00069	0.0025	NA	0.0032
				Cadmium	NA	NA	NA	NA	Kidney	0.000031	0.000089	NA	0.00012
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00082	NA	NA	0.00082
				Copper	NA	NA	NA	NA	Gastrointestinal	0.000084	NA	NA	0.000084
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00043	NA	NA	0.00043
				Manganese	NA	NA	NA	NA	CNS	0.00013	NA	NA	0.00013
				Mercury	NA	NA	NA	NA	Immunological	0.00011	NA	NA	0.00011
				Nickel	NA	NA	NA	NA	Body	0.000054	NA	NA	0.000054
				Thallium	NA	NA	NA	NA	Hair	0.002	NA	NA	0.002
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.000016	NA	NA	0.000016
			PAHs	Benz[a]anthracene	1.7E-09	1.5E-08	NA	1.7E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.5E-08	1.4E-07	NA	1.6E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.0E-09	1.9E-08	NA	2.1E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	3.7E-09	3.5E-08	NA	3.8E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	9.8E-10	9.1E-09	NA	1.0E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.2E-10	NA	NA	1.2E-10	Liver	0.0000014	NA	NA	0.0000014
				Heptachlor epoxide	4.2E-10	NA	NA	4.2E-10	Liver	0.000021	NA	NA	0.000021
			PCBs	PCBs (total Aroclors)	3.8E-09	3.8E-08	NA	4.2E-08	Immunological, Dermal, Ocular	0.00056	0.0056	NA	0.0062
				Chemical Total	8.2E-08	4.5E-07	NA	5.3E-07		0.0051	0.0082	NA	0.013
		Exposure Point Total						5.3E-07					0.013
	Exposure Medium Total							5.3E-07					0.013
Sediment Total								5.3E-07					0.013
Surface Water	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle & Hepatopancreas in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	NA	NA	NA	NA
				Copper	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Iron	NA	NA	NA	NA	Gastrointestinal	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
				Mercury (inorganic)	NA	NA	NA	NA	Immunological	0.00025	NA	NA	0.00025
				Selenium	NA	NA	NA	NA	CNS, Hematological, Dermal	NA	NA	NA	NA
			Organometals	Methyl mercury	NA	NA	NA	NA	CNS, Developmental	0.0049	NA	NA	0.0049
			PCBs	PCBs (total Aroclors)	9.0E-08	NA	NA	9.0E-08	Immunological, Dermal, Ocular	0.013	NA	NA	0.013
				Chemical Total	9.0E-08	NA	NA	9.0E-08		0.018	NA	NA	0.018
		Exposure Point Total						9.0E-08					0.018
	Exposure Medium Total							9.0E-08					0.018
Surface Water Total								9.0E-08					0.018
Total Receptor Risks								6E-07					0.03

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.121 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Current
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.000087	NA	NA	0.000087
				Arsenic	3.2E-08	1.1E-07	NA	1.5E-07	Cardiovascular, Dermal	0.00042	0.0015	NA	0.0019
				Cadmium	NA	NA	NA	NA	Kidney	0.000019	0.000053	NA	0.000072
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.00049	NA	NA	0.00049
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00005	NA	NA	0.00005
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00026	NA	NA	0.00026
				Manganese	NA	NA	NA	NA	CNS	0.000075	NA	NA	0.000075
				Mercury	NA	NA	NA	NA	Immunological	0.000068	NA	NA	0.000068
				Nickel	NA	NA	NA	NA	Body	0.000033	NA	NA	0.000033
				Thallium	NA	NA	NA	NA	Hair	0.0012	NA	NA	0.0012
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.0000093	NA	NA	0.0000093
			PAHs	Benz[a]anthracene	9.9E-10	9.2E-09	NA	1.0E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	9.2E-09	8.5E-08	NA	9.4E-08	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	1.2E-09	1.1E-08	NA	1.2E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	2.2E-09	2.1E-08	NA	2.3E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	5.9E-10	5.5E-09	NA	6.1E-09	NA	NA	NA	NA	NA
			Pesticides	Aldrin	7.4E-11	NA	NA	7.4E-11	Liver	8.5E-07	NA	NA	0.00000085
				Heptachlor epoxide	2.5E-10	NA	NA	2.5E-10	Liver	0.000012	NA	NA	0.000012
			PCBs	PCBs (total Aroclors)	2.3E-09	2.3E-08	NA	2.5E-08	Immunological, Dermal, Ocular	0.00034	0.0034	NA	0.0037
				Chemical Total	4.9E-08	2.7E-07	NA	3.2E-07		0.0031	0.0049	NA	0.0079
		Exposure Point Total						3.2E-07					0.0079
	Exposure Medium Total							3.2E-07					0.0079
Sediment Total								3.2E-07					0.0079
Total Receptor Risks								3E-07					0.008

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 9.122 CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTERAL TENDENCY EXPOSURE
BERRY'S CREEK STUDY AREA

Scenario Timeframe: Future
Receptor Population: Kayaker/Canoer
Receptor Age: Adult

					Carcinogenic Risk				Noncarcinogenic Hazard Quotient				
Medium	**Exposure Medium**	**Exposure Point**	**Chemical Class**	**COPC**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**	**Primary Target Organ(s)**	**Ingestion**	**Dermal**	**Inhalation**	**Exposure Routes Total**
Sediment	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats	Surface Sediment (0-15 cm) Marsh at Access Points & All Mudflats in Reference Sites	Metals	Antimony	NA	NA	NA	NA	Hematological	0.00018	NA	NA	0.00018
				Arsenic	6.8E-08	2.4E-07	NA	3.1E-07	Cardiovascular, Dermal	0.00088	0.0031	NA	0.004
				Cadmium	NA	NA	NA	NA	Kidney	0.00004	0.00011	NA	0.00015
				Chromium (VI)	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Cobalt	NA	NA	NA	NA	Thyroid	0.001	NA	NA	0.001
				Copper	NA	NA	NA	NA	Gastrointestinal	0.00011	NA	NA	0.00011
				Iron	NA	NA	NA	NA	Gastrointestinal	0.00054	NA	NA	0.00054
				Manganese	NA	NA	NA	NA	CNS	0.00016	NA	NA	0.00016
				Mercury	NA	NA	NA	NA	Immunological	0.00014	NA	NA	0.00014
				Nickel	NA	NA	NA	NA	Body	0.000069	NA	NA	0.000069
				Thallium	NA	NA	NA	NA	Hair	0.0025	NA	NA	0.0025
				Zinc	NA	NA	NA	NA	Immunological, Hematological	0.00002	NA	NA	0.00002
			PAHs	Benz[a]anthracene	2.1E-09	1.9E-08	NA	2.2E-08	NA	NA	NA	NA	NA
				Benzo[a]pyrene	1.9E-08	1.8E-07	NA	2.0E-07	NA	NA	NA	NA	NA
				Benzo[b]fluoranthene	2.5E-09	2.4E-08	NA	2.6E-08	NA	NA	NA	NA	NA
				Dibenz[a,h]anthracene	4.7E-09	4.4E-08	NA	4.9E-08	NA	NA	NA	NA	NA
				Indeno[1,2,3-cd]pyrene	1.2E-09	1.2E-08	NA	1.3E-08	NA	NA	NA	NA	NA
			Pesticides	Aldrin	1.6E-10	NA	NA	1.6E-10	Liver	0.0000018	NA	NA	0.0000018
				Heptachlor epoxide	5.3E-10	NA	NA	5.3E-10	Liver	0.000026	NA	NA	0.000026
			PCBs	PCBs (total Aroclors)	4.9E-09	4.9E-08	NA	5.3E-08	Immunological, Dermal, Ocular	0.00071	0.0071	NA	0.0078
				Chemical Total	1.0E-07	5.7E-07	NA	6.7E-07		0.0065	0.01	NA	0.017
		Exposure Point Total						6.7E-07					0.017
	Exposure Medium Total							6.7E-07					0.017
Sediment Total								6.7E-07					0.017
Total Receptor Risks								7E-07					0.02

Notes:
CNS = central nervous system
COPC =chemical of potential concern
N = sample size
NA = not available
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

Draft
Attachment M5: Quantitative Risk Analysis to Support Uncertainty Evaluation

Baseline Human Health Risk Assessment

Berry's Creek Study Area Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

August 2016

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INTRODUCTION

A baseline human health risk assessment (BHHRA) is being conducted as part of the remedial investigation (RI) of the Berry's Creek Study Area (BCSA). U.S. Environmental Protection Agency (EPA) guidance (USEPA 1989) specifies that uncertainties should be evaluated as part of the risk assessment process. This attachment presents quantitative analyses that support the uncertainty evaluation for the BHHRA.

The following quantitative assessments were completed to support the uncertainty evaluation for the BHHRA:

- An evaluation of exposure and risk to chemicals of potential concern (COPCs) in individual large white perch (>200 mm) compared to white perch of target size (composites from fish 150–190 mm). Only COPCs that were measured in perch of both sizes (i.e., methyl mercury, mercury, polychlorinated biphenyls [PCBs], and selenium) were included in this analysis.

- An evaluation of exposure and risk to toxicity equivalence for dioxins and furans (TEQ_{df}) and toxicity equivalence for PCBs (TEQ_{p}) relative to 2,3,7,8-TCDD in media with available data.[1] Dioxins and furans have been sampled in waterway sediment, white perch, and crab, and PCB congeners in white perch and crab only.

- An evaluation of exposure and risk to total PCBs as congeners compared to total PCBs as Aroclors. PCB congener data were available for white perch and crab only; thus, only these exposure media were evaluated.

- An evaluation of exposure and risk for construction workers using exposure point concentrations (EPCs) derived from depth-weighted average concentrations calculated from all sediment data.[2]

METHODOLOGY

Reasonable maximum exposure (RME) estimates of exposure and risk were derived for recreators (i.e., anglers, crabbers, and kayaker/canoers) and construction workers for exposure media with available data.

[1] TEQs were calculated using toxicity equivalence for mammalians (Van den Berg et al. 2006).
[2] The baseline risk evaluation relied on depth-weighted average concentrations from all sampling locations with data extending beyond 15 cm for COPCs with any available data, and used depth-weighted average concentrations from surface sediments (0–15cm) for COPCs for which no deeper sediments were available.

Input Parameters

Toxicological criteria for all COPCs are presented in Attachment M2. Additional noncancer reference doses and cancer slope factors required for the uncertainty evaluations described above are summarized in Tables 1 and 2 respectively. These criteria were selected using the hierarchy established by USEPA (2003) and methodology presented in Attachment M2.

Chemical-specific factors, including relative bioavailability, dermal absorption factors, and cooking loss, for all COPCs are presented in Attachment M3. Additional chemical-specific factors required for these assessments, including factors for TEQ_{df}, TEQ_{p}, and total PCBs as congeners, are presented in Table 3. Default values available from EPA were adopted for these factors.

Exposure and risks were estimated using the spatial constructs and exposure points described in Attachment M4. The exception to this is for construction worker exposures to TEQ_{df} in sediment. In the absence of data for sediment intervals deeper than 0–15 cm, data from surface sediment (0–15 cm) were assumed as the exposure point for estimating risks to construction workers.

Data treatment and summation rules are described in the RI Report.[3] EPCs were estimated using the methodology outlined in Attachment M4. EPCs for tissue COPCs in large white perch and perch of target size are presented in Tables 4 and 5, respectively. EPCs for TEQ_{df}, TEQ_{p}, total PCBs as congeners, and total PCBs as Aroclors in white perch, crab muscle, and crab hepatopancreas and muscle are presented in Tables 6, 7, and 8, respectively. EPCs for TEQ_{df} and TEQ_{p} in sediment for angler/crabber, kayaker/canoer, and construction worker are presented in Tables 9, 10, and 11, respectively. EPCs for COPCs based on depth-weighted averages calculated from all surface and deep sediment samples for mashes and waterways are presented in Tables 12 and 13, respectively. Data distributions and goodness of fit tests are provided as Exhibit 1.

The remainder of the exposure parameters used are identical to those applied in the main risk evaluation (Attachment M4).

Exposure and Risk Characterization

Equations for estimating exposure (i.e., lifetime average daily dose] and average daily dose), cancer risk, and noncancer hazards are presented in Attachment M4 and were applied for the uncertainty characterization herein.

RESULTS

The results of the quantitative analyses to support the uncertainty evaluation are as follows:

[3] Refer to Appendix K.

- **Large White Perch.** Table 14 presents exposure and risk to anglers exposed to COPCs in large white perch compared to white perch of target size. Figures 1 and 2 summarize excess lifetime cancer risks and noncancer hazards for the younger child angler, respectively.

- **TEQ.** Tables 15 through 20 present pathway-specific excess lifetime cancer risks and noncancer hazards for TEQ_{df} and TEQ_{p} for each receptor group. Table 21 presents cumulative excess lifetime cancer risks and noncancer hazards for all receptor groups. Figures 3 through 6 summarize excess lifetime cancer risks and noncancer hazards for TEQ_{df} and TEQ_{p} for all receptor groups.

- **PCB Congeners Compared to Aroclors.** Tables 22 through 24 present excess lifetime cancer risks and noncancer hazards for total PCBs as the sum of congeners and total PCBs as the sum of Aroclors for crabbers and anglers. Figures 7 and 8 summarize excess lifetime cancer risks and noncancer hazards for PCB congeners and PCB Aroclors in tissue for all relevant receptor groups.

- **TEQ, PCB Congeners, and PCB Aroclors.** Figures 11 and 12 summarize excess lifetime cancer risks and noncancer hazards for TEQ_{df}, TEQ_{p}, PCB Aroclors, and PCB congeners from the tissue exposure pathway by exposure unit.

- **Surface and Deep Sediments.** Tables 25 and 26 present excess lifetime cancer risks and noncancer hazards for COPCs based on depth-weighted averages calculated using all surface and deep sediments. Table 25 presents the risks for marshes, and Table 26 presents the risks for waterways.

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Van den Berg, M., L.S. Birnbaum, M. Denison, M. De Vito, W. Farland, M. Feeley, H. Fiedler, H. Hakansson, A. Hanberg, L. Haws, M. Rose, S. Safe, D. Schrenk, C. Tohyama, A. Tritscher, J. Tuomisto, M. Tysklind, N. Walker, and R.E. Peterson. 2006. The 2005 World Health Organization re-evaluation of human and mammalian toxic equivalency factors for dioxins and dioxin-like compounds. *Toxicol. Sci.* 93(2):223-241.

TABLES

Table 1. Reference Doses for Uncertainty Evaluation

Chemical	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal [a]	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfD: Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
TEQ_{df} [b]	Chronic	7.0E-10	mg/kg-day	1	7.0E-10	mg/kg-day	Reproductive	30	IRIS	1/20/2016
TEQ_{p} [b]	Chronic	7.0E-10	mg/kg-day	1	7.0E-10	mg/kg-day	Reproductive	30	IRIS	1/20/2016
PCBs (total congeners) [c]	Chronic	2.0E-05	mg/kg-day	1	2.0E-05	mg/kg-day	Dermal, Immunological, Ocular	300	IRIS	1/20/2016

Notes:

IRIS = Integrated Risk Information System

PCBs (total congeners) = polychlorinated biphenyls as the sum of 209 congeners

RAGS = Risk Assessment Guidance for Superfund

RfD = reference dose

TCDD = tetrachlorodibenzo-*p*-dioxin

TEQ_{df} = toxicity equivalence for dioxins and furans

TEQ_{p} = toxicity equivalence for dioxin-like PCBs

[a] Source is USEPA (2004) - RAGS Part E, Section 4.2 and Exhibit 4-1. Follows recommendations for RfD adjustments. If RAGS E recommends no adjustment be made, the oral absorption efficiency is listed as 1 in this table.

[b] Values are based on 2,3,7,8-TCDD.

[c] Values are based on Aroclor 1254.

Sources:

USEPA (2004)

USEPA (2016)

Table 2. Cancer Slope Factors for Uncertainty Evaluation

Chemical	Oral CSF		Oral Absorption Efficiency fo Dermal [a]	Absorbed CSF for Dermal		Weight of Evidence/Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
TEQ_{df}	1.5E+05	$(mg/kg\text{-}day)^{-1}$	1	1.5E+05	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	1/20/2016
TEQ_{p}	1.5E+05	$(mg/kg\text{-}day)^{-1}$	1	1.5E+05	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	1/20/2016
PCBs (total congeners)	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	1/20/2016

Notes:

B2 = probable human carcinogen
CSF = cancer slope factor
HEAST = Health Effects Assessment Summary tables
IRIS = Integrated Risk Information System
NA = not available
PCBs (total congeners) = polychlorinated biphenyls as the sum of 209 congeners
RAGS = Risk Assessment Guidance for Superfund
TEQ_{df} = toxicity equivalence for dioxins and furans
TEQ_{p} = toxicity equivalence for dioxin-like PCBs

[a] Source is USEPA (2004) - RAGS Part E, Section 4.2 and Exhibit 4-1. Follows recommendations for CSF adjustments. If RAGS E recommends no adjustment be made, the oral absorption efficiency is listed as 1 in this table.

Sources:

USEPA (1997)
USEPA (2004)
USEPA (2016)

Table 3. Chemical-specific Parameters for Uncertainty Evaluation

Chemical	Sediment - Oral Pathway		Sediment - Dermal Pathway		Tissue - Oral Pathway	
	RBA	Units	ABS_d [a]	Units	Cooking Loss	Units
TEQ_{df}	1.0	unitless	0.030	unitless	0	unitless
TEQ_p	1.0	unitless	0.030	unitless	0	unitless
PCBs (total congeners)	1.0	unitless	0.14	unitless	0	unitless

Notes:

ABS_d = dermal absorption factor

PCBs (total congeners) = polychlorinated biphenyls as the sum of 209 congeners

RAGS = Risk Assessment Guidance for Superfund

RBA = relative bioavailability

TEQ_{df} = toxicity equivalence for dioxins and furans

TEQ_p = toxicity equivalence for dioxin-like PCBs

[a] Source is USEPA (2004) RAGS E.

Sources:

USEPA (2004)

Table 4. EPCs for COPCs in Large White Perch Fillet

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	Metals	Mercury (inorganic)	5	5	100	0.10	0.34	0.24	NA	Normal	95% Student's-t UCL	0.34	0.34	(3)
	Organometals	Methyl mercury	6	6	100	0.29	1.1	0.68	0.0031–0.018	Normal	95% Student's-t UCL	0.98	0.98	(1)
	PCBs	PCBs (total Aroclors)	6	6	100	0.18	2.4	0.79	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	2.2	2.2	(1)
	Metals	Selenium	1	1	100	0.75 J	0.75 J	0.75	0.44–0.44	None	Maximum concentration	0.75	0.75	(4)
MBC	Metals	Mercury (inorganic)	5	5	100	0.16	0.68	0.37	NA	Normal	95% Student's-t UCL	0.56	0.56	(1)
	Organometals	Methyl mercury	7	7	100	0.060	0.80	0.37	0.0031–0.0064	Normal	95% Student's-t UCL	0.56	0.56	(1)
	PCBs	PCBs (total Aroclors)	7	7	100	0.010 J	1.3	0.58	NA	Nonparametric	97.5% Chebyshev (Mean, SD) UCL	1.6	1.3	(3)
	Metals	Selenium	2	2	100	0.63 J	1.1	0.86	0.36–0.45	None	Maximum concentration	1.1	1.1	(4)
BCC	Metals	Mercury (inorganic)	5	5	100	0.07	0.20	0.13	NA	Normal	95% Student's-t UCL	0.18	0.18	(1)
	Organometals	Methyl mercury	5	5	100	0.30	0.59	0.48	0.0031–0.0064	Normal	95% Student's-t UCL	0.59	0.59	(3)
	PCBs	PCBs (total Aroclors)	5	5	100	0.053	0.31	0.14	NA	Normal	95% Student's-t UCL	0.24	0.24	(1)
	Metals	Selenium	--	--	--	--	--	--	NA	--	--	--	--	(6)
LBC	Metals	Mercury (inorganic)	5	5	100	0.0030	0.49	0.11	NA	Lognormal	99% Chebyshev (Mean, Sd) UCL	1.1	0.49	(3)
	Organometals	Methyl mercury	5	5	100	0.097	0.43	0.29	0.0031–0.0064	Normal	95% Student's-t UCL	0.41	0.41	(1)
	PCBs	PCBs (total Aroclors)	5	5	100	0.17	0.56	0.32	NA	Normal	95% Student's-t UCL	0.47	0.47	(1)
	Metals	Selenium	--	--	--	--	--	--	NA	--	--	--	--	(6)
Reference Sites	Metals	Mercury (inorganic)	15	11	73	0.01	0.23	0.084	NA	Lognormal	97.5% KM (Chebyshev) UCL	0.18	0.18	(1)
	Organometals	Methyl mercury	21	21	100	0.22	0.85	0.47	0.0030–0.0075	Normal	95% Student's-t UCL	0.53	0.53	(1)
	PCBs	PCBs (total Aroclors)	21	21	100	0.063 J	1.6	0.72	NA	Normal	95% Student's-t UCL	0.88	0.88	(1)
	Metals	Selenium	6	6	100	0.80 J	2.1	1.2	0.37–0.43	Normal	95% Student's-t UCL	1.6	1.6	(1)

Notes:

BCC = Berry's Creek Canal
COPC = chemical of potential concern
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PCB = polychlorianted biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = no data/not applicable

(1) The 95 UCL is selected as the exposure point concentration.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the exposure point concentration.
(4) Less than 4 detected values; therefore, the maximum concentration is selected as the exposure point concentration.
(6) No available data.

Table 5. EPCs for COPCs in White Perch Fillet of Target Size

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	Metals	Mercury (inorganic)	42	26	62	0.010	0.51 J	0.11	NA	Lognormal	95% KM (BCA) UCL	0.10	0.10	(1)
	Organometals	Methyl mercury	52	52	100	0.038	1.2 J	0.40	0.00055–0.02	Gamma	95% Approximate Gamma UCL	0.48	0.48	(1)
	PCBs	PCBs (total Aroclors)	52	52	100	0.13	3.4	0.98	NA	Lognormal	95% Chebyshev (Mean, Dd) UCL	1.5	1.5	(1)
	Metals	Selenium	17	15	88	0.56 J	1.1	0.75	0.38–0.45	Normal	95% KM (t) UCL	0.79	0.79	(1)
MBC	Metals	Mercury (inorganic)	49	36	73	0.020 J	1.1	0.21	NA	Gamma	95% KM (Adjusted Gamma) UCL	0.21	0.21	(1)
	Organometals	Methyl mercury	59	59	100	0.040	0.99 J	0.37	0.00055–0.0064	Normal	95% Student's-t UCL	0.41	0.41	(1)
	PCBs	PCBs (total Aroclors)	59	59	100	0.11	3.2 J	0.80	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	1.2	1.2	(1)
	Metals	Selenium	23	22	96	0.51 J	1.2	0.78	0.35–0.45	Normal	95% KM (t) UCL	0.84	0.84	(1)
BCC	Metals	Mercury (inorganic)	49	26	53	0.010	0.36	0.17	NA	Gamma	95% KM (Adjusted Gamma) UCL	0.12	0.12	(1)
	Organometals	Methyl mercury	59	59	100	0.013	0.76	0.30	0.00055–0.015	Nonparametric	95% Chebyshev (Mean, SD) UCL	0.39	0.39	(1)
	PCBs	PCBs (total Aroclors)	59	59	100	0.056 J	2.9	0.81	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	1.2	1.2	(1)
	Metals	Selenium	23	21	91	0.49 J	1.4	0.90	0.36–0.45	Normal	95% KM (t) UCL	0.95	0.95	(1)
LBC	Metals	Mercury (inorganic)	47	25	53	0.010	0.44 J	0.14	NA	Lognormal	95% KM (Chebyshev) UCL	0.14	0.14	(1)
	Organometals	Methyl mercury	57	57	100	0.056	0.69	0.31	0.00055–0.014	Normal	95% Student's-t UCL	0.34	0.34	(1)
	PCBs	PCBs (total Aroclors)	57	57	100	0.036	1.7 J	0.43	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	0.64	0.64	(1)
	Metals	Selenium	21	16	76	0.53 J	1.1	0.75	0.32–0.45	Normal	95% KM (t) UCL	0.75	0.75	(1)
Reference Sites	Metals	Mercury (inorganic)	103	58	56	0.010	0.28 J	0.065	NA	lognormal	95% KM (t) UCL	0.045	0.045	(1)
	Organometals	Methyl mercury	125	125	100	0.017	0.48	0.25	0.00055–0.024	Normal	95% Student's-t UCL	0.26	0.26	(1)
	PCBs	PCBs (total Aroclors)	125	125	100	0.027 J	2.1	0.51	NA	Nonparametric	95% Chebyshev (Mean, SD) UCL	0.66	0.66	(1)
	Metals	Selenium	38	38	100	0.41 J	1.1	0.77	0.26–0.45	Normal	95% Student's-t UCL	0.82	0.82	(1)

Notes:

BCC = Berry's Creek Canal
COPC = chemical of potential concern
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PCB = polychlorianted biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit

(1) The 95 UCL is selected as the exposure point concentration.

Table 6. EPCs for Dioxins, Furans, and PCBs in White Perch Fillet

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	PCBs	PCBs (total Aroclors)	52	52	100	0.13	3.4	0.98	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	1.5	1.5	(1)
		PCBs (total congeners)	8	8	100	1.3 J	2.5 J	2.0	NA	Normal	95% Student's-t UCL	2.3	2.3	(1)
	TEQ	TEQ_{df}	5	5	100	8.4E-06 J	2.5E-05 J	1.5E-05	NA	Normal	95% Student's-t UCL	2.1E-05	2.1E-05	(1)
		TEQ_{p}	8	8	100	2.0E-05 J	7.1E-05 J	3.6E-05	NA	Normal	95% Student's-t UCL	4.7E-05	4.7E-05	(1)
MBC	PCBs	PCBs (total Aroclors)	59	59	100	0.11	3.2 J	0.80	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	1.2	1.2	(1)
		PCBs (total congeners)	8	8	100	0.64 J	3.2 J	1.7	NA	Normal	95% Student's-t UCL	2.2	2.2	(1)
	TEQ	TEQ_{df}	5	5	100	1.1E-05 J	2.5E-05 J	1.8E-05	NA	Normal	95% Student's-t UCL	2.3E-05	2.3E-05	(1)
		TEQ_{p}	8	8	100	1.4E-05 J	4.1E-05 J	2.6E-05	NA	Normal	95% Student's-t UCL	3.4E-05	3.4E-05	(1)
BCC	PCBs	PCBs (total Aroclors)	59	59	100	0.056 J	2.9	0.81	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	1.2	1.2	(1)
		PCBs (total congeners)	8	8	100	0.48 J	2.2 J	1.4	NA	Normal	95% Student's-t UCL	1.8	1.8	(1)
	TEQ	TEQ_{df}	5	5	100	2.6E-05 J	1.0E-04 J	4.8E-05	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	1.1E-04	1.0E-04	(3)
		TEQ_{p}	8	8	100	7.7E-06 J	3.8E-05 J	2.0E-05	NA	Normal	95% Student's-t UCL	2.7E-05	2.7E-05	(1)
LBC	PCBs	PCBs (total Aroclors)	57	57	100	0.036	1.7 J	0.43	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	0.64	0.64	(1)
		PCBs (total congeners)	8	8	100	0.26 J	2.2 J	1.1	NA	Normal	95% Student's-t UCL	1.5	1.5	(1)
	TEQ	TEQ_{df}	5	5	100	1.3E-05 J	4.4E-05 J	3.1E-05	NA	Normal	95% Student's-t UCL	4.2E-05	4.2E-05	(1)
		TEQ_{p}	8	8	100	8.4E-06 J	7.1E-05 J	2.5E-05	NA	Normal	95% Student's-t UCL	3.9E-05	3.9E-05	(1)
Reference Sites	PCBs	PCBs (total Aroclors)	125	125	100	0.027 J	2.1	0.51	NA	Nonparametric	95% Chebyshev (Mean, SD) UCL	0.66	0.66	(1)
		PCBs (total congeners)	24	24	100	0.31 J	1.2 J	0.75	NA	Normal	95% Student's-t UCL	0.82	0.82	(1)
	TEQ	TEQ_{df}	16	16	100	1.6E-06 J	2.6E-05 J	1.5E-05	NA	Normal	95% Student's-t UCL	1.8E-05	1.8E-05	(1)
		TEQ_{p}	24	24	100	7.7E-06 J	8.2E-05 J	1.9E-05	NA	Nonparametric	95% Chebyshev (Mean, SD) UCL	3.3E-05	3.3E-05	(1)

Notes:

BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PCB = polychlorianted biphenyl
SD = standard deviation
TEQ = toxicity equivalence
TEQ_{df} = toxicity equivalence for dioxins and furans
TEQ_{p} = toxicity equivalence for dioxin-like PCBs
UBC = Upper Berry's Creek
UCL = upper confidence limit

(1) The 95 UCL is selected as the exposure point concentration.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the exposure point concentration.

Table 7. EPCs for Dioxins, Furans, and PCBs in Crab Muscle

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	PCBs	PCBs (total Aroclors)	13	10	77	0.0024 J	0.025	0.010	NA	Lognormal	95% KM (BCA) UCL	0.013	0.013	(1)
		PCBs (total congeners)	5	5	100	0.054 J	0.27 J	0.17	NA	Normal	95% Student's-t UCL	0.25	0.25	(1)
	TEQ	TEQ_{df}	5	5	100	3.3E-06 J	4.8E-06 J	3.9E-06	NA	Normal	95% Student's-t UCL	4.6E-06	4.6E-06	(1)
		TEQ_{p}	5	5	100	1.9E-06 J	8.2E-06 J	5.4E-06	NA	Normal	95% Student's-t UCL	7.8E-06	7.8E-06	(1)
MBC	PCBs	PCBs (total Aroclors)	14	11	79	0.0019 J	0.047	0.017	NA	Lognormal	97.5% KM (Chebyshev) UCL	0.040	0.040	(1)
		PCBs (total congeners)	5	5	100	0.072 J	0.26 J	0.13	NA	Normal	95% Student's-t UCL	0.20	0.20	(1)
	TEQ	TEQ_{df}	5	5	100	8.5E-07 J	6.9E-06 J	4.5E-06	NA	Normal	95% Student's-t UCL	6.8E-06	6.8E-06	(1)
		TEQ_{p}	5	5	100	1.4E-06 J	6.7E-06 J	3.4E-06	NA	Normal	95% Student's-t UCL	5.3E-06	5.3E-06	(1)
BCC	PCBs	PCBs (total Aroclors)	14	11	79	0.0016 J	0.021	0.010	NA	Normal	95% KM (t) UCL	0.011	0.011	(1)
		PCBs (total congeners)	5	5	100	0.052 J	0.12 J	0.077	NA	Normal	95% Student's-t UCL	0.10	0.10	(1)
	TEQ	TEQ_{df}	5	5	100	1.7E-06 J	1.7E-05 J	7.8E-06	NA	Normal	95% Student's-t UCL	1.4E-05	1.4E-05	(1)
		TEQ_{p}	5	5	100	1.3E-06 J	3.9E-06 J	2.6E-06	NA	Normal	95% Student's-t UCL	3.6E-06	3.6E-06	(1)
LBC	PCBs	PCBs (total Aroclors)	13	11	85	0.0020 J	0.038	0.0082	NA	Lognormal	95% KM (Chebyshev) UCL	0.019	0.019	(1)
		PCBs (total congeners)	5	5	100	0.045 J	0.080 J	0.057	NA	Normal	95% Student's-t UCL	0.070	0.070	(1)
	TEQ	TEQ_{df}	5	5	100	4.2E-06 J	1.3E-05 J	6.6E-06	NA	Approximate normal	95% Modified Student's-t UCL	1.0E-05	1.0E-05	(1)
		TEQ_{p}	5	5	100	9.1E-07 J	3.2E-06 J	1.6E-06	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	3.4E-06	3.2E-06	(3)
Reference Sites	PCBs	PCBs (total Aroclors)	39	27	69	0.0016 J	0.017 J	0.0064	NA	Normal	95% KM (t) UCL	0.0059	0.0059	(1)
		PCBs (total congeners)	16	16	100	0.054 J	0.13 J	0.077	NA	Normal	95% Student's-t UCL	0.085	0.085	(1)
	TEQ	TEQ_{df}	16	16	100	3.3E-07 J	1.2E-05 J	3.4E-06	NA	Normal	95% Student's-t UCL	4.7E-06	4.7E-06	(1)
		TEQ_{p}	16	16	100	1.4E-06 J	5.5E-06 J	2.6E-06	NA	Normal	95% Student's-t UCL	3.1E-06	3.1E-06	(1)

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PCB = polychlorianted biphenyl
SD = standard deviation
TEQ = toxicity equivalence
TEQ_{df} = toxicity equivalence for dioxins and furans
TEQ_{p} = toxicity equivalence for dioxin-like PCBs
UBC = Upper Berry's Creek
UCL = upper confidence limit

(1) The 95 UCL is selected as the exposure point concentration.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the exposure point concentration.

Table 8. EPCs for Dioxins, Furans, and PCBs in Crab Muscle and Hepatopancreas

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	PCBs	PCBs (total Aroclors)	9	9	100	0.099	0.25 J	0.15	NA	Normal	95% Student's-t UCL	0.18	0.18	(1)
		PCBs (total congeners)	5	5	100	0.40 J	1.0 J	0.69	NA	Normal	95% Student's-t UCL	0.94	0.94	(1)
	TEQ	TEQ_{df}	5	5	100	1.1E-05 J	2.9E-05 J	1.9E-05	NA	Normal	95% Student's-t UCL	2.5E-05	2.5E-05	(1)
		TEQ_{p}	5	5	100	1.4E-05 J	3.7E-05 J	2.4E-05	NA	Normal	95% Student's-t UCL	3.2E-05	3.2E-05	(1)
MBC	PCBs	PCBs (total Aroclors)	9	9	100	0.0064 J	0.17	0.097	NA	Normal	95% Student's-t UCL	0.13	0.13	(1)
		PCBs (total congeners)	5	5	100	0.44 J	1.0 J	0.60	NA	Approximate normal	95% Modified Student's-t UCL	0.84	0.84	(1)
	TEQ	TEQ_{df}	5	5	100	1.5E-05 J	2.7E-05 J	2.2E-05	NA	Normal	95% Student's-t UCL	2.7E-05	2.7E-05	(1)
		TEQ_{p}	5	5	100	1.4E-05 J	3.4E-05 J	1.8E-05	NA	Approximate normal	95% Modified Student's-t UCL	2.7E-05	2.7E-05	(1)
BCC	PCBs	PCBs (total Aroclors)	8	8	100	0.065	0.18 J	0.13	NA	Normal	95% Student's-t UCL	0.15	0.15	(1)
		PCBs (total congeners)	5	5	100	0.33 J	0.47 J	0.39	NA	Normal	95% Student's-t UCL	0.45	0.45	(1)
	TEQ	TEQ_{df}	5	5	100	1.3E-05 J	3.9E-05 J	2.5E-05	NA	Normal	95% Student's-t UCL	3.6E-05	3.6E-05	(1)
		TEQ_{p}	5	5	100	9.1E-06 J	1.4E-05 J	1.2E-05	NA	Normal	95% Student's-t UCL	1.4E-05	1.4E-05	(1)
LBC	PCBs	PCBs (total Aroclors)	8	8	100	0.024 J	0.42 J	0.14	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	0.33	0.33	(1)
		PCBs (total congeners)	5	5	100	0.30 J	0.43 J	0.37	NA	Normal	95% Student's-t UCL	0.43	0.43	(1)
	TEQ	TEQ_{df}	5	5	100	2.7E-05 J	4.6E-05 J	3.2E-05	NA	Approximate normal	95% Modified Student's-t UCL	4.0E-05	4.0E-05	(1)
		TEQ_{p}	5	5	100	8.3E-06 J	1.4E-05 J	1.1E-05	NA	Normal	95% Student's-t UCL	1.3E-05	1.3E-05	(1)
Reference Sites	PCBs	PCBs (total Aroclors)	27	27	100	0.039 J	0.21	0.11	NA	Normal	95% Student's-t UCL	0.13	0.13	(1)
		PCBs (total congeners)	16	16	100	0.29 J	0.75 J	0.47	NA	Approximate normal	95% Modified Student's-t UCL	0.53	0.53	(1)
	TEQ	TEQ_{df}	16	16	100	3.7E-06 J	3.7E-05 J	2.0E-05	NA	Normal	95% Student's-t UCL	2.4E-05	2.4E-05	(1)
		TEQ_{p}	16	16	100	7.1E-06 J	3.2E-05 J	1.6E-05	NA	Normal	95% Student's-t UCL	1.9E-05	1.9E-05	(1)

Notes:

BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PCB = polychlorianted biphenyl
SD = standard deviation
TEQ = toxicity equivalence
TEQ_{df} = toxicity equivalence for dioxins and furans
TEQ_{p} = toxicity equivalence for dioxin-like PCBs
UBC = Upper Berry's Creek
UCL = upper confidence limit

(1) The 95 UCL is selected as the exposure point concentration.

Table 9. Angler/Crabber EPCs for Dioxins and Furans in Sediment

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	TEQ	TEQ_{df}	2	2	100	4.1E-05 J	6.5E-05 J	5.3E-05	NA	None	Maximum concentration	6.5E-05	6.5E-05	(4)
MBC			4	4	100	4.4E-05 J	1.1E-04 J	7.7E-05	NA	Normal	95% Student's-t UCL	1.1E-04	1.1E-04	(3)
BCC			2	2	100	1.4E-04 J	1.7E-04 J	1.5E-04	NA	None	Maximum concentration	1.7E-04	1.7E-04	(4)
LBC			4	4	100	2.5E-05 J	1.5E-04 J	1.0E-04	NA	Normal	95% Student's-t UCL	1.6E-04	1.5E-04	(3)
Reference Sites			21	21	100	8.5E-08 J	1.8E-04 J	3.1E-05	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	7.6E-05	7.6E-05	(1)

Notes:

BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
SD = standard deviation
TEQ = toxicity equivalence
TEQ_{df} = toxicity equivalence for dioxins and furans
UBC = Upper Berry's Creek
UCL = upper confidence limit

(1) The 95 UCL is selected as the exposure point concentration.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the exposure point concentration.
(4) Less than 4 detected values; therefore, the maximum concentration is selected as the exposure point concentration.

Table 10. Kayaker/Canoer EPCs for Dioxins and Furans in Sediment

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	TEQ	TEQ_{df}	4	4	100	4.1E-05 J	1.9E-04 J	9.9E-05	NA	Normal	95% Student's-t UCL	1.8E-04	1.8E-04	(1)
MBC			6	6	100	4.4E-05 J	1.3E-04 J	9.4E-05	NA	Normal	95% Student's-t UCL	1.2E-04	1.2E-04	(1)
BCC			8	8	100	1.1E-05 J	2.0E-04 J	9.9E-05	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	2.2E-04	2.0E-04	(3)
LBC			10	10	100	2.4E-05 J	1.8E-04 J	1.1E-04	NA	Normal	95% Student's-t UCL	1.4E-04	1.4E-04	(1)
Reference Sites			21	21	100	8.5E-08 J	1.8E-04 J	3.1E-05	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	7.6E-05	7.6E-05	(1)

Notes:

BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
SD = standard deviation
TEQ = toxicity equivalence
TEQ_{df} = toxicity equivalence for dioxins and furans
UBC = Upper Berry's Creek
UCL = upper confidence limit

(1) The 95 UCL is selected as the exposure point concentration.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the exposure point concentration.

Table 11. Construction Worker EPCs for Dioxins and Furans in Sediment

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UBC	TEQ	TEQ_{df}	9	9	100	1.0E-05 J	1.9E-04 J	6.6E-05	NA	Normal	95% Student's-t UCL	1.0E-04	1.0E-04	(1)
MBC			10	10	100	3.7E-05 J	3.9E-04 J	1.3E-04	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	2.7E-04	2.7E-04	(1)
BCC			10	10	100	1.1E-05 J	2.0E-04 J	9.1E-05	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	1.9E-04	1.9E-04	(1)
LBC			10	10	100	2.4E-05 J	1.8E-04 J	1.1E-04	NA	Normal	95% Student's-t UCL	1.4E-04	1.4E-04	(1)
Reference Sites			21	21	100	8.5E-08 J	1.8E-04 J	3.1E-05	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	7.6E-05	7.6E-05	(1)

Notes:

BCC = Berry's Creek Canal
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
SD = standard deviation
TEQ = toxicity equivalence
TEQ_{df} = toxicity equivalence for dioxins and furans
UBC = Upper Berry's Creek
UCL = upper confidence limit

(1) The 95 UCL is selected as the exposure point concentration.
EPCs for construction worker were estimated using surface sediment (no TEQ_{df} data available for deep sediment).

Table 12. EPCs for COPCs in Marsh Sediment (All Samples)

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Nevertouch Marsh	Metals	Mercury	37	37	100	3.4	370 J	82	0.022–10	Lognormal	95% Chebyshev (Mean, SD) UCL	130	130	(1)
	PCBs	PCBs (total Aroclors)	29	29	100	0.059 J	11 J	2.2	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	4.4	4.4	(1)
	Metals	Aluminum	15	15	100	9,700 J	18,000 J	12,000	35.1–209	Normal	95% Student's-t UCL	14,000	14,000	(1)
		Antimony	15	6	40	2.0 J	4.2 J	3.1	1.4–7.6	Normal	95% KM (t) UCL	2.6	2.6	(1)
		Arsenic	15	15	100	20 J	67 J	32	0.95–2.4	Approximate normal	95% Modified Student's-t UCL	40	40	(1)
		Cadmium	15	15	100	3.4 J	34 J	12	0.13–0.70	Nonparametric	95% Chebyshev (Mean, SD) UCL	24	24	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	15	15	100	9.9 J	33 J	20	0.51–1.3	Normal	95% Student's-t UCL	24	24	(1)
		Copper	15	15	100	110 J	560 J	250	2.3–5.9	Approximate normal	95% Modified Student's-t UCL	310	310	(1)
		Iron	19	19	100	18,000 J	39,000 J	27,000	11–38.8	Normal	95% Student's-t UCL	29,000	29,000	(1)
		Manganese	19	19	100	400 J	29,000 J	8,900	0.27–3.6	Lognormal	95% Chebyshev (Mean, SD) UCL	17,000	17,000	(1)
		Nickel	15	15	100	54 J	230 J	110	0.86–2.1	Normal	95% Student's-t UCL	130	130	(1)
		Thallium	15	9	60	3.3 J	40 J	13	2.0–15.5	Normal	95% KM (t) UCL	14	14	(1)
		Vanadium	15	15	100	51 J	95 J	65	0.38–0.95	Normal	95% Student's-t UCL	70	70	(1)
		Zinc	15	15	100	570 J	17,000 J	3,000	3.5–73.2	Nonparametric	95% Chebyshev (Mean, SD) UCL	8,200	8,200	(1)
	PAHs	Benzo[a]pyrene	5	5	100	0.11 J	0.36 J	0.19	0.0030–0.024	Normal	95% Student's-t UCL	0.29	0.29	(1)
		Dibenz[a,h]anthracene	5	5	100	0.012 J	0.079 J	0.047	0.0033–0.027	Normal	95% Student's-t UCL	0.076	0.076	(1)
	Pesticides	Aldrin	5	2	40	0.0014 J	0.26 J	0.13	0.00021–0.0055	None	Maximum concentration	0.26	0.26	(4)
		Heptachlor	4	1	25	0.21 J	0.21 J	0.21	0.00026–0.0068	None	Maximum concentration	0.21	0.21	(4)
		Heptachlor epoxide	5	4	80	0.0010 J	0.29 J	0.080	0.00023–0.0059	Lognormal	99% KM (Chebyshev) UCL	0.64	0.29	(3)
	Volatiles	Trichloroethene	5	0	0	--	--	--	0.0023–0.011	None	Not detected	--	--	(2)
Eight Day Swamp	Metals	Mercury	38	38	100	16 J	210 J	47	0.0307–11	Lognormal	95% Chebyshev (Mean, SD) UCL	70	70	(1)
	PCBs	PCBs (total Aroclors)	27	27	100	0.10 J	5.7 J	1.7	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	3.0	3.0	(1)
	Metals	Aluminum	14	14	100	9,600 J	15,000 J	13,000	21–516	Normal	95% Student's-t UCL	14,000	14,000	(1)
		Antimony	14	9	64	1.7 J	5.2 J	3.0	0.87–21	Normal	95% KM (t) UCL	2.9	2.9	(1)
		Arsenic	14	14	100	15 J	41 J	23	0.67–2.3	Approximate normal	95% Modified Student's-t UCL	27	27	(1)
		Cadmium	14	14	100	2.7 J	16 J	6.2	0.080–1.9	Lognormal	95% Chebyshev (Mean, SD) UCL	11	11	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	14	13	93	11 J	54 J	22	0.22–1.2	Approximate normal	95% KM (t) UCL	26	26	(1)
		Copper	14	14	100	99 J	850 J	310	1.1–5.7	Normal	95% Student's-t UCL	410	410	(1)
		Iron	20	20	100	15,000 J	37,000 J	25,000	9.2–37.5	Normal	95% Student's-t UCL	28,000	28,000	(1)
		Manganese	20	20	100	430 J	20,000 J	5,300	0.24–4.0	Lognormal	95% Chebyshev (Mean, SD) UCL	11,000	11,000	(1)
		Nickel	14	14	100	46 J	350 J	120	0.37–2.1	Lognormal	95% Chebyshev (Mean, SD) UCL	210	210	(1)
		Thallium	14	10	71	3.0 J	60 J	18	0.60–29.6	Lognormal	95% KM (BCA) UCL	22	22	(1)
		Vanadium	14	14	100	36 J	99 J	65	0.27–0.92	Normal	95% Student's-t UCL	74	74	(1)
		Zinc	14	14	100	470 J	2,400 J	940	2.2–53.8	Normal	95% Student's-t UCL	1,200	1,200	(1)
	PAHs	Benzo[a]pyrene	6	6	100	0.063 J	0.25 J	0.17	0.0017–0.016	Normal	95% Student's-t UCL	0.23	0.23	(1)
		Dibenz[a,h]anthracene	6	6	100	0.012 J	0.10 J	0.041	0.0019–0.012	Normal	95% Student's-t UCL	0.068	0.068	(1)
	Pesticides	Aldrin	6	3	50	0.013 J	0.020 J	0.016	0.000043–0.00098	None	Maximum concentration	0.020	0.020	(4)
		Heptachlor	6	1	17	0.012 J	0.012 J	0.012	0.000054–0.0012	None	Maximum concentration	0.012	0.012	(4)
		Heptachlor epoxide	5	3	60	0.0016 J	0.016 J	0.0080	0.000047–0.0011	None	Maximum concentration	0.016	0.016	(4)
	Volatiles	Trichloroethene	6	0	0	--	--	--	0.0020–0.0041	None	Not detected	--	--	(2)

Table 12. EPCs for COPCs in Marsh Sediment (All Samples)

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Paterson Plank Marsh	Metals	Mercury	10	10	100	1.8	47 J	26	0.021–8.4	Normal	95% Student's-t UCL	33	33	(1)
	PCBs	PCBs (total Aroclors)	8	8	100	0.095 J	3.3 J	1.1	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	2.7	2.7	(1)
	Metals	Aluminum	3	3	100	10,000 J	11,000 J	11,000	23.2–61.2	None	Maximum concentration	11,000	11,000	(4)
		Antimony	3	1	33	3.2 J	3.2 J	3.2	0.94–2.5	None	Maximum concentration	3.2	3.2	(4)
		Arsenic	3	3	100	16 J	40 J	25	0.73–1.9	None	Maximum concentration	40	40	(4)
		Cadmium	3	3	100	4.9 J	8.8 J	6.4	0.087–0.23	None	Maximum concentration	8.8	8.8	(4)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	3	3	100	12 J	39 J	24	0.39–1.0	None	Maximum concentration	39	39	(4)
		Copper	3	3	100	140 J	230 J	180	1.8–4.7	None	Maximum concentration	230	230	(4)
		Iron	4	4	100	18,000 J	25,000 J	22,000	9.7–31.2	Normal	95% Student's-t UCL	26,000	25,000	(3)
		Manganese	4	4	100	410 J	6,900 J	2,900	0.18–1.9	Lognormal	95% Chebyshev (Mean, SD) UCL	9,200	6,900	(3)
		Nickel	3	3	100	64 J	200 J	130	0.65–1.7	None	Maximum concentration	200	200	(4)
		Thallium	3	3	100	2.2 J	10 J	6.1	1.3–14.3	None	Maximum concentration	10	10	(4)
		Vanadium	3	3	100	45 J	91 J	67	0.29–0.77	None	Maximum concentration	91	91	(4)
		Zinc	3	3	100	530 J	1,300 J	830	2.4–6.4	None	Maximum concentration	1,300	1,300	(4)
	PAHs	Benzo[a]pyrene	1	1	100	0.42 J	0.42 J	0.42	0.0068–0.0068	None	Maximum concentration	0.42	0.42	(4)
		Dibenz[a,h]anthracene	1	1	100	0.085 J	0.085 J	0.085	0.0075–0.0075	None	Maximum concentration	0.085	0.085	(4)
	Pesticides	Aldrin	1	1	100	0.0050 J	0.0050 J	0.0050	0.00038–0.00038	None	Maximum concentration	0.0050	0.0050	(4)
		Heptachlor	1	0	0	--	--	--	0.00047–0.00047	None	Not detected	--	--	(2)
		Heptachlor epoxide	--	--	--	--	--	--	NA	--	--	--	--	(6)
	Volatiles	Trichloroethene	1	0	0	--	--	--	0.0036–0.0036	None	Not detected	--	--	(2)
Upper Peach Island Creek Marsh	Metals	Mercury	22	22	100	43 J	680 J	280	0.017–29	Gamma	95% Adjusted Gamma UCL	420	420	(1)
	PCBs	PCBs (total Aroclors)	19	19	100	0.034 J	14 J	2.0	NA	Lognormal	99% Chebyshev (Mean, SD) UCL	9.7	9.7	(1)
	Metals	Aluminum	7	7	100	5,000 J	18,000 J	13,000	21–170	Normal	95% Student's-t UCL	16,000	16,000	(1)
		Antimony	6	2	33	5.4 J	17 J	11	0.64–2.0	None	Maximum concentration	17	17	(4)
		Arsenic	7	7	100	52 J	260 J	130	0.49–1.5	Normal	95% Student's-t UCL	190	190	(1)
		Cadmium	7	7	100	2.9 J	37 J	11	0.059–0.18	Lognormal	95% Chebyshev (Mean, SD) UCL	30	30	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	7	7	100	5.2 J	150 J	33	0.26–0.80	Lognormal	95% Chebyshev (Mean, SD) UCL	120	120	(1)
		Copper	7	7	100	160 J	5,200 J	1,100	1.2–3.7	Lognormal	95% Chebyshev (Mean, SD) UCL	4,100	4,100	(1)
		Iron	12	12	100	20,000 J	59,000 J	36,000	5.0–25	Normal	95% Student's-t UCL	41,000	41,000	(1)
		Manganese	12	12	100	230 J	11,000 J	4,700	0.13–5.1	Lognormal	95% Chebyshev (Mean, SD) UCL	9,700	9,700	(1)
		Nickel	7	7	100	29 J	1,100 J	220	0.44–1.4	Lognormal	95% Chebyshev (Mean, SD) UCL	860	860	(1)
		Thallium	7	3	43	2.7 J	6.6 J	4.3	1.2–11	None	Maximum concentration	6.6	6.6	(4)
		Vanadium	7	7	100	34 J	200 J	120	0.20–0.60	Normal	95% Student's-t UCL	160	160	(1)
		Zinc	7	7	100	220 J	590 J	400	1.6–5.0	Normal	95% Student's-t UCL	510	510	(1)
	PAHs	Benzo[a]pyrene	4	4	100	0.20 J	0.55 J	0.37	0.0021–0.018	Normal	95% Student's-t UCL	0.55	0.55	(1)
		Dibenz[a,h]anthracene	4	4	100	0.014 J	0.11 J	0.063	0.0023–0.020	Normal	95% Student's-t UCL	0.12	0.11	(3)
	Pesticides	Aldrin	4	2	50	0.0065 J	0.045 J	0.026	0.000098–0.0012	None	Maximum concentration	0.045	0.045	(4)
		Heptachlor	4	2	50	0.0085 J	0.021 J	0.015	0.00012–0.0014	None	Maximum concentration	0.021	0.021	(4)
		Heptachlor epoxide	3	2	67	0.00050 J	0.0091 J	0.0048	0.00011–0.00023	None	Maximum concentration	0.0091	0.0091	(4)
	Volatiles	Trichloroethene	4	0	0	--	--	--	0.0018–0.0052	None	Not detected	--	--	(2)

Table 12. EPCs for COPCs in Marsh Sediment (All Samples)

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Walden Swamp	Metals	Mercury	54	54	100	0.68	130 J	27	0.018–9.5	Gamma	95% Approximate Gamma UCL	33	33	(1)
	PCBs	PCBs (total Aroclors)	47	47	100	0.032 J	6.3 J	0.97	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	1.7	1.7	(1)
	Metals	Aluminum	32	32	100	4,700	17,000 J	12,000	11–180	Normal	95% Student's-t UCL	12,000	12,000	(1)
		Antimony	32	13	41	0.78 J	5.7 J	3.6	0.46–3.5	Normal	95% KM (t) UCL	2.4	2.4	(1)
		Arsenic	32	32	100	3.6	47 J	20	0.35–2.7	Lognormal	95% Chebyshev (Mean, SD) UCL	27	27	(1)
		Cadmium	32	32	100	0.24 J	11 J	4.1	0.043–0.33	Lognormal	95% Chebyshev (Mean, SD) UCL	6.4	6.4	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	32	31	97	4.6 J	39 J	20	0.19–1.5	Normal	95% KM (t) UCL	22	22	(1)
		Copper	32	32	100	33	250 J	140	0.88–6.7	Normal	95% Student's-t UCL	150	150	(1)
		Iron	36	36	100	10,000	62,000 J	25,000	5.8–44.5	Approximate normal	95% Modified Student's-t UCL	27,000	27,000	(1)
		Manganese	36	36	100	150	38,000 J	6,500	0.088–2.8	Lognormal	95% Chebyshev (Mean, SD) UCL	13,000	13,000	(1)
		Nickel	32	32	100	16	310 J	110	0.32–3.8	Lognormal	95% Chebyshev (Mean, SD) UCL	170	170	(1)
		Thallium	32	18	56	3.1 J	95 J	18	0.65–14.5	Nonparametric	97.5% KM (Chebyshev) UCL	33	33	(1)
		Vanadium	32	32	100	17	130 J	59	0.14–1.5	Normal	95% Student's-t UCL	65	65	(1)
		Zinc	32	32	100	130	2100 J	620	1.2–9.1	Lognormal	95% Chebyshev (Mean, SD) UCL	950	950	(1)
	PAHs	Benzo[a]pyrene	6	6	100	0.11 J	0.98 J	0.37	0.0038–0.044	Normal	95% Student's-t UCL	0.65	0.65	(1)
		Dibenz[a,h]anthracene	6	6	100	0.023 J	0.36 J	0.13	0.0042–0.039	Lognormal	95% Chebyshev (Mean, SD) UCL	0.38	0.36	(3)
	Pesticides	Aldrin	5	3	60	0.0030 J	0.024 J	0.015	0.000070–0.00096	None	Maximum concentration	0.024	0.024	(4)
		Heptachlor	6	2	33	0.00092 J	0.0058 J	0.0034	0.000061–0.0012	None	Maximum concentration	0.0058	0.0058	(4)
		Heptachlor epoxide	6	3	50	0.0015 J	0.0092 J	0.0047	0.000053–0.0010	None	Maximum concentration	0.0092	0.0092	(4)
	Volatiles	Trichloroethene	6	0	0	--	--	--	0.00072–0.0066	None	Not detected	--	--	(2)
Ackerman's East Marsh	Metals	Mercury	32	32	100	0.49	100 J	18	0.019–20	Gamma	95% Adjusted Gamma UCL	26	26	(1)
	PCBs	PCBs (total Aroclors)	29	27	93	0.032 J	6.1 J	0.60	NA	Lognormal	97.5% KM (Chebyshev) UCL	1.9	1.9	(1)
	Metals	Aluminum	10	10	100	3,600 J	20,000 J	13,000	16–190	Normal	95% Student's-t UCL	16,000	16,000	(1)
		Antimony	10	4	40	2.0 J	4.8	2.9	1.0–19	Normal	95% KM (t) UCL	3.0	3.0	(1)
		Arsenic	10	10	100	11 J	36 J	19	0.80–19	Normal	95% Student's-t UCL	24	24	(1)
		Cadmium	10	10	100	0.53 J	5.6	2.8	0.086–4.8	Normal	95% Student's-t UCL	3.9	3.9	(1)
		Chromium (VI)	1	1	100	17	17	17	3.4–7.6	None	Maximum concentration	17	17	(4)
		Cobalt	10	9	90	7.8 J	95 J	26	0.19–48	Lognormal	95% KM (Chebyshev) UCL	62	62	(1)
		Copper	10	10	100	30	190 J	88	0.94–24	Normal	95% Student's-t UCL	120	120	(1)
		Iron	14	14	100	6,300 J	84,000 J	28,000	7.0–95	Lognormal	95% Chebyshev (Mean, SD) UCL	48,000	48,000	(1)
		Manganese	14	14	100	400	31,000 J	4,100	0.18–32	Lognormal	95% Chebyshev (Mean, SD) UCL	13,000	13,000	(1)
		Nickel	10	10	100	30 J	210 J	73	0.33–38	Normal	95% Student's-t UCL	100	100	(1)
		Thallium	10	3	30	0.57 J	100 J	35	0.53–22	None	Maximum concentration	100	100	(4)
		Vanadium	10	10	100	35 J	66 J	51	0.32–48	Normal	95% Student's-t UCL	57	57	(1)
		Zinc	10	10	100	130	540 J	360	2.0–19	Normal	95% Student's-t UCL	440	440	(1)
	PAHs	Benzo[a]pyrene	8	5	62	0.038	0.14 J	0.072	0.0011–0.087	Normal	95% KM (t) UCL	0.078	0.078	(1)
		Dibenz[a,h]anthracene	8	3	38	0.012	0.015 J	0.013	0.00099–0.097	None	Maximum concentration	0.015	0.015	(4)
	Pesticides	Aldrin	2	2	100	0.00074 J	0.0044 J	0.0026	0.00015–0.00021	None	Maximum concentration	0.0044	0.0044	(4)
		Heptachlor	2	0	0	--	--	--	0.00019–0.00026	None	Not detected	--	--	(2)
		Heptachlor epoxide	2	0	0	--	--	--	0.00018–0.00023	None	Not detected	--	--	(2)
	Volatiles	Trichloroethene	8	1	12	0.033 J	0.033 J	0.033	0.00058–0.0097	None	Maximum concentration	0.033	0.033	(4)

Table 12. EPCs for COPCs in Marsh Sediment (All Samples)

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Rutherford Marsh	Metals	Mercury	16	16	100	0.88	28 J	11	0.023–0.77	Normal	95% Student's-t UCL	13	13	(1)
	PCBs	PCBs (total Aroclors)	9	9	100	0.029 J	0.94 J	0.34	NA	Gamma	95% Adjusted Gamma UCL	1.1	0.94	(3)
	Metals	Aluminum	5	5	100	6,700 J	15,000 J	9,900	14–63.1	Normal	95% Student's-t UCL	13,000	13,000	(1)
		Antimony	5	1	20	1.2 J	1.2 J	1.2	0.56–2.6	None	Maximum concentration	1.2	1.2	(4)
		Arsenic	5	5	100	2.9	16 J	11	0.43–2.0	Normal	95% Student's-t UCL	16	16	(1)
		Cadmium	5	3	60	0.21 J	1.6 J	0.90	0.052–0.24	None	Maximum concentration	1.6	1.6	(4)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	5	5	100	5.5 J	14 J	10	0.23–1.1	Normal	95% Student's-t UCL	14	14	(1)
		Copper	5	5	100	29	160 J	100	1.1–4.9	Normal	95% Student's-t UCL	140	140	(1)
		Iron	7	7	100	10,000 J	34,000 J	20,000	7.0–32.2	Normal	95% Student's-t UCL	26,000	26,000	(1)
		Manganese	7	7	100	140	11,000 J	3,100	0.11–1.6	Lognormal	99% Chebyshev (Mean, SD) UCL	18,000	11,000	(3)
		Nickel	5	5	100	13	79 J	46	0.39–1.8	Normal	95% Student's-t UCL	71	71	(1)
		Thallium	5	4	80	1.8 J	6.7 J	4.3	0.79–3.6	Normal	95% KM (t) UCL	5.6	5.6	(1)
		Vanadium	5	5	100	32	58 J	44	0.17–0.79	Normal	95% Student's-t UCL	55	55	(1)
		Zinc	5	5	100	53	360 J	230	1.4–6.6	Normal	95% Student's-t UCL	360	360	(1)
	PAHs	Benzo[a]pyrene	4	4	100	0.071	0.32 J	0.24	0.0014–0.019	Normal	95% Student's-t UCL	0.37	0.32	(3)
		Dibenz[a,h]anthracene	4	2	50	0.016 J	0.059	0.038	0.0015–0.021	None	Maximum concentration	0.059	0.059	(4)
	Pesticides	Aldrin	4	2	50	0.0050 J	0.0056 J	0.0053	0.000060–0.00039	None	Maximum concentration	0.0056	0.0056	(4)
		Heptachlor	3	0	0	--	--	--	0.000074–0.00011	None	Not detected	--	--	(2)
		Heptachlor epoxide	3	2	67	0.0024 J	0.0027 J	0.0026	0.000065–0.00042	None	Maximum concentration	0.0027	0.0027	(4)
	Volatiles	Trichloroethene	4	0	0	--	--	--	0.0014–0.0065	None	Not detected	--	--	(2)
Tollgate Marsh	Metals	Mercury	15	15	100	0.19 J	15 J	6.8	0.019–1.4	Gamma	95% Adjusted Gamma UCL	11	11	(1)
	PCBs	PCBs (total Aroclors)	10	9	90	0.010 J	0.58 J	0.28	NA	Lognormal	97.5% KM (Chebyshev) UCL	0.73	0.58	(3)
	Metals	Aluminum	6	6	100	11,000 J	16,000 J	13,000	13.2–60.5	Normal	95% Student's-t UCL	15,000	15,000	(1)
		Antimony	6	0	0	--	--	--	0.54–2.5	None	Not detected	--	--	(2)
		Arsenic	6	6	100	9.2 J	21 J	13	0.41–1.9	Normal	95% Student's-t UCL	17	17	(1)
		Cadmium	6	6	100	0.55 J	1.6 J	0.87	0.050–0.23	Normal	95% Student's-t UCL	1.2	1.2	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	6	6	100	8.2 J	22 J	13	0.22–1.0	Normal	95% Student's-t UCL	17	17	(1)
		Copper	6	6	100	66 J	140 J	110	1.0–4.7	Normal	95% Student's-t UCL	130	130	(1)
		Iron	8	8	100	16,000 J	38,000 J	27,000	3.8–30.9	Normal	95% Student's-t UCL	32,000	32,000	(1)
		Manganese	8	8	100	310 J	2,200 J	1,200	0.099–0.91	Normal	95% Student's-t UCL	1,700	1,700	(1)
		Nickel	6	6	100	38 J	110 J	53	0.37–1.7	Approximate normal	95% Modified Student's-t UCL	77	77	(1)
		Thallium	6	4	67	1.8 J	3.4 J	2.7	0.76–3.5	Normal	95% KM (t) UCL	3.1	3.1	(1)
		Vanadium	6	6	100	29 J	61 J	44	0.17–0.76	Normal	95% Student's-t UCL	53	53	(1)
		Zinc	6	6	100	160 J	360 J	230	1.4–6.3	Normal	95% Student's-t UCL	290	290	(1)
	PAHs	Benzo[a]pyrene	3	3	100	0.071 J	0.27 J	0.16	0.0057–0.017	None	Maximum concentration	0.27	0.27	(4)
		Dibenz[a,h]anthracene	3	3	100	0.019 J	0.062 J	0.039	0.0063–0.014	None	Maximum concentration	0.062	0.062	(4)
	Pesticides	Aldrin	3	2	67	0.003 J	0.0078 J	0.0054	0.00031–0.00039	None	Maximum concentration	0.0078	0.0078	(4)
		Heptachlor	2	0	0	--	--	--	0.00039–0.00043	None	Not detected	--	--	(2)
		Heptachlor epoxide	2	0	0	--	--	--	0.00034–0.00038	None	Not detected	--	--	(2)
	Volatiles	Trichloroethene	3	0	0	--	--	--	0.0035–0.0037	None	Not detected	--	--	(2)

Table 12. EPCs for COPCs in Marsh Sediment (All Samples)

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Oritani Marsh	Metals	Mercury	21	21	100	0.26 J	7.8 J	2.6	0.00439–0.22	Normal	95% Student's-t UCL	3.2	3.2	(1)
	PCBs	PCBs (total Aroclors)	16	15	94	0.014 J	0.61 J	0.16	NA	Lognormal	97.5% KM (Chebyshev) UCL	0.43	0.43	(1)
	Metals	Aluminum	9	9	100	5,900 J	14,000 J	10,000	13.9–85.3	Normal	95% Student's-t UCL	12,000	12,000	(1)
		Antimony	9	6	67	1.0 J	3.2 J	2.3	0.57–3.5	Normal	95% KM (t) UCL	2.5	2.5	(1)
		Arsenic	9	9	100	12 J	29 J	18	0.43–2.7	Normal	95% Student's-t UCL	21	21	(1)
		Cadmium	9	4	44	0.24 J	0.92 J	0.60	0.052–0.32	Normal	95% KM (t) UCL	0.51	0.51	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	9	9	100	3.9 J	16 J	9.8	0.23–1.4	Normal	95% Student's-t UCL	13	13	(1)
		Copper	9	9	100	41 J	110 J	78	1.1–6.6	Normal	95% Student's-t UCL	91	91	(1)
		Iron	10	10	100	9,900 J	34,000 J	23,000	3.7–43.5	Normal	95% Student's-t UCL	28,000	28,000	(1)
		Manganese	10	10	100	90 J	640	370	0.097–0.66	Normal	95% Student's-t UCL	470	470	(1)
		Nickel	9	9	100	28 J	47 J	38	0.39–2.4	Normal	95% Student's-t UCL	42	42	(1)
		Thallium	9	3	33	1.8 J	3.4 J	2.4	0.80–4.9	None	Maximum concentration	3.4	3.4	(4)
		Vanadium	9	9	100	30 J	94 J	57	0.17–1.1	Normal	95% Student's-t UCL	74	74	(1)
		Zinc	9	9	100	120 J	250 J	170	1.4–8.9	Normal	95% Student's-t UCL	200	200	(1)
	PAHs	Benzo[a]pyrene	2	2	100	0.056 J	0.20 J	0.13	0.0019–0.0059	None	Maximum concentration	0.20	0.20	(4)
		Dibenz[a,h]anthracene	2	1	50	0.0083 J	0.0083 J	0.0083	0.0021–0.0066	None	Maximum concentration	0.0083	0.0083	(4)
	Pesticides	Aldrin	2	0	0	--	--	--	0.00021–0.00066	None	Not detected	--	--	(2)
		Heptachlor	2	1	50	0.0012 J	0.0012 J	0.0012	0.00026–0.00082	None	Maximum concentration	0.0012	0.0012	(4)
		Heptachlor epoxide	2	1	50	0.0023 J	0.0023 J	0.0023	0.00023–0.00072	None	Maximum concentration	0.0023	0.0023	(4)
	Volatiles	Trichloroethene	2	0	0	--	--	--	0.0017–0.0065	None	Not detected	--	--	(2)
Berry's Creek Marsh	Metals	Mercury	19	19	100	1.1 J	7.8 J	4.0	0.0173–0.28	Normal	95% Student's-t UCL	4.7	4.7	(1)
	PCBs	PCBs (total Aroclors)	15	15	100	0.023 J	0.61 J	0.19	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	0.38	0.38	(1)
	Metals	Aluminum	10	10	100	7,000 J	16,000 J	11,000	19.1–67.7	Normal	95% Student's-t UCL	13,000	13,000	(1)
		Antimony	10	7	70	1.0 J	3.8 J	2.3	0.78–2.7	Normal	95% KM (t) UCL	2.5	2.5	(1)
		Arsenic	10	10	100	10 J	34 J	20	0.60–2.1	Normal	95% Student's-t UCL	25	25	(1)
		Cadmium	10	9	90	0.25 J	2.6 J	1.0	0.072–0.25	Normal	95% KM (t) UCL	1.4	1.4	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	10	10	100	7.4 J	18 J	12	0.32–1.1	Normal	95% Student's-t UCL	14	14	(1)
		Copper	10	10	100	49 J	150 J	100	1.5–5.2	Normal	95% Student's-t UCL	120	120	(1)
		Iron	12	12	100	14,000 J	30,000 J	24,000	9.7–34.5	Normal	95% Student's-t UCL	26,000	26,000	(1)
		Manganese	12	12	100	330 J	4,500 J	1,100	0.15–0.80	Lognormal	95% Chebyshev (Mean, SD) UCL	2,600	2,600	(1)
		Nickel	10	10	100	40 J	94 J	61	0.54–1.9	Normal	95% Student's-t UCL	73	73	(1)
		Thallium	10	4	40	2.2 J	3.4 J	2.7	1.1–3.9	Normal	95% KM (t) UCL	2.6	2.6	(1)
		Vanadium	10	10	100	40 J	70 J	56	0.24–0.85	Normal	95% Student's-t UCL	63	63	(1)
		Zinc	10	10	100	130 J	390 J	250	2.0–7.0	Normal	95% Student's-t UCL	300	300	(1)
	PAHs	Benzo[a]pyrene	3	3	100	0.11 J	0.30 J	0.18	0.0036–0.021	None	Maximum concentration	0.30	0.30	(4)
		Dibenz[a,h]anthracene	3	3	100	0.02 J	0.077 J	0.053	0.0040–0.016	None	Maximum concentration	0.077	0.077	(4)
	Pesticides	Aldrin	3	0	0	--	--	--	0.00021–0.00081	None	Not detected	--	--	(2)
		Heptachlor	3	0	0	--	--	--	0.00026–0.0010	None	Not detected	--	--	(2)
		Heptachlor epoxide	3	1	33	0.0015 J	0.0015 J	0.0015	0.00022–0.00088	None	Maximum concentration	0.0015	0.0015	(4)
	Volatiles	Trichloroethene	3	0	0	--	--	--	0.0036–0.0046	None	Not detected	--	--	(2)

Table 12. EPCs for COPCs in Marsh Sediment (All Samples)

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
Former ENCAP Restoration Area	Metals	Mercury	5	5	100	1.7 J	8.3 J	4.5	0.024–0.092	Normal	95% Student's-t UCL	6.9	6.9	(1)
	PCBs	PCBs (total Aroclors)	4	4	100	0.097 J	0.21 J	0.14	NA	Normal	95% Student's-t UCL	0.20	0.20	(1)
	Metals	Aluminum	1	1	100	8,600 J	8,600 J	8,600	45.2–57.4	None	Maximum concentration	8,600	8,600	(4)
		Antimony	1	0	0	--	--	--	1.8–2.3	None	Not detected	--	--	(2)
		Arsenic	1	1	100	15 J	15 J	15	1.4–1.8	None	Maximum concentration	15	15	(4)
		Cadmium	1	0	0	--	--	--	0.17–0.22	None	Not detected	--	--	(2)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	1	1	100	6.8 J	6.8 J	6.8	0.75–0.96	None	Maximum concentration	6.8	6.8	(4)
		Copper	1	1	100	110 J	110 J	110	3.5–4.4	None	Maximum concentration	110	110	(4)
		Iron	1	1	100	14,000 J	14,000 J	14,000	23–29.3	None	Maximum concentration	14,000	14,000	(4)
		Manganese	1	1	100	160 J	160 J	160	0.35–0.44	None	Maximum concentration	160	160	(4)
		Nickel	1	1	100	42 J	42 J	42	1.3–1.6	None	Maximum concentration	42	42	(4)
		Thallium	1	0	0	--	--	--	2.6–3.3	None	Not detected	--	--	(2)
		Vanadium	1	1	100	78 J	78 J	78	0.56–0.72	None	Maximum concentration	78	78	(4)
		Zinc	1	1	100	140 J	140 J	140	4.7–6.0	None	Maximum concentration	140	140	(4)
	PAHs	Benzo[a]pyrene	1	1	100	0.35 J	0.35 J	0.35	0.016–0.016	None	Maximum concentration	0.35	0.35	(4)
		Dibenz[a,h]anthracene	1	0	0	--	--	--	0.017–0.017	None	Not detected	--	--	(2)
	Pesticides	Aldrin	1	1	100	0.0016 J	0.0016 J	0.0016	0.00035–0.00035	None	Maximum concentration	0.0016	0.0016	(4)
		Heptachlor	1	0	0	--	--	--	0.00044–0.00044	None	Not detected	--	--	(2)
		Heptachlor epoxide	1	1	100	0.0020 J	0.0020 J	0.0020	0.00038–0.00038	None	Maximum concentration	0.0020	0.0020	(4)
	Volatiles	Trichloroethene	1	0	0	--	--	--	0.0035–0.0035	None	Not detected	--	--	(2)

Notes:

COPC = chemical of potential concern
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
KM = Kaplan Meier
n = sample size
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SD = standard deviation
UCL = upper confidence limit
-- = no data/not applicable

(1) The 95 UCL is selected as the exposure point concentration.
(2) Not detected.
(3) The 95 UCL is greater than maximum detected value; therefore, the maximum detected value is selected as the exposure point concentration.
(4) Less than 4 detected values; therefore, the maximum concentration is selected as the exposure point concentration.
(6) No available data.

Table 13. EPCs for COPCs in Waterway Sediment (All Samples)

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
UPIC	Metals	Mercury	20	20	100	9.7 J	350 J	120	0.017–11	Lognormal	95% Chebyshev (Mean, SD) UCL	210	210	(1)
	PCBs	PCBs (total Aroclors)	20	20	100	1.5 J	17 J	6.2	NA	Lognormal	95% Chebyshev (Mean, SD) UCL	11	11	(1)
	Metals	Aluminum	19	19	100	7,100 J	20,000 J	13,000	16–50	Normal	95% Student's-t UCL	14,000	14,000	(1)
		Antimony	19	11	58	0.77 J	4.1 J	1.8	0.66–2.0	Approximate normal	95% KM (t) UCL	1.9	1.9	(1)
		Arsenic	19	19	100	7.2 J	120 J	34	0.51–1.6	Normal	95% Student's-t UCL	45	45	(1)
		Cadmium	19	19	100	4.0 J	190 J	48	0.061–0.19	Lognormal	95% Chebyshev (Mean, SD) UCL	92	92	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	19	17	89	7.2 J	31 J	15	0.14–0.83	Normal	95% KM (t) UCL	16	16	(1)
		Copper	19	19	100	140 J	3500 J	930	0.68–3.8	Lognormal	95% Chebyshev (Mean, SD) UCL	1,800	1,800	(1)
		Iron	19	19	100	17,000 J	48,000 J	29,000	8.3–25	Normal	95% Student's-t UCL	33,000	33,000	(1)
		Manganese	19	19	100	190 J	920 J	470	0.13–0.38	Normal	95% Student's-t UCL	560	560	(1)
		Nickel	19	19	100	29 J	870 J	230	0.24–1.4	Normal	95% Student's-t UCL	310	310	(1)
		Thallium	19	7	37	1.1 J	7.6 J	3.9	0.38–2.9	Normal	95% KM (t) UCL	2.7	2.7	(1)
		Vanadium	19	19	100	26 J	74 J	49	0.20–0.62	Normal	95% Student's-t UCL	55	55	(1)
		Zinc	19	19	100	480 J	6,600 J	2,100	1.7–19	Normal	95% Student's-t UCL	2,700	2,700	(1)
	PAHs	Benzo[a]pyrene	13	13	100	0.28 J	1.6 J	0.95	0.0056–0.047	Normal	95% Student's-t UCL	1.2	1.2	(1)
		Dibenz[a,h]anthracene	13	13	100	0.049 J	0.54 J	0.24	0.0063–0.037	Normal	95% Student's-t UCL	0.31	0.31	(1)
	Pesticides	Aldrin	13	3	23	0.013 J	0.05 J	0.028	0.00016–0.0014	None	Maximum concentration	0.050	0.050	(4)
		Heptachlor	4	1	25	0.029 J	0.029 J	0.029	0.00025–0.0015	None	Maximum concentration	0.029	0.029	(4)
		Heptachlor epoxide	13	9	69	0.0054 J	0.11	0.042	0.00017–0.0015	Normal	95% KM (t) UCL	0.044	0.044	(1)
	Volatiles	Trichloroethene	10	1	10	27	27	27	0.0011–0.18	None	Maximum concentration	27	27	(4)
UBC	Metals	Mercury	146	146	100	0.53 J	1400 J	90	0.014–40.4	Lognormal	95% Chebyshev (Mean, SD) UCL	150	150	(1)
	PCBs	PCBs (total Aroclors)	141	141	100	0.0073	24 J	2.6	NA	Nonparametric	95% Chebyshev (Mean, SD) UCL	4.0	4.0	(1)
	Metals	Aluminum	113	113	100	1,800	20,000 J	10,000	8.0–68	Normal	95% Student's-t UCL	11,000	11,000	(1)
		Antimony	114	23	20	0.56 J	14 J	2.7	0.32–3.0	Nonparametric	95% KM (t) UCL	1.3	1.3	(1)
		Arsenic	114	114	100	2.9	96 J	20	0.25–3.0	Lognormal	95% Chebyshev (Mean, SD) UCL	26	26	(1)
		Cadmium	114	113	99	0.14 J	67 J	9.4	0.030–0.76	Nonparametric	95% KM (Chebyshev) UCL	14	14	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	114	112	98	2.5 J	26 J	11	0.13–7.6	Normal	95% KM (t) UCL	12	12	(1)
		Copper	113	113	100	14	1,200 J	180	0.61–5.2	Gamma	95% Approximate Gamma UCL	210	210	(1)
		Iron	115	115	100	5,100	42,000 J	24,000	4.1–34	Normal	95% Student's-t UCL	26,000	26,000	(1)
		Manganese	114	114	100	70 J	1,600 J	480	0.061–2.3	Gamma	95% Approximate Gamma UCL	540	540	(1)
		Nickel	114	114	100	8.6	170 J	45	0.22–6.1	Gamma	95% Approximate Gamma UCL	50	50	(1)
		Thallium	114	36	32	0.71 J	6.5 J	2.5	0.46–3.9	Lognormal	95% KM (t) UCL	1.6	1.6	(1)
		Vanadium	114	114	100	6.0 J	97 J	34	0.099–7.6	Normal	95% Student's-t UCL	36	36	(1)
		Zinc	112	112	100	66 J	7,600 J	1,100	0.83–53.8	Nonparametric	95% Chebyshev (Mean, SD) UCL	1,700	1,700	(1)
	PAHs	Benzo[a]pyrene	79	79	100	0.0055 J	5.3 J	0.93	0.00086–0.058	Nonparametric	95% Chebyshev (Mean, SD) UCL	1.3	1.3	(1)
		Dibenz[a,h]anthracene	79	72	91	0.049 J	1.3 J	0.35	0.00096–0.064	Lognormal	95% KM (BCA) UCL	0.38	0.38	(1)
	Pesticides	Aldrin	68	33	49	0.0013 J	0.22 J	0.036	0.000048–0.0088	Lognormal	95% KM (BCA) UCL	0.026	0.026	(1)
		Heptachlor	42	9	21	0.00062 J	0.058 J	0.018	0.000060–0.012	Lognormal	97.5% KM (Chebyshev) UCL	0.015	0.015	(1)
		Heptachlor epoxide	65	61	94	0.00039 J	0.18 J	0.030	0.000052–0.011	Nonparametric	95% KM (Chebyshev) UCL	0.047	0.047	(1)
	Volatiles	Trichloroethene	57	1	2	0.0015 J	0.0015 J	0.0015	0.00079–0.0081	None	Maximum concentration	0.0015	0.0015	(4)

Table 13. EPCs for COPCs in Waterway Sediment (All Samples)

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
MBC	Metals	Mercury	164	163	99	0.019 J	240 J	27	0.014–52	Nonparametric	95% KM (Chebyshev) UCL	38	38	(1)
	PCBs	PCBs (total Aroclors)	163	162	99	0.0098	33 J	3.0	NA	Nonparametric	95% KM (Chebyshev) UCL	4.6	4.6	(1)
	Metals	Aluminum	122	122	100	2,000	21,000	12,000	11–97	Normal	95% Student's-t UCL	12,000	12,000	(1)
		Antimony	122	14	11	0.64 J	6.5	2.2	0.46–9.7	Lognormal	95% KM (t) UCL	0.87	0.87	(1)
		Arsenic	122	122	100	2.9	75 J	15	0.35–9.7	Nonparametric	95% Chebyshev (Mean, SD) UCL	18	18	(1)
		Cadmium	122	113	93	0.50 J	27 J	4.1	0.042–2.4	Nonparametric	95% KM (BCA) UCL	4.4	4.4	(1)
		Chromium (VI)	5	4	80	1.1	4.4	2.7	0.94–3.5	Normal	95% KM (t) UCL	3.8	3.8	(1)
		Cobalt	122	106	87	2.5 J	22 J	11	0.12–24	Normal	95% KM (t) UCL	11	11	(1)
		Copper	122	122	100	3.9	290 J	110	0.59–12	Nonparametric	95% Chebyshev (Mean, SD) UCL	130	130	(1)
		Iron	123	123	100	6,700	100,000 J	28,000	5.8–110	Approximate normal	95% Modified Student's-t UCL	30,000	30,000	(1)
		Manganese	123	123	100	87 J	2,600 J	560	0.087–7.2	Nonparametric	95% Chebyshev (Mean, SD) UCL	700	700	(1)
		Nickel	122	122	100	8.5	78 J	35	0.21–19	Normal	95% Student's-t UCL	37	37	(1)
		Thallium	122	24	20	0.86 J	5.6 J	2.2	0.33–10	Normal	95% KM (t) UCL	1.1	1.1	(1)
		Vanadium	122	122	100	7.8 J	66 J	31	0.14–24	Normal	95% Student's-t UCL	33	33	(1)
		Zinc	122	122	100	45	2300 J	470	1.2–11	Nonparametric	95% Chebyshev (Mean, SD) UCL	600	600	(1)
	PAHs	Benzo[a]pyrene	84	82	98	0.045	4.3 J	0.67	0.00060–0.058	Lognormal	95% KM (BCA) UCL	0.78	0.78	(1)
		Dibenz[a,h]anthracene	84	74	88	0.011	0.93 J	0.21	0.00051–0.040	Lognormal	95% KM (Chebyshev) UCL	0.28	0.28	(1)
	Pesticides	Aldrin	63	24	38	0.0028 J	0.086 J	0.026	0.000051–0.0041	Normal	95% KM (t) UCL	0.014	0.014	(1)
		Heptachlor	41	5	12	0.0047 J	0.034 J	0.022	0.00011–0.0051	Normal	95% KM (t) UCL	0.0048	0.0048	(1)
		Heptachlor epoxide	63	47	75	0.0014 J	0.15 J	0.027	0.000050–0.0044	Lognormal	95% KM (BCA) UCL	0.028	0.028	(1)
	Volatiles	Trichloroethene	71	1	1	0.0012 J	0.0012 J	0.0012	0.00039–0.0069	None	Maximum concentration	0.0012	0.0012	(4)
BCC	Metals	Mercury	55	55	100	0.31 J	31 J	8.1	0.0162–2.0	Gamma	95% Approximate Gamma UCL	11	11	(1)
	PCBs	PCBs (total Aroclors)	52	51	98	0.058 J	3.0 J	0.82	NA	Gamma	95% KM (Approximate Gamma) UCL	0.99	0.99	(1)
	Metals	Aluminum	44	44	100	2,300 J	17,000 J	10,000	12.4–85	Normal	95% Student's-t UCL	11,000	11,000	(1)
		Antimony	44	8	18	1.4 J	4.3 J	2.3	0.50–3.5	Normal	95% KM (t) UCL	1.0	1.0	(1)
		Arsenic	44	44	100	2.3	38 J	12	0.39–2.7	Approximate normal	95% Modified Student's-t UCL	14	14	(1)
		Cadmium	44	43	98	0.32 J	11 J	2.4	0.046–0.32	Lognormal	95% KM (Chebyshev) UCL	3.7	3.7	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	44	37	84	2.2 J	15 J	9.4	0.21–1.4	Approximate normal	95% KM (t) UCL	8.9	8.9	(1)
		Copper	44	44	100	16	300 J	99	0.95–6.6	Nonparametric	95% Chebyshev (Mean, SD) UCL	130	130	(1)
		Iron	44	44	100	6,100 J	54,000 J	25,000	6.3–44	Approximate normal	95% Modified Student's-t UCL	27,000	27,000	(1)
		Manganese	44	44	100	70 J	650 J	360	0.095–0.66	Normal	95% Student's-t UCL	390	390	(1)
		Nickel	44	43	98	7.9 J	78 J	32	0.35–2.4	Approximate normal	95% KM (t) UCL	35	35	(1)
		Thallium	44	13	30	1.1 J	4.2 J	2.1	0.71–4.9	Normal	95% KM (t) UCL	1.5	1.5	(1)
		Vanadium	44	42	95	6.3 J	75 J	28	0.15–1.1	Approximate normal	95% KM (t) UCL	29	29	(1)
		Zinc	44	44	100	52	1,200 J	290	1.3–8.9	Gamma	95% Adjusted Gamma UCL	360	360	(1)
	PAHs	Benzo[a]pyrene	43	42	98	0.061 J	1.7 J	0.68	0.0036–0.14	Normal	95% KM (t) UCL	0.75	0.75	(1)
		Dibenz[a,h]anthracene	43	38	88	0.032 J	0.55 J	0.14	0.0040–0.11	Lognormal	95% KM (Chebyshev) UCL	0.18	0.18	(1)
	Pesticides	Aldrin	43	26	60	0.00055 J	0.035 J	0.012	0.000096–0.0024	Gamma	95% KM (Adjusted Gamma) UCL	0.010	0.010	(1)
		Heptachlor	38	14	37	0.0034 J	0.024 J	0.013	0.00012–0.0030	Normal	95% KM (t) UCL	0.0066	0.0066	(1)
		Heptachlor epoxide	39	24	62	0.00037 J	0.029 J	0.0075	0.00010–0.0026	Lognormal	95% KM (BCA) UCL	0.0066	0.0066	(1)
	Volatiles	Trichloroethene	37	0	0	--	--	--	0.00070–0.0056	None	Not detected	--	--	(2)

Table 13. EPCs for COPCs in Waterway Sediment (All Samples)

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale
LBC	Metals	Mercury	89	88	99	0.046 J	39 J	5.4	0.018–0.84	Nonparametric	95% KM (Chebyshev) UCL	8.2	8.2	(1)
	PCBs	PCBs (total Aroclors)	86	83	97	0.016 J	2.5 J	0.56	NA	Gamma	95% KM (Approximate Gamma) UCL	0.62	0.62	(1)
	Metals	Aluminum	74	74	100	3,200 J	19,000 J	12,000	12–46.5	Approximate normal	95% Modified Student's-t UCL	13,000	13,000	(1)
		Antimony	74	9	12	1.0 J	2.5 J	1.4	0.49–1.9	Approximate normal	95% KM (t) UCL	0.68	0.68	(1)
		Arsenic	74	74	100	3.1	75 J	16	0.37–1.5	Lognormal	95% Chebyshev (Mean, SD) UCL	22	22	(1)
		Cadmium	74	72	97	0.14 J	20 J	2.7	0.045–0.17	Nonparametric	95% KM (BCA) UCL	3.4	3.4	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	74	74	100	4.1 J	20 J	11	0.20–0.77	Normal	95% Student's-t UCL	12	12	(1)
		Copper	74	74	100	12	310 J	110	0.92–3.6	Gamma	95% Approximate Gamma UCL	130	130	(1)
		Iron	74	74	100	12,000 J	59,000 J	32,000	6.1–23.7	Normal	95% Student's-t UCL	33,000	33,000	(1)
		Manganese	74	74	100	110 J	870 J	410	0.092–0.62	Approximate normal	95% Modified Student's-t UCL	440	440	(1)
		Nickel	74	74	100	12 J	120 J	38	0.34–2.1	Approximate normal	95% Modified Student's-t UCL	41	41	(1)
		Thallium	74	22	30	1.1 J	4.8 J	2.1	0.69–2.7	Approximate normal	95% KM (t) UCL	1.3	1.3	(1)
		Vanadium	74	74	100	11	71	34	0.15–0.82	Approximate normal	95% Modified Student's-t UCL	36	36	(1)
		Zinc	74	74	100	64	4,000	350	1.2–6.8	Nonparametric	95% Chebyshev (Mean, SD) UCL	580	580	(1)
	PAHs	Benzo[a]pyrene	62	60	97	0.040	7.9 J	0.76	0.0021–0.23	Nonparametric	95% KM (Chebyshev) UCL	1.3	1.3	(1)
		Dibenz[a,h]anthracene	62	51	82	0.015 J	1.8 J	0.20	0.0024–0.18	Lognormal	95% KM (Chebyshev) UCL	0.31	0.31	(1)
	Pesticides	Aldrin	62	40	65	0.0018 J	0.051 J	0.0061	0.000093–0.00090	Lognormal	95% KM (BCA) UCL	0.0061	0.0061	(1)
		Heptachlor	57	10	18	0.00039 J	0.0035 J	0.0016	0.00012–0.0011	Normal	95% KM (t) UCL	0.00056	0.00056	(1)
		Heptachlor epoxide	46	19	41	0.00059 J	0.029 J	0.0038	0.00011–0.00098	Lognormal	95% KM (t) UCL	0.0027	0.0027	(1)
	Volatiles	Trichloroethene	59	1	2	0.0031 J	0.0031 J	0.0031	0.00076–0.0030	None	Maximum concentration	0.0031	0.0031	(4)
Reference Sites	Metals	Mercury	42	38	90	0.030 J	14 J	2.6	0.014–0.29	Lognormal	95% KM (Chebyshev) UCL	4.4	4.4	(1)
	PCBs	PCBs (total Aroclors)	38	31	82	0.014 J	7.0 J	0.72	NA	Lognormal	97.5% KM (Chebyshev) UCL	2.0	2.0	(1)
	Metals	Aluminum	38	38	100	2,700	21,000 J	10,000	10–70	Gamma	95% Adjusted Gamma UCL	13,000	13,000	(1)
		Antimony	38	2	5	0.50 J	2.1 J	1.3	0.41–7.0	None	Maximum concentration	2.1	2.1	(4)
		Arsenic	38	38	100	2.6 J	26 J	10	0.32–7.0	Normal	95% Student's-t UCL	12	12	(1)
		Cadmium	38	29	76	0.065 J	17 J	2.3	0.038–1.8	Lognormal	97.5% KM (Chebyshev) UCL	5.2	5.2	(1)
		Chromium (VI)	--	--	--	--	--	--	NA	--	--	--	--	(6)
		Cobalt	38	33	87	2.7 J	17 J	9.3	0.17–18	Normal	95% KM (t) UCL	10	10	(1)
		Copper	38	38	100	16	440 J	110	0.79–8.8	Lognormal	95% Chebyshev (Mean, SD) UCL	180	180	(1)
		Iron	38	38	100	7,500 J	72,000 J	25,000	5.2–35	Lognormal	95% Chebyshev (Mean, SD) UCL	35,000	35,000	(1)
		Manganese	38	38	100	75 J	610 J	270	0.079–5.3	Normal	95% Student's-t UCL	310	310	(1)
		Nickel	38	38	100	6.1 J	79	32	0.29–14	Gamma	95% Adjusted Gamma UCL	39	39	(1)
		Thallium	38	4	11	1.5	2.8 J	2.0	0.59–3.5	Normal	95% KM (t) UCL	0.87	0.87	(1)
		Vanadium	38	38	100	6.0 J	96 J	31	0.13–18	Lognormal	95% Chebyshev (Mean, SD) UCL	45	45	(1)
		Zinc	37	37	100	51 J	1000 J	290	1.1–7.0	Lognormal	95% Chebyshev (Mean, SD) UCL	440	440	(1)
	PAHs	Benzo[a]pyrene	38	36	95	0.049 J	3.5 J	0.82	0.0017–0.038	Gamma	95% KM (Adjusted Gamma) UCL	1.1	1.1	(1)
		Dibenz[a,h]anthracene	38	31	82	0.018 J	0.81 J	0.24	0.0019–0.035	Lognormal	95% KM (Chebyshev) UCL	0.34	0.34	(1)
	Pesticides	Aldrin	31	8	26	0.00079 J	0.041 J	0.0080	0.000049–0.0012	Lognormal	95% KM (BCA) UCL	0.0048	0.0048	(1)
		Heptachlor	21	1	5	0.0012 J	0.0012 J	0.0012	0.00011–0.0015	None	Maximum concentration	0.0012	0.0012	(4)
		Heptachlor epoxide	30	12	40	0.00053 J	0.096 J	0.019	0.000053–0.0013	Nonparametric	97.5% KM (Chebyshev) UCL	0.034	0.034	(1)
	Volatiles	Trichloroethene	26	0	0	--	--	--	0.00075–0.0035	None	Not detected	--	--	(2)

Table 13. EPCs for COPCs in Waterway Sediment (All Samples)

Exposure Unit	Chemical Class	Chemical	n	n (Detect)	FOD (%)	Minimum (Detect) (mg/kg)	Maximum (Detect) (mg/kg)	Arithmetic Mean (Detects) (mg/kg)	Detection Limit Range (mg/kg)	Distribution	UCL Method	95 UCL (mg/kg)	EPC (mg/kg)	Rationale

Notes:

BCA = bias-corrected accelerated bootstrap method
BCC = Berry's Creek Canal
COPC = chemical of potential concern
EPC = exposure point concentration
FOD = frequency of detection
J = estimated value
KM = Kaplan Meier
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
n = sample size
NA = not available
PAH = polycyclic aromatic hydrocarbon
PBC = polychlorinated biphenyl
SD = standard deviation
UBC = Upper Berry's Creek
UCL = upper confidence limit
-- = no data/not applicable

(1) The 95 UCL is selected as the exposure point concentration.
(2) Not detected.
(4) Less than 4 detected values; therefore, the maximum concentration is selected as the exposure point concentration.
(6) No available data.

Table 14. Excess Lifetime Cancer Risks and Noncancer Hazards from Ingestion of Large Perch and Target Size Perch

Exposure Unit	Exposure Medium	Chemical	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard Younger Child ADD (mg/kg-day)	Noncancer Hazard Younger Child HQ	Noncancer Hazard Older Child ADD (mg/kg-day)	Noncancer Hazard Older Child HQ	Noncancer Hazard Adult ADD (mg/kg-day)	Noncancer Hazard Adult HQ
UBC	Target Size Perch	Mercury (inorganic)	0.10	9.4E-07	--	3.7E-06	0.012	2.3E-06	0.0076	2.1E-06	0.0069
		Methyl mercury	0.48	4.4E-06	--	1.7E-05	0.17	1.1E-05	0.11	9.7E-06	0.097
		PCBs (total Aroclors)	1.5	1.4E-05	2.7E-05	5.3E-05	2.6	3.3E-05	1.6	3.0E-05	1.5
		Selenium	0.79	7.3E-06	--	2.8E-05	0.0057	1.8E-05	0.0035	1.6E-05	0.0032
		All COPCs	--	--	2.7E-05	--	2.9	--	1.8	--	1.6
	Large Perch	Mercury (inorganic)	0.34	3.1E-06	--	1.2E-05	0.041	7.6E-06	0.025	6.9E-06	0.02
		Methyl mercury	0.98	9.1E-06	--	3.5E-05	0.35	2.2E-05	0.22	2.0E-05	0.20
		PCBs (total Aroclors)	2.2	2.0E-05	4.1E-05	7.9E-05	4.0	4.9E-05	2.5	4.5E-05	2.2
		Selenium	0.75	6.9E-06	--	2.7E-05	0.0054	1.7E-05	0.0033	1.5E-05	0.0031
		All COPCs	--	--	4.1E-05	--	4.5	--	2.8	--	2.5
MBC	Target Size Perch	Mercury (inorganic)	0.21	1.9E-06	--	7.6E-06	0.025	4.7E-06	0.016	4.3E-06	0.01
		Methyl mercury	0.41	3.8E-06	--	1.5E-05	0.15	9.2E-06	0.092	8.4E-06	0.084
		PCBs (total Aroclors)	1.2	1.1E-05	2.1E-05	4.2E-05	2.1	2.6E-05	1.3	2.3E-05	1.2
		Selenium	0.84	7.7E-06	--	3.0E-05	0.0060	1.9E-05	0.0037	1.7E-05	0.0034
		All COPCs	--	--	2.1E-05	--	2.3	--	1.4	--	1.3
	Large Perch	Mercury (inorganic)	0.56	5.2E-06	--	2.0E-05	0.068	1.3E-05	0.042	1.1E-05	0.04
		Methyl mercury	0.56	5.1E-06	--	2.0E-05	0.20	1.2E-05	0.12	1.1E-05	0.11
		PCBs (total Aroclors)	1.3	1.2E-05	2.4E-05	4.6E-05	2.3	2.9E-05	1.4	2.6E-05	1.3
		Selenium	1.1	1.0E-05	--	4.0E-05	0.0079	2.5E-05	0.0049	2.2E-05	0.0045
		All COPCs	--	--	2.4E-05	--	2.6	--	1.6	--	1.5
BCC	Target Size Perch	Mercury (inorganic)	0.12	1.1E-06	--	4.5E-06	0.015	2.8E-06	0.0093	2.5E-06	0.01
		Methyl mercury	0.39	3.6E-06	--	1.4E-05	0.14	8.6E-06	0.086	7.9E-06	0.079
		PCBs (total Aroclors)	1.2	1.1E-05	2.2E-05	4.2E-05	2.1	2.6E-05	1.3	2.4E-05	1.2
		Selenium	0.95	8.8E-06	--	3.4E-05	0.0069	2.1E-05	0.0042	1.9E-05	0.0039
		All COPCs	--	--	2.2E-05	--	2.3	--	1.4	--	1.3
	Large Perch	Mercury (inorganic)	0.18	1.7E-06	--	6.5E-06	0.022	4.0E-06	0.013	3.7E-06	0.01
		Methyl mercury	0.59	5.4E-06	--	2.1E-05	0.21	1.3E-05	0.13	1.2E-05	0.12
		PCBs (total Aroclors)	0.24	2.2E-06	4.4E-06	8.5E-06	0.43	5.3E-06	0.26	4.8E-06	0.24
		Selenium	--	--	--	--	--	--	--	--	--
		All COPCs	--	--	4.4E-06	--	0.73	--	0.45	--	0.41

Table 14. Excess Lifetime Cancer Risks and Noncancer Hazards from Ingestion of Large Perch and Target Size Perch

Exposure Unit	Exposure Medium	Chemical	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard Younger Child ADD (mg/kg-day)	Noncancer Hazard Younger Child HQ	Noncancer Hazard Older Child ADD (mg/kg-day)	Noncancer Hazard Older Child HQ	Noncancer Hazard Adult ADD (mg/kg-day)	Noncancer Hazard Adult HQ
LBC	Target Size Perch	Mercury (inorganic)	0.14	1.3E-06	--	5.1E-06	0.017	3.2E-06	0.011	2.9E-06	0.010
		Methyl mercury	0.34	3.2E-06	--	1.2E-05	0.12	7.7E-06	0.077	7.0E-06	0.070
		PCBs (total Aroclors)	0.64	5.9E-06	1.2E-05	2.3E-05	1.2	1.4E-05	0.72	1.3E-05	0.65
		Selenium	0.75	6.9E-06	--	2.7E-05	0.0054	1.7E-05	0.0033	1.5E-05	0.0030
		All COPCs	--	--	1.2E-05	--	1.3	--	0.82	--	0.75
	Large Perch	Mercury (inorganic)	0.49	4.5E-06	--	1.8E-05	0.059	1.1E-05	0.036	1.0E-05	0.033
		Methyl mercury	0.41	3.8E-06	--	1.5E-05	0.15	9.2E-06	0.092	8.4E-06	0.084
		PCBs (total Aroclors)	0.47	4.3E-06	8.6E-06	1.7E-05	0.84	1.0E-05	0.52	9.5E-06	0.48
		Selenium	--	--	--	--	--	--	--	--	--
		All COPCs	--	--	8.6E-06	--	1.1	--	0.66	--	0.61
Reference Sites	Target Size Perch	Mercury (inorganic)	0.045	4.1E-07	--	1.6E-06	0.0054	1.0E-06	0.0033	9.1E-07	0.0030
		Methyl mercury	0.26	2.4E-06	--	9.4E-06	0.094	5.8E-06	0.058	5.3E-06	0.053
		PCBs (total Aroclors)	0.66	6.1E-06	1.2E-05	2.4E-05	1.2	1.5E-05	0.73	1.3E-05	0.67
		Selenium	0.82	7.5E-06	--	2.9E-05	0.0059	1.8E-05	0.0036	1.7E-05	0.0033
		All COPCs	--	--	1.2E-05	--	1.3	--	0.81	--	0.74
	Large Perch	Mercury (inorganic)	0.18	1.6E-06	--	6.4E-06	0.021	3.9E-06	0.013	3.6E-06	0.0120
		Methyl mercury	0.53	4.9E-06	--	1.9E-05	0.19	1.2E-05	0.12	1.1E-05	0.11
		PCBs (total Aroclors)	0.88	8.1E-06	1.6E-05	3.2E-05	1.6	2.0E-05	0.98	1.8E-05	0.90
		Selenium	1.6	1.5E-05	--	5.8E-05	0.012	3.6E-05	0.0072	3.3E-05	0.0066
		All COPCs	--	--	1.6E-05	--	1.9	--	1.1	--	1.0

Notes:

ADD = average daily dose
BCC = Berry's Creek Canal
COPC = chemical of potential concern
EPC = exposure point concentration
HQ = hazard quotient
LADD = lifetime average daily dose
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PBC = polychlorinated biphenyl
UBC = Upper Berry's Creek
-- = no data/not applicable

Table 15. Excess Lifetime Cancer Risks and Noncancer Hazards from TEQ, Angler

Exposure Unit	Exposure Medium	Exposure Route	Chemical	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard Younger Child ADD (mg/kg-day)	Noncancer Hazard Younger Child HQ	Noncancer Hazard Older Child ADD (mg/kg-day)	Noncancer Hazard Older Child HQ	Noncancer Hazard Adult ADD (mg/kg-day)	Noncancer Hazard Adult HQ
UBC	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.000065	2.4E-12	3.5E-07	--	--	9.8E-12	0.014	6.0E-12	0.0085
		Dermal	TEQ_{df}	0.000065	6.1E-13	9.1E-08	--	--	1.8E-12	0.0026	2.6E-12	0.0037
	White perch fillet	Ingestion	TEQ_{df}	0.000021	2.0E-10	2.9E-05	7.6E-10	1.1	4.7E-10	0.68	4.3E-10	0.62
		Ingestion	TEQ_{p}	0.000047	4.3E-10	6.4E-05	1.7E-09	2.4	1.0E-09	1.5	9.5E-10	1.4
MBC	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.00011	4.1E-12	6.1E-07	--	--	1.7E-11	0.024	1.0E-11	0.015
		Dermal	TEQ_{df}	0.00011	1.0E-12	1.6E-07	--	--	3.1E-12	0.0045	4.4E-12	0.0063
	White perch fillet	Ingestion	TEQ_{df}	0.000023	2.2E-10	3.3E-05	8.5E-10	1.2	5.2E-10	0.75	4.8E-10	0.68
		Ingestion	TEQ_{p}	0.000034	3.1E-10	4.7E-05	1.2E-09	1.7	7.5E-10	1.1	6.8E-10	0.98
BCC	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.00017	6.2E-12	9.3E-07	--	--	2.6E-11	0.037	1.6E-11	0.022
		Dermal	TEQ_{df}	0.00017	1.6E-12	2.4E-07	--	--	4.8E-12	0.0069	6.7E-12	0.0096
	White perch fillet	Ingestion	TEQ_{df}	0.00010	9.6E-10	1.4E-04	3.7E-09	5.3	2.3E-09	3.3	2.1E-09	3.0
		Ingestion	TEQ_{p}	0.000027	2.5E-10	3.8E-05	9.8E-10	1.4	6.1E-10	0.87	5.5E-10	0.79
LBC	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.00015	5.3E-12	8.0E-07	--	--	2.2E-11	0.032	1.4E-11	0.019
		Dermal	TEQ_{df}	0.00015	1.4E-12	2.1E-07	--	--	4.1E-12	0.0059	5.8E-12	0.0083
	White perch fillet	Ingestion	TEQ_{df}	0.000042	3.9E-10	5.8E-05	1.5E-09	2.2	9.4E-10	1.3	8.5E-10	1.2
		Ingestion	TEQ_{p}	0.000039	3.6E-10	5.4E-05	1.4E-09	2.0	8.7E-10	1.2	7.9E-10	1.1
Reference Sites	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.000076	2.8E-12	4.2E-07	--	--	1.2E-11	0.016	7.0E-12	0.010
		Dermal	TEQ_{df}	0.000076	7.1E-13	1.1E-07	--	--	2.1E-12	0.0031	3.0E-12	0.0043
	White perch fillet	Ingestion	TEQ_{df}	0.000018	1.7E-10	2.6E-05	6.6E-10	0.95	4.1E-10	0.59	3.8E-10	0.54
		Ingestion	TEQ_{p}	0.000033	3.1E-10	4.6E-05	1.2E-09	1.7	7.4E-10	1.1	6.8E-10	0.96

Notes:

ADD = average daily dose
BCC = Berry's Creek Canal
EPC = exposure point concentration
HQ = hazard quotient
LADD = lifetime average daily dose
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
TEQ = toxicity equivalence
TEQ_{df} = toxicity equivalence for dioxins and furans
TEQ_{p} = toxicity equivalence for dioxin-like PCBs
UBC = Upper Berry's Creek
-- = no data/not applicable

Table 16. Excess Lifetime Cancer Risks and Noncancer Hazards from TEQ, Crabber (Muscle Only)

Exposure Unit	Exposure Medium	Exposure Route	Chemical	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard Younger Child ADD (mg/kg-day)	Noncancer Hazard Younger Child HQ	Noncancer Hazard Older Child ADD (mg/kg-day)	Noncancer Hazard Older Child HQ	Noncancer Hazard Adult ADD (mg/kg-day)	Noncancer Hazard Adult HQ
UBC	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.000065	2.4E-12	3.5E-07	--	--	9.8E-12	0.014	6.0E-12	0.0085
		Dermal	TEQ_{df}	0.000065	6.1E-13	9.1E-08	--	--	1.8E-12	0.0026	2.6E-12	0.0037
	Blue crab muscle	Ingestion	TEQ_{df}	0.0000046	4.2E-11	6.3E-06	1.6E-10	0.24	1.0E-10	0.15	9.3E-11	0.13
		Ingestion	TEQ_{p}	0.0000078	7.2E-11	1.1E-05	2.8E-10	0.40	1.7E-10	0.25	1.6E-10	0.23
MBC	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.00011	4.1E-12	6.1E-07	--	--	1.7E-11	0.024	1.0E-11	0.015
		Dermal	TEQ_{df}	0.00011	1.0E-12	1.6E-07	--	--	3.1E-12	0.0045	4.4E-12	0.0063
	Blue crab muscle	Ingestion	TEQ_{df}	0.0000068	6.3E-11	9.5E-06	2.5E-10	0.35	1.5E-10	0.22	1.4E-10	0.20
		Ingestion	TEQ_{p}	0.0000053	4.9E-11	7.3E-06	1.9E-10	0.27	1.2E-10	0.17	1.1E-10	0.15
BCC	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.00017	6.2E-12	9.3E-07	--	--	2.6E-11	0.037	1.6E-11	0.022
		Dermal	TEQ_{df}	0.00017	1.6E-12	2.4E-07	--	--	4.8E-12	0.0069	6.7E-12	0.0096
	Blue crab muscle	Ingestion	TEQ_{df}	0.000014	1.3E-10	2.0E-05	5.1E-10	0.73	3.2E-10	0.45	2.9E-10	0.41
		Ingestion	TEQ_{p}	0.0000036	3.4E-11	5.0E-06	1.3E-10	0.19	8.1E-11	0.12	7.4E-11	0.11
LBC	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.00015	5.3E-12	8.0E-07	--	--	2.2E-11	0.032	1.4E-11	0.019
		Dermal	TEQ_{df}	0.00015	1.4E-12	2.1E-07	--	--	4.1E-12	0.0059	5.8E-12	0.0083
	Blue crab muscle	Ingestion	TEQ_{df}	0.000010	9.4E-11	1.4E-05	3.7E-10	0.52	2.3E-10	0.32	2.1E-10	0.30
		Ingestion	TEQ_{p}	0.0000032	2.9E-11	4.4E-06	1.1E-10	0.16	7.1E-11	0.10	6.5E-11	0.092
Reference Sites	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.000076	2.8E-12	4.2E-07	--	--	1.2E-11	0.016	7.0E-12	0.010
		Dermal	TEQ_{df}	0.000076	7.1E-13	1.1E-07	--	--	2.1E-12	0.0031	3.0E-12	0.0043
	Blue crab muscle	Ingestion	TEQ_{df}	0.0000047	4.4E-11	6.5E-06	1.7E-10	0.24	1.1E-10	0.15	9.6E-11	0.14
		Ingestion	TEQ_{p}	0.0000031	2.8E-11	4.2E-06	1.1E-10	0.16	6.8E-11	0.098	6.2E-11	0.089

Notes:

ADD = average daily dose
BCC = Berry's Creek Canal
EPC = exposure point concentration
HQ = hazard quotient
LADD = lifetime average daily dose
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
TEQ = toxicity equivalence
TEQ_{df} = toxicity equivalence for dioxins and furans
TEQ_{p} = toxicity equivalence for dioxin-like PCBs
UBC = Upper Berry's Creek
-- = no data/not applicable

Table 17. Excess Lifetime Cancer Risks and Noncancer Hazards from TEQ, Crabber (Muscle & Hepatopancreas)

Exposure Unit	Exposure Medium	Exposure Route	Chemical	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard Younger Child ADD (mg/kg-day)	Noncancer Hazard Younger Child HQ	Noncancer Hazard Older Child ADD (mg/kg-day)	Noncancer Hazard Older Child HQ	Noncancer Hazard Adult ADD (mg/kg-day)	Noncancer Hazard Adult HQ
UBC	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.000065	2.4E-12	3.5E-07	--	--	9.8E-12	0.014	6.0E-12	0.0085
		Dermal	TEQ_{df}	0.000065	6.1E-13	9.1E-08	--	--	1.8E-12	0.0026	2.6E-12	0.0037
	Blue crab muscle & hepatopancreas	Ingestion	TEQ_{df}	0.000025	2.3E-10	3.5E-05	9.1E-10	1.3	5.6E-10	0.81	5.2E-10	0.74
		Ingestion	TEQ_{p}	0.000032	3.0E-10	4.5E-05	1.2E-09	1.7	7.2E-10	1.0	6.6E-10	0.94
MBC	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.00011	4.1E-12	6.1E-07	--	--	1.7E-11	0.024	1.0E-11	0.015
		Dermal	TEQ_{df}	0.00011	1.0E-12	1.6E-07	--	--	3.1E-12	0.0045	4.4E-12	0.0063
	Blue crab muscle & hepatopancreas	Ingestion	TEQ_{df}	0.000027	2.5E-10	3.7E-05	9.6E-10	1.4	6.0E-10	0.85	5.4E-10	0.78
		Ingestion	TEQ_{p}	0.000027	2.5E-10	3.8E-05	9.8E-10	1.4	6.1E-10	0.87	5.6E-10	0.79
BCC	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.00017	6.2E-12	9.3E-07	--	--	2.6E-11	0.037	1.6E-11	0.022
		Dermal	TEQ_{df}	0.00017	1.6E-12	2.4E-07	--	--	4.8E-12	0.0069	6.7E-12	0.0096
	Blue crab muscle & hepatopancreas	Ingestion	TEQ_{df}	0.000036	3.3E-10	5.0E-05	1.3E-09	1.9	8.0E-10	1.1	7.3E-10	1.0
		Ingestion	TEQ_{p}	0.000014	1.3E-10	1.9E-05	4.9E-10	0.71	3.1E-10	0.44	2.8E-10	0.40
LBC	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.00015	5.3E-12	8.0E-07	--	--	2.2E-11	0.032	1.4E-11	0.019
		Dermal	TEQ_{df}	0.00015	1.4E-12	2.1E-07	--	--	4.1E-12	0.0059	5.8E-12	0.0083
	Blue crab muscle & hepatopancreas	Ingestion	TEQ_{df}	0.00004	3.7E-10	5.6E-05	1.4E-09	2.1	9.0E-10	1.3	8.2E-10	1.2
		Ingestion	TEQ_{p}	0.000013	1.2E-10	1.8E-05	4.8E-10	0.68	3.0E-10	0.42	2.7E-10	0.39
Reference Sites	Surface sediment (0–15 cm) marsh and mudflat at access points	Ingestion	TEQ_{df}	0.000076	2.8E-12	4.2E-07	--	--	1.2E-11	0.016	7.0E-12	0.010
		Dermal	TEQ_{df}	0.000076	7.1E-13	1.1E-07	--	--	2.1E-12	0.0031	3.0E-12	0.0043
	Blue crab muscle & hepatopancreas	Ingestion	TEQ_{df}	0.000024	2.2E-10	3.3E-05	8.7E-10	1.2	5.4E-10	0.77	4.9E-10	0.70
		Ingestion	TEQ_{p}	0.000019	1.8E-10	2.6E-05	6.9E-10	0.98	4.3E-10	0.61	3.9E-10	0.55

Notes:

ADD = average daily dose
BCC = Berry's Creek Canal
EPC = exposure point concentration
HQ = hazard quotient
LADD = lifetime average daily dose
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
TEQ = toxicity equivalence
TEQ_{df} = toxicity equivalence for dioxins and furans
TEQ_{p} = toxicity equivalence for dioxin-like PCBs
UBC = Upper Berry's Creek
-- = no data/not applicable

Table 18. Excess Lifetime Cancer Risks and Noncancer Hazards from TEQ, Current Kayaker/Canoer

Exposure Unit	Exposure Medium	Exposure Route	Chemical	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard Older Child ADD (mg/kg-day)	Noncancer Hazard Older Child HQ	Noncancer Hazard Adult ADD (mg/kg-day)	Noncancer Hazard Adult HQ
UBC	Surface sediment (0–15 cm) marsh at access points & all mudflats	Ingestion	TEQ_{df}	0.00018	4.3E-12	6.5E-07	1.8E-11	0.026	1.1E-11	0.016
		Dermal	TEQ_{df}	0.00018	1.1E-12	1.7E-07	3.3E-12	0.0048	4.7E-12	0.0067
MBC		Ingestion	TEQ_{df}	0.00012	3.0E-12	4.5E-07	1.3E-11	0.018	7.7E-12	0.011
		Dermal	TEQ_{df}	0.00012	7.8E-13	1.2E-07	2.3E-12	0.0033	3.3E-12	0.0047
BCC		Ingestion	TEQ_{df}	0.00020	4.9E-12	7.3E-07	2.0E-11	0.029	1.2E-11	0.018
		Dermal	TEQ_{df}	0.00020	1.2E-12	1.9E-07	3.8E-12	0.0054	5.3E-12	0.0075
LBC		Ingestion	TEQ_{df}	0.00014	3.4E-12	5.2E-07	1.4E-11	0.020	8.7E-12	0.012
		Dermal	TEQ_{df}	0.00014	8.8E-13	1.3E-07	2.7E-12	0.0038	3.7E-12	0.0053
Reference Sites		Ingestion	TEQ_{df}	0.000076	1.9E-12	2.8E-07	7.7E-12	0.011	4.7E-12	0.0067
		Dermal	TEQ_{df}	0.000076	4.8E-13	7.1E-08	1.4E-12	0.0020	2.0E-12	0.0029

Notes:

ADD = average daily dose
BCC = Berry's Creek Canal
EPC = exposure point concentration
HQ = hazard quotient
LADD = lifetime average daily dose
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
TEQ = toxicity equivalence
TEQ_{df} = toxicity equivalence for dioxins and furans
UBC = Upper Berry's Creek

Table 19. Excess Lifetime Cancer Risks and Noncancer Hazards from TEQ, Future Kayaker/Canoer

Exposure Unit	Exposure Medium	Exposure Route	Chemical	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard Older Child ADD (mg/kg-day)	Noncancer Hazard Older Child HQ	Noncancer Hazard Adult ADD (mg/kg-day)	Noncancer Hazard Adult HQ
UBC	Surface sediment (0–15 cm) marsh at access points & all mudflats	Ingestion	TEQ_{df}	0.00018	9.3E-12	1.4E-06	3.9E-11	0.055	2.4E-11	0.034
		Dermal	TEQ_{df}	0.00018	2.4E-12	3.6E-07	7.2E-12	0.010	1.0E-11	0.014
MBC		Ingestion	TEQ_{df}	0.00012	6.6E-12	9.8E-07	2.7E-11	0.039	1.7E-11	0.024
		Dermal	TEQ_{df}	0.00012	1.7E-12	2.5E-07	5.1E-12	0.0072	7.1E-12	0.010
BCC		Ingestion	TEQ_{df}	0.00020	1.1E-11	1.6E-06	4.4E-11	0.062	2.7E-11	0.038
		Dermal	TEQ_{df}	0.00020	2.7E-12	4.0E-07	8.1E-12	0.012	1.1E-11	0.016
LBC		Ingestion	TEQ_{df}	0.00014	7.5E-12	1.1E-06	3.1E-11	0.044	1.9E-11	0.027
		Dermal	TEQ_{df}	0.00014	1.9E-12	2.9E-07	5.8E-12	0.0082	8.1E-12	0.012
Reference Sites		Ingestion	TEQ_{df}	0.000076	4.0E-12	6.0E-07	1.7E-11	0.024	1.0E-11	0.015
		Dermal	TEQ_{df}	0.000076	1.0E-12	1.5E-07	3.1E-12	0.0044	4.3E-12	0.0062

Notes:

ADD = average daily dose
BCC = Berry's Creek Canal
EPC = exposure point concentration
HQ = hazard quotient
LADD = lifetime average daily dose
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
TEQ = toxicity equivalence
TEQ_{df} = toxicity equivalence for dioxins and furans
UBC = Upper Berry's Creek

Table 20. Excess Lifetime Cancer Risks and Noncancer Hazards from TEQ, Construction Worker

Exposure Unit	Exposure Medium	Exposure Route	Chemical	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard Adult ADD (mg/kg-day)	Noncancer Hazard Adult HQ
UBC	Waterway sediment	Ingestion	TEQ_{df}	0.00010	6.5E-13	9.7E-08	4.5E-11	0.065
		Dermal	TEQ_{df}	0.00010	6.1E-14	9.2E-09	4.3E-12	0.0061
MBC		Ingestion	TEQ_{df}	0.00027	1.7E-12	2.6E-07	1.2E-10	0.17
		Dermal	TEQ_{df}	0.00027	1.7E-13	2.5E-08	1.2E-11	0.017
BCC		Ingestion	TEQ_{df}	0.00019	1.2E-12	1.8E-07	8.6E-11	0.12
		Dermal	TEQ_{df}	0.00019	1.2E-13	1.7E-08	8.1E-12	0.012
LBC		Ingestion	TEQ_{df}	0.00014	9.1E-13	1.4E-07	6.4E-11	0.091
		Dermal	TEQ_{df}	0.00014	8.6E-14	1.3E-08	6.0E-12	0.0086
Reference Sites		Ingestion	TEQ_{df}	0.000076	4.9E-13	7.4E-08	3.4E-11	0.049
		Dermal	TEQ_{df}	0.000076	4.6E-14	7.0E-09	3.3E-12	0.0046

Notes:

ADD = average daily dose
BCC = Berry's Creek Canal
EPC = exposure point concentration
HQ = hazard quotient
LADD = lifetime average daily dose
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
TEQ = toxicity equivalence
TEQ_{df} = toxicity equivalence for dioxins and furans
UBC = Upper Berry's Creek

No TEQ_{df} data available for deep sediment; risks for construction worker were estimated using surface sediment TEQ_{df}.

Table 21. Summary of Excess Lifetime Cancer Risks and Noncancer Hazards from TEQ Across Exposure Pathways

Receptor Population (Timeframe)	Exposure Unit	Chemical	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard Younger Child ADD (mg/kg-day)	Noncancer Hazard Younger Child HI	Noncancer Hazard Older Child ADD (mg/kg-day)	Noncancer Hazard Older Child HI	Noncancer Hazard Adult ADD (mg/kg-day)	Noncancer Hazard Adult HI
Angler (Current/Future)	UBC	TEQ_{df}	2.0E-10	3.0E-05	7.6E-10	1.1	4.8E-10	0.69	4.4E-10	0.63
		TEQ_{p}	4.3E-10	6.4E-05	1.7E-09	2.4	1.0E-09	1.5	9.5E-10	1.4
	MBC	TEQ_{df}	2.2E-10	3.3E-05	8.5E-10	1.2	5.4E-10	0.78	4.9E-10	0.70
		TEQ_{p}	3.1E-10	4.7E-05	1.2E-09	1.7	7.5E-10	1.1	6.8E-10	0.98
	BCC	TEQ_{df}	9.7E-10	1.4E-04	3.7E-09	5.3	2.3E-09	3.3	2.1E-09	3.0
		TEQ_{p}	2.5E-10	3.8E-05	9.8E-10	1.4	6.1E-10	0.87	5.5E-10	0.79
	LBC	TEQ_{df}	3.9E-10	5.9E-05	1.5E-09	2.2	9.6E-10	1.4	8.7E-10	1.2
		TEQ_{p}	3.6E-10	5.4E-05	1.4E-09	2.0	8.7E-10	1.2	7.9E-10	1.1
	Reference Sites	TEQ_{df}	1.7E-10	2.6E-05	6.6E-10	0.95	4.3E-10	0.61	3.9E-10	0.55
		TEQ_{p}	3.1E-10	4.6E-05	1.2E-09	1.7	7.4E-10	1.1	6.8E-10	0.96
Crabber-Blue Crab Muscle (Current/Future)	UBC	TEQ_{df}	4.5E-11	6.8E-06	1.6E-10	0.24	1.1E-10	0.16	1.0E-10	0.15
		TEQ_{p}	7.2E-11	1.1E-05	2.8E-10	0.40	1.7E-10	0.25	1.6E-10	0.23
	MBC	TEQ_{df}	6.8E-11	1.0E-05	2.5E-10	0.35	1.7E-10	0.25	1.5E-10	0.22
		TEQ_{p}	4.9E-11	7.3E-06	1.9E-10	0.27	1.2E-10	0.17	1.1E-10	0.15
	BCC	TEQ_{df}	1.4E-10	2.1E-05	5.1E-10	0.73	3.5E-10	0.50	3.1E-10	0.45
		TEQ_{p}	3.4E-11	5.0E-06	1.3E-10	0.19	8.1E-11	0.12	7.4E-11	0.11
	LBC	TEQ_{df}	1.0E-10	1.5E-05	3.7E-10	0.52	2.5E-10	0.36	2.3E-10	0.32
		TEQ_{p}	2.9E-11	4.4E-06	1.1E-10	0.16	7.1E-11	0.10	6.5E-11	0.092
	Reference Sites	TEQ_{df}	4.7E-11	7.1E-06	1.7E-10	0.24	1.2E-10	0.17	1.1E-10	0.15
		TEQ_{p}	2.8E-11	4.2E-06	1.1E-10	0.16	6.8E-11	0.098	6.2E-11	0.089
Crabber-Blue Crab Muscle & Hepatopancreas (Current/Future)	UBC	TEQ_{df}	2.4E-10	3.6E-05	9.1E-10	1.3	5.8E-10	0.82	5.2E-10	0.75
		TEQ_{p}	3.0E-10	4.5E-05	1.2E-09	1.7	7.2E-10	1.0	6.6E-10	0.94
	MBC	TEQ_{df}	2.5E-10	3.8E-05	9.6E-10	1.4	6.2E-10	0.88	5.6E-10	0.80
		TEQ_{p}	2.5E-10	3.8E-05	9.8E-10	1.4	6.1E-10	0.87	5.6E-10	0.79
	BCC	TEQ_{df}	3.4E-10	5.1E-05	1.3E-09	1.9	8.4E-10	1.2	7.6E-10	1.1
		TEQ_{p}	1.3E-10	1.9E-05	4.9E-10	0.71	3.1E-10	0.44	2.8E-10	0.4
	LBC	TEQ_{df}	3.8E-10	5.7E-05	1.4E-09	2.1	9.2E-10	1.3	8.4E-10	1.2
		TEQ_{p}	1.2E-10	1.8E-05	4.8E-10	0.68	3.0E-10	0.42	2.7E-10	0.39
	Reference Sites	TEQ_{df}	2.3E-10	3.4E-05	8.7E-10	1.2	5.5E-10	0.79	5.0E-10	0.71
		TEQ_{p}	1.8E-10	2.6E-05	6.9E-10	0.98	4.3E-10	0.61	3.9E-10	0.55

Table 21. Summary of Excess Lifetime Cancer Risks and Noncancer Hazards from TEQ Across Exposure Pathways

Receptor Population (Timeframe)	Exposure Unit	Chemical	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard Younger Child ADD (mg/kg-day)	Noncancer Hazard Younger Child HI	Noncancer Hazard Older Child ADD (mg/kg-day)	Noncancer Hazard Older Child HI	Noncancer Hazard Adult ADD (mg/kg-day)	Noncancer Hazard Adult HI
Kayaker/Canoer (Current)	UBC	TEQ_{df}	5.4E-12	8.1E-07	--	--	2.1E-11	0.030	1.6E-11	0.022
	MBC	TEQ_{df}	3.8E-12	5.7E-07	--	--	1.5E-11	0.021	1.1E-11	0.016
	BCC	TEQ_{df}	6.1E-12	9.2E-07	--	--	2.4E-11	0.034	1.8E-11	0.025
	LBC	TEQ_{df}	4.3E-12	6.5E-07	--	--	1.7E-11	0.024	1.2E-11	0.018
	Reference Sites	TEQ_{df}	2.3E-12	3.5E-07	--	--	9.1E-12	0.013	6.7E-12	0.0096
Kayaker/Canoer (Future)	UBC	TEQ_{df}	1.2E-11	1.8E-06	--	--	4.6E-11	0.066	3.4E-11	0.048
	MBC	TEQ_{df}	8.2E-12	1.2E-06	--	--	3.2E-11	0.046	2.4E-11	0.034
	BCC	TEQ_{df}	1.3E-11	2.0E-06	--	--	5.2E-11	0.074	3.8E-11	0.054
	LBC	TEQ_{df}	9.4E-12	1.4E-06	--	--	3.7E-11	0.052	2.7E-11	0.038
	Reference Sites	TEQ_{df}	5.0E-12	7.6E-07	--	--	2.0E-11	0.028	1.5E-11	0.021
Construction Worker (Current/Future)	UBC	TEQ_{df}	7.1E-13	1.1E-07	--	--	--	--	5.0E-11	0.071
	MBC	TEQ_{df}	1.9E-12	2.9E-07	--	--	--	--	1.3E-10	0.19
	BCC	TEQ_{df}	1.3E-12	2.0E-07	--	--	--	--	9.4E-11	0.13
	LBC	TEQ_{df}	1.0E-12	1.5E-07	--	--	--	--	7.0E-11	0.10
	Reference Sites	TEQ_{df}	5.4E-13	8.1E-08	--	--	--	--	3.8E-11	0.054

Notes:

ADD = average daily dose
BCC = Berry's Creek Canal
HI = hazard index
LADD = lifetime average daily dose
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
TEQ = toxicity equivalence
TEQ_{df} = toxicity equivalence for dioxins and furans
TEQ_p = toxicity equivalence for dioxin-like PCBs
UBC = Upper Berry's Creek
-- = no data/not applicable

TEQ_p risks include tissue ingestion only (no TEQ_p data available for sediment). No TEQ_{df} data available for deep sediment; risks for construction worker were estimated using surface sediment TEQ_{df}.

Table 22. Excess Lifetime Cancer Risks and Noncancer Hazards from PCBs in White Perch Fillet

Exposure Unit	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard Younger Child ADD (mg/kg-day)	Noncancer Hazard Younger Child HQ	Noncancer Hazard Older Child ADD (mg/kg-day)	Noncancer Hazard Older Child HQ	Noncancer Hazard Adult ADD (mg/kg-day)	Noncancer Hazard Adult HQ
UBC	PCBs (total Aroclors)	1.5	1.4E-05	2.7E-05	5.3E-05	2.6	3.3E-05	1.6	3.0E-05	1.5
	PCBs (total congeners)	2.3	2.1E-05	4.2E-05	8.2E-05	4.1	5.1E-05	2.6	4.7E-05	2.3
MBC	PCBs (total Aroclors)	1.2	1.1E-05	2.1E-05	4.2E-05	2.1	2.6E-05	1.3	2.3E-05	1.2
	PCBs (total congeners)	2.2	2.0E-05	4.0E-05	7.9E-05	3.9	4.9E-05	2.4	4.4E-05	2.2
BCC	PCBs (total Aroclors)	1.2	1.1E-05	2.2E-05	4.2E-05	2.1	2.6E-05	1.3	2.4E-05	1.2
	PCBs (total congeners)	1.8	1.7E-05	3.4E-05	6.6E-05	3.3	4.1E-05	2.1	3.8E-05	1.9
LBC	PCBs (total Aroclors)	0.64	5.9E-06	1.2E-05	2.3E-05	1.2	1.4E-05	0.72	1.3E-05	0.65
	PCBs (total congeners)	1.5	1.4E-05	2.8E-05	5.4E-05	2.7	3.3E-05	1.7	3.0E-05	1.5
Reference Sites	PCBs (total Aroclors)	0.66	6.1E-06	1.2E-05	2.4E-05	1.2	1.5E-05	0.73	1.3E-05	0.67
	PCBs (total congeners)	0.82	7.6E-06	1.5E-05	3.0E-05	1.5	1.8E-05	0.92	1.7E-05	0.84

Notes:
ADD = average daily dose
BCC = Berry's Creek Canal
COPC = chemical of potential concern
EPC = exposure point concentration
HQ = hazard quotient
LADD = lifetime average daily dose
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek

Table 23. Excess Lifetime Cancer Risks and Noncancer Hazards from PCBs in Blue Crab Muscle

Exposure Unit	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard Younger Child ADD (mg/kg-day)	Noncancer Hazard Younger Child HQ	Noncancer Hazard Older Child ADD (mg/kg-day)	Noncancer Hazard Older Child HQ	Noncancer Hazard Adult ADD (mg/kg-day)	Noncancer Hazard Adult HQ
UBC	PCBs (total Aroclors)	0.013	1.2E-07	2.3E-07	4.6E-07	0.023	2.8E-07	0.014	2.6E-07	0.013
	PCBs (total congeners)	0.25	2.3E-06	4.6E-06	8.9E-06	0.45	5.5E-06	0.28	5.0E-06	0.25
MBC	PCBs (total Aroclors)	0.040	3.7E-07	7.4E-07	1.4E-06	0.072	8.9E-07	0.045	8.1E-07	0.041
	PCBs (total congeners)	0.20	1.9E-06	3.7E-06	7.3E-06	0.36	4.5E-06	0.23	4.1E-06	0.21
BCC	PCBs (total Aroclors)	0.011	1.1E-07	2.1E-07	4.1E-07	0.021	2.6E-07	0.013	2.3E-07	0.012
	PCBs (total congeners)	0.10	9.7E-07	1.9E-06	3.8E-06	0.19	2.3E-06	0.12	2.1E-06	0.11
LBC	PCBs (total Aroclors)	0.019	1.8E-07	3.6E-07	7.0E-07	0.035	4.3E-07	0.022	3.9E-07	0.020
	PCBs (total congeners)	0.070	6.5E-07	1.3E-06	2.5E-06	0.13	1.6E-06	0.078	1.4E-06	0.071
Reference Sites	PCBs (total Aroclors)	0.0059	5.5E-08	1.1E-07	2.1E-07	0.011	1.3E-07	0.0066	1.2E-07	0.0060
	PCBs (total congeners)	0.085	7.8E-07	1.6E-06	3.0E-06	0.15	1.9E-06	0.094	1.7E-06	0.086

Notes:
ADD = average daily dose
BCC = Berry's Creek Canal
COPC = chemical of potential concern
EPC = exposure point concentration
HQ = hazard quotient
LADD = lifetime average daily dose
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek

Table 24. Excess Lifetime Cancer Risks and Noncancer Hazards from PCBs in Blue Crab Muscle & Hepatopancreas

Exposure Unit	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard Younger Child ADD (mg/kg-day)	Noncancer Hazard Younger Child HQ	Noncancer Hazard Older Child ADD (mg/kg-day)	Noncancer Hazard Older Child HQ	Noncancer Hazard Adult ADD (mg/kg-day)	Noncancer Hazard Adult HQ
UBC	PCBs (total Aroclors)	0.18	1.6E-06	3.3E-06	6.4E-06	0.32	4.0E-06	0.20	3.6E-06	0.18
	PCBs (total congeners)	0.94	8.7E-06	1.7E-05	3.4E-05	1.7	2.1E-05	1.0	1.9E-05	0.95
MBC	PCBs (total Aroclors)	0.13	1.2E-06	2.4E-06	4.6E-06	0.23	2.9E-06	0.14	2.6E-06	0.13
	PCBs (total congeners)	0.84	7.8E-06	1.6E-05	3.0E-05	1.5	1.9E-05	0.94	1.7E-05	0.85
BCC	PCBs (total Aroclors)	0.15	1.4E-06	2.8E-06	5.5E-06	0.28	3.4E-06	0.17	3.1E-06	0.16
	PCBs (total congeners)	0.45	4.1E-06	8.2E-06	1.6E-05	0.80	9.9E-06	0.50	9.1E-06	0.45
LBC	PCBs (total Aroclors)	0.33	3.0E-06	6.0E-06	1.2E-05	0.59	7.3E-06	0.36	6.7E-06	0.33
	PCBs (total congeners)	0.43	3.9E-06	7.9E-06	1.5E-05	0.77	9.5E-06	0.48	8.7E-06	0.44
Reference Sites	PCBs (total Aroclors)	0.13	1.2E-06	2.4E-06	4.6E-06	0.23	2.9E-06	0.14	2.6E-06	0.13
	PCBs (total congeners)	0.53	4.9E-06	9.8E-06	1.9E-05	0.95	1.2E-05	0.59	1.1E-05	0.54

Notes:
ADD = average daily dose
BCC = Berry's Creek Canal
COPC = chemical of potential concern
EPC = exposure point concentration
HQ = hazard quotient
LADD = lifetime average daily dose
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek

Table 25. Excess Lifetime Cancer Risks and Noncancer Hazards from Marsh Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
Nevertouch Marsh	Ingestion	Metals	Mercury	130	8.6E-07	--	6.0E-05	0.20
	Dermal			130	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	4.4	2.8E-08	5.7E-08	2.0E-06	0.099
	Dermal			4.4	1.3E-08	2.5E-08	8.8E-07	0.044
	Ingestion	Metals	Aluminum	14,000	8.7E-05	--	6.1E-03	0.0061
	Dermal			14,000	--	--	--	--
	Ingestion		Antimony	2.6	1.7E-08	--	1.2E-06	0.0030
	Dermal			2.6	--	--	--	--
	Ingestion		Arsenic	40	1.5E-07	2.3E-07	1.1E-05	0.036
	Dermal			40	2.4E-08	3.6E-08	1.7E-06	0.0056
	Ingestion		Cadmium	24	1.5E-07	--	1.1E-05	0.011
	Dermal			24	4.8E-10	--	3.4E-08	0.0013
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	24	1.5E-07	--	1.1E-05	0.036
	Dermal			24	--	--	--	--
	Ingestion		Copper	310	2.0E-06	--	1.4E-04	0.0035
	Dermal			310	--	--	--	--
	Ingestion		Iron	29,000	1.9E-04	--	1.3E-02	0.019
	Dermal			29,000	--	--	--	--
	Ingestion		Manganese	17,000	1.1E-04	--	7.9E-03	0.056
	Dermal			17,000	--	--	--	--
	Ingestion		Nickel	130	8.3E-07	--	5.8E-05	0.0029
	Dermal			130	--	--	--	--
	Ingestion		Thallium	14	8.9E-08	--	6.3E-06	0.63
	Dermal			14	--	--	--	--
	Ingestion		Vanadium	70	4.5E-07	--	3.2E-05	0.0064
	Dermal			70	--	--	--	--
	Ingestion		Zinc	8,200	5.3E-05	--	3.7E-03	0.012
	Dermal			8,200	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	0.29	1.9E-09	1.4E-08	1.3E-07	--
	Dermal			0.29	7.7E-10	5.6E-09	5.4E-08	--
	Ingestion		Dibenz[a,h]anthracene	0.076	4.9E-10	3.6E-09	3.4E-08	--
	Dermal			0.076	2.0E-10	1.5E-09	1.4E-08	--
	Ingestion	Pesticides	Aldrin	0.26	1.7E-09	2.8E-08	1.2E-07	0.0039
	Dermal			0.26	--	--	--	--
	Ingestion		Heptachlor	0.21	1.4E-09	6.2E-09	9.7E-08	0.00019
	Dermal			0.21	--	--	--	--
	Ingestion		Heptachlor epoxide	0.29	1.9E-09	1.7E-08	1.3E-07	0.010
	Dermal			0.29	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	--	--	--	--	--
	Dermal			--	--	--	--	--
	Cumulative	--	--	--	--	4.0E-07	--	1.0

Table 25. Excess Lifetime Cancer Risks and Noncancer Hazards from Marsh Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
Eight Day Swamp	Ingestion	Metals	Mercury	70	4.5E-07	--	3.2E-05	0.11
	Dermal			70	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	3.0	1.9E-08	3.9E-08	1.4E-06	0.068
	Dermal			3.0	8.5E-09	1.7E-08	6.0E-07	0.030
	Ingestion	Metals	Aluminum	14,000	8.8E-05	--	6.2E-03	0.0062
	Dermal			14,000	--	--	--	--
	Ingestion		Antimony	2.9	1.8E-08	--	1.3E-06	0.0032
	Dermal			2.9	--	--	--	--
	Ingestion		Arsenic	27	1.0E-07	1.6E-07	7.3E-06	0.024
	Dermal			27	1.6E-08	2.5E-08	1.1E-06	0.0038
	Ingestion		Cadmium	11	6.8E-08	--	4.8E-06	0.0048
	Dermal			11	2.2E-10	--	1.5E-08	6.00E-04
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	26	1.7E-07	--	1.2E-05	0.039
	Dermal			26	--	--	--	--
	Ingestion		Copper	410	2.7E-06	--	1.9E-04	0.0046
	Dermal			410	--	--	--	--
	Ingestion		Iron	28,000	1.8E-04	--	1.3E-02	0.018
	Dermal			28,000	--	--	--	--
	Ingestion		Manganese	11,000	6.9E-05	--	4.8E-03	0.034
	Dermal			11,000	--	--	--	--
	Ingestion		Nickel	210	1.3E-06	--	9.4E-05	0.0047
	Dermal			210	--	--	--	--
	Ingestion		Thallium	22	1.4E-07	--	1.0E-05	1.0
	Dermal			22	--	--	--	--
	Ingestion		Vanadium	74	4.8E-07	--	3.3E-05	0.0067
	Dermal			74	--	--	--	--
	Ingestion		Zinc	1,200	7.6E-06	--	5.3E-04	0.0018
	Dermal			1,200	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	0.23	1.5E-09	1.1E-08	1.0E-07	--
	Dermal			0.23	6.0E-10	4.4E-09	4.2E-08	--
	Ingestion		Dibenz[a,h]anthracene	0.068	4.4E-10	3.2E-09	3.1E-08	--
	Dermal			0.068	1.8E-10	1.3E-09	1.3E-08	--
	Ingestion	Pesticides	Aldrin	0.020	1.3E-10	2.2E-09	9.2E-09	0.00031
	Dermal			0.020	--	--	--	--
	Ingestion		Heptachlor	0.012	7.6E-11	3.4E-10	5.3E-09	1.10E-05
	Dermal			0.012	--	--	--	--
	Ingestion		Heptachlor epoxide	0.016	1.0E-10	9.3E-10	7.2E-09	0.00055
	Dermal			0.016	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	--	--	--	--	--
	Dermal			--	--	--	--	--
	Cumulative	--	--	--	--	3.0E-07	--	1.0

Table 25. Excess Lifetime Cancer Risks and Noncancer Hazards from Marsh Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
Paterson Plank Marsh	Ingestion	Metals	Mercury	33	2.1E-07	--	1.5E-05	0.050
	Dermal			33	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	2.7	1.8E-08	3.5E-08	1.2E-06	0.062
	Dermal			2.7	7.8E-09	1.6E-08	5.5E-07	0.027
	Ingestion	Metals	Aluminum	11,000	7.0E-05	--	4.9E-03	0.0049
	Dermal			11,000	--	--	--	--
	Ingestion		Antimony	3.2	2.0E-08	--	1.4E-06	0.0036
	Dermal			3.2	--	--	--	--
	Ingestion		Arsenic	40	1.5E-07	2.3E-07	1.1E-05	0.036
	Dermal			40	2.4E-08	3.6E-08	1.7E-06	0.0056
	Ingestion		Cadmium	8.8	5.7E-08	--	4.0E-06	0.0040
	Dermal			8.8	1.8E-10	--	1.3E-08	5.0E-04
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	39	2.5E-07	--	1.7E-05	0.058
	Dermal			39	--	--	--	--
	Ingestion		Copper	230	1.5E-06	--	1.1E-04	0.0026
	Dermal			230	--	--	--	--
	Ingestion		Iron	25,000	1.6E-04	--	1.1E-02	0.016
	Dermal			25,000	--	--	--	--
	Ingestion		Manganese	6,900	4.5E-05	--	3.1E-03	0.022
	Dermal			6,900	--	--	--	--
	Ingestion		Nickel	200	1.3E-06	--	8.9E-05	0.0045
	Dermal			200	--	--	--	--
	Ingestion		Thallium	10	6.6E-08	--	4.6E-06	0.46
	Dermal			10	--	--	--	--
	Ingestion		Vanadium	91	5.9E-07	--	4.1E-05	0.0082
	Dermal			91	--	--	--	--
	Ingestion		Zinc	1,300	8.3E-06	--	5.8E-04	0.0019
	Dermal			1,300	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	0.42	2.7E-09	2.0E-08	1.9E-07	--
	Dermal			0.42	1.1E-09	8.1E-09	7.8E-08	--
	Ingestion		Dibenz[a,h]anthracene	0.085	5.5E-10	4.0E-09	3.8E-08	--
	Dermal			0.085	2.3E-10	1.6E-09	1.6E-08	--
	Ingestion	Pesticides	Aldrin	0.0050	3.2E-11	5.5E-10	2.3E-09	7.5E-05
	Dermal			0.0050	--	--	--	--
	Ingestion		Heptachlor	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Heptachlor epoxide	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	--	--	--	--	--
	Dermal			--	--	--	--	--
	Cumulative	--	--	--	--	4.0E-07	--	0.80

Table 25. Excess Lifetime Cancer Risks and Noncancer Hazards from Marsh Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
Upper Peach Island Creek Marsh	Ingestion	Metals	Mercury	420	2.7E-06	--	1.9E-04	0.64
	Dermal			420	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	9.7	6.3E-08	1.3E-07	4.4E-06	0.22
	Dermal			9.7	2.8E-08	5.6E-08	1.9E-06	0.097
	Ingestion	Metals	Aluminum	16,000	1.0E-04	--	7.3E-03	0.0073
	Dermal			16,000	--	--	--	--
	Ingestion		Antimony	17	1.1E-07	--	7.6E-06	0.019
	Dermal			17	--	--	--	--
	Ingestion		Arsenic	190	7.3E-07	1.1E-06	5.1E-05	0.17
	Dermal			190	1.1E-07	1.7E-07	8.0E-06	0.027
	Ingestion		Cadmium	30	2.0E-07	--	1.4E-05	0.014
	Dermal			30	6.2E-10	--	4.3E-08	0.0017
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	120	7.7E-07	--	5.4E-05	0.18
	Dermal			120	--	--	--	--
	Ingestion		Copper	4,100	2.6E-05	--	1.8E-03	0.046
	Dermal			4,100	--	--	--	--
	Ingestion		Iron	41,000	2.7E-04	--	1.9E-02	0.027
	Dermal			41,000	--	--	--	--
	Ingestion		Manganese	9,700	6.3E-05	--	4.4E-03	0.031
	Dermal			9,700	--	--	--	--
	Ingestion		Nickel	860	5.6E-06	--	3.9E-04	0.019
	Dermal			860	--	--	--	--
	Ingestion		Thallium	6.6	4.3E-08	--	3.0E-06	0.30
	Dermal			6.6	--	--	--	--
	Ingestion		Vanadium	160	1.0E-06	--	7.2E-05	0.014
	Dermal			160	--	--	--	--
	Ingestion		Zinc	510	3.3E-06	--	2.3E-04	0.00076
	Dermal			510	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	0.55	3.5E-09	2.6E-08	2.5E-07	--
	Dermal			0.55	1.4E-09	1.1E-08	1.0E-07	--
	Ingestion		Dibenz[a,h]anthracene	0.11	7.1E-10	5.2E-09	5.0E-08	--
	Dermal			0.11	2.9E-10	2.1E-09	2.0E-08	--
	Ingestion	Pesticides	Aldrin	0.045	2.9E-10	4.9E-09	2.0E-08	0.00068
	Dermal			0.045	--	--	--	--
	Ingestion		Heptachlor	0.021	1.4E-10	6.1E-10	9.5E-09	1.9E-05
	Dermal			0.021	--	--	--	--
	Ingestion		Heptachlor epoxide	0.0091	5.9E-11	5.3E-10	4.1E-09	0.00032
	Dermal			0.0091	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	--	--	--	--	--
	Dermal			--	--	--	--	--
	Cumulative	--	--	--	--	2.0E-06	--	2.0

Table 25. Excess Lifetime Cancer Risks and Noncancer Hazards from Marsh Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
Walden Swamp	Ingestion	Metals	Mercury	33	2.2E-07	--	1.5E-05	0.050
	Dermal			33	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	1.7	1.1E-08	2.2E-08	7.6E-07	0.038
	Dermal			1.7	4.8E-09	9.6E-09	3.3E-07	0.017
	Ingestion	Metals	Aluminum	12,000	8.0E-05	--	5.6E-03	0.0056
	Dermal			12,000	--	--	--	--
	Ingestion		Antimony	2.4	1.6E-08	--	1.1E-06	0.0028
	Dermal			2.4	--	--	--	--
	Ingestion		Arsenic	27	1.1E-07	1.6E-07	7.4E-06	0.025
	Dermal			27	1.7E-08	2.5E-08	1.2E-06	0.0039
	Ingestion		Cadmium	6.4	4.1E-08	--	2.9E-06	0.0029
	Dermal			6.4	1.3E-10	--	9.1E-09	0.00036
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	22	1.4E-07	--	1.0E-05	0.034
	Dermal			22	--	--	--	--
	Ingestion		Copper	150	9.7E-07	--	6.8E-05	0.0017
	Dermal			150	--	--	--	--
	Ingestion		Iron	27,000	1.8E-04	--	1.2E-02	0.018
	Dermal			27,000	--	--	--	--
	Ingestion		Manganese	13,000	8.3E-05	--	5.8E-03	0.041
	Dermal			13,000	--	--	--	--
	Ingestion		Nickel	170	1.1E-06	--	7.6E-05	0.0038
	Dermal			170	--	--	--	--
	Ingestion		Thallium	33	2.1E-07	--	1.5E-05	1.5
	Dermal			33	--	--	--	--
	Ingestion		Vanadium	65	4.2E-07	--	3.0E-05	0.0059
	Dermal			65	--	--	--	--
	Ingestion		Zinc	950	6.1E-06	--	4.3E-04	0.0014
	Dermal			950	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	0.65	4.2E-09	3.1E-08	3.0E-07	--
	Dermal			0.65	1.7E-09	1.3E-08	1.2E-07	--
	Ingestion		Dibenz[a,h]anthracene	0.36	2.3E-09	1.7E-08	1.6E-07	--
	Dermal			0.36	9.5E-10	7.0E-09	6.7E-08	--
	Ingestion	Pesticides	Aldrin	0.024	1.5E-10	2.6E-09	1.1E-08	0.00036
	Dermal			0.024	--	--	--	--
	Ingestion		Heptachlor	0.0058	3.8E-11	1.7E-10	2.6E-09	5.30E-06
	Dermal			0.0058	--	--	--	--
	Ingestion		Heptachlor epoxide	0.0092	5.9E-11	5.4E-10	4.2E-09	0.00032
	Dermal			0.0092	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	--	--	--	--	--
	Dermal			--	--	--	--	--
	Cumulative	--	--	--	--	3.0E-07	--	2.0

Table 25. Excess Lifetime Cancer Risks and Noncancer Hazards from Marsh Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
Ackerman's East Marsh	Ingestion	Metals	Mercury	26	1.7E-07	--	1.2E-05	0.039
	Dermal			26	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	1.9	1.2E-08	2.4E-08	8.4E-07	0.042
	Dermal			1.9	5.3E-09	1.1E-08	3.7E-07	0.019
	Ingestion	Metals	Aluminum	16,000	1.0E-04	--	7.1E-03	0.0071
	Dermal			16,000	--	--	--	--
	Ingestion		Antimony	3.0	1.9E-08	--	1.4E-06	0.0034
	Dermal			3.0	--	--	--	--
	Ingestion		Arsenic	24	9.2E-08	1.4E-07	6.4E-06	0.021
	Dermal			24	1.5E-08	2.2E-08	1.0E-06	0.0034
	Ingestion		Cadmium	3.9	2.5E-08	--	1.8E-06	0.0018
	Dermal			3.9	7.9E-11	--	5.5E-09	0.00022
	Ingestion		Chromium (VI)	17	1.1E-07	5.4E-08	7.5E-06	0.0025
	Dermal			17	--	--	--	--
	Ingestion		Cobalt	62	4.0E-07	--	2.8E-05	0.093
	Dermal			62	--	--	--	--
	Ingestion		Copper	120	7.4E-07	--	5.2E-05	0.0013
	Dermal			120	--	--	--	--
	Ingestion		Iron	48,000	3.1E-04	--	2.2E-02	0.031
	Dermal			48,000	--	--	--	--
	Ingestion		Manganese	13,000	8.5E-05	--	5.9E-03	0.042
	Dermal			13,000	--	--	--	--
	Ingestion		Nickel	100	6.7E-07	--	4.7E-05	0.0024
	Dermal			100	--	--	--	--
	Ingestion		Thallium	100	6.5E-07	--	4.6E-05	4.6
	Dermal			100	--	--	--	--
	Ingestion		Vanadium	57	3.7E-07	--	2.6E-05	0.0051
	Dermal			57	--	--	--	--
	Ingestion		Zinc	440	2.8E-06	--	2.0E-04	0.00066
	Dermal			440	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	0.078	5.0E-10	3.7E-09	3.5E-08	--
	Dermal			0.078	2.1E-10	1.5E-09	1.4E-08	--
	Ingestion		Dibenz[a,h]anthracene	0.015	9.9E-11	7.2E-10	6.9E-09	--
	Dermal			0.015	4.1E-11	3.0E-10	2.8E-09	--
	Ingestion	Pesticides	Aldrin	0.0044	2.8E-11	4.8E-10	2.0E-09	6.6E-05
	Dermal			0.0044	--	--	--	--
	Ingestion		Heptachlor	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Heptachlor epoxide	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	0.033	2.1E-10	9.8E-12	1.5E-08	3.0E-05
	Dermal			0.033	--	--	--	--
	Cumulative	--	--	--	--	2.0E-07	--	5.0

Table 25. Excess Lifetime Cancer Risks and Noncancer Hazards from Marsh Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
Rutherford Marsh	Ingestion	Metals	Mercury	13	8.7E-08	--	6.1E-06	0.020
	Dermal			13	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	0.94	6.1E-09	1.2E-08	4.2E-07	0.021
	Dermal			0.94	2.7E-09	5.4E-09	1.9E-07	0.0094
	Ingestion	Metals	Aluminum	13,000	8.6E-05	--	6.0E-03	0.0060
	Dermal			13,000	--	--	--	--
	Ingestion		Antimony	1.2	7.7E-09	--	5.4E-07	0.0014
	Dermal			1.2	--	--	--	--
	Ingestion		Arsenic	16	6.1E-08	9.1E-08	4.3E-06	0.014
	Dermal			16	9.6E-09	1.4E-08	6.7E-07	0.0022
	Ingestion		Cadmium	1.6	1.1E-08	--	7.4E-07	0.00074
	Dermal			1.6	3.4E-11	--	2.3E-09	9.4E-05
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	14	8.9E-08	--	6.3E-06	0.021
	Dermal			14	--	--	--	--
	Ingestion		Copper	140	9.3E-07	--	6.5E-05	0.0016
	Dermal			140	--	--	--	--
	Ingestion		Iron	26,000	1.7E-04	--	1.2E-02	0.017
	Dermal			26,000	--	--	--	--
	Ingestion		Manganese	11,000	7.1E-05	--	5.0E-03	0.036
	Dermal			11,000	--	--	--	--
	Ingestion		Nickel	71	4.6E-07	--	3.2E-05	0.0016
	Dermal			71	--	--	--	--
	Ingestion		Thallium	5.6	3.6E-08	--	2.5E-06	0.25
	Dermal			5.6	--	--	--	--
	Ingestion		Vanadium	55	3.5E-07	--	2.5E-05	0.0049
	Dermal			55	--	--	--	--
	Ingestion		Zinc	360	2.3E-06	--	1.6E-04	0.00054
	Dermal			360	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	0.32	2.1E-09	1.5E-08	1.4E-07	--
	Dermal			0.32	8.5E-10	6.2E-09	5.9E-08	--
	Ingestion		Dibenz[a,h]anthracene	0.059	3.8E-10	2.8E-09	2.7E-08	--
	Dermal			0.059	1.6E-10	1.1E-09	1.1E-08	--
	Ingestion	Pesticides	Aldrin	0.0056	3.6E-11	6.1E-10	2.5E-09	8.4E-05
	Dermal			0.0056	--	--	--	--
	Ingestion		Heptachlor	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Heptachlor epoxide	0.0027	1.7E-11	1.6E-10	1.2E-09	9.4E-05
	Dermal			0.0027	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	--	--	--	--	--
	Dermal			--	--	--	--	--
	Cumulative	--	--	--	--	2.0E-07	--	0.40

Table 25. Excess Lifetime Cancer Risks and Noncancer Hazards from Marsh Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
Tollgate Marsh	Ingestion	Metals	Mercury	11	7.3E-08	--	5.1E-06	0.017
	Dermal			11	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	0.58	3.7E-09	7.5E-09	2.6E-07	0.013
	Dermal			0.58	1.7E-09	3.3E-09	1.2E-07	0.0058
	Ingestion	Metals	Aluminum	15,000	9.8E-05	--	6.9E-03	0.0069
	Dermal			15,000	--	--	--	--
	Ingestion		Antimony	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Arsenic	17	6.5E-08	9.7E-08	4.5E-06	0.015
	Dermal			17	1.0E-08	1.5E-08	7.1E-07	0.0024
	Ingestion		Cadmium	1.2	7.8E-09	--	5.5E-07	0.00055
	Dermal			1.2	2.5E-11	--	1.7E-09	6.9E-05
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	17	1.1E-07	--	7.7E-06	0.026
	Dermal			17	--	--	--	--
	Ingestion		Copper	130	8.3E-07	--	5.8E-05	0.0015
	Dermal			130	--	--	--	--
	Ingestion		Iron	32,000	2.0E-04	--	1.4E-02	0.020
	Dermal			32,000	--	--	--	--
	Ingestion		Manganese	1,700	1.1E-05	--	7.7E-04	0.0055
	Dermal			1,700	--	--	--	--
	Ingestion		Nickel	77	5.0E-07	--	3.5E-05	0.0017
	Dermal			77	--	--	--	--
	Ingestion		Thallium	3.1	2.0E-08	--	1.4E-06	0.14
	Dermal			3.1	--	--	--	--
	Ingestion		Vanadium	53	3.4E-07	--	2.4E-05	0.0048
	Dermal			53	--	--	--	--
	Ingestion		Zinc	290	1.9E-06	--	1.3E-04	0.00044
	Dermal			290	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	0.27	1.7E-09	1.3E-08	1.2E-07	--
	Dermal			0.27	7.2E-10	5.2E-09	5.0E-08	--
	Ingestion		Dibenz[a,h]anthracene	0.062	4.0E-10	2.9E-09	2.8E-08	--
	Dermal			0.062	1.6E-10	1.2E-09	1.1E-08	--
	Ingestion	Pesticides	Aldrin	0.0078	5.0E-11	8.6E-10	3.5E-09	0.00012
	Dermal			0.0078	--	--	--	--
	Ingestion		Heptachlor	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Heptachlor epoxide	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	--	--	--	--	--
	Dermal			--	--	--	--	--
	Cumulative	--	--	--	--	2.0E-07	--	0.30

Table 25. Excess Lifetime Cancer Risks and Noncancer Hazards from Marsh Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
Oritani Marsh	Ingestion	Metals	Mercury	3.2	2.0E-08	--	1.4E-06	0.0048
	Dermal			3.2	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	0.43	2.8E-09	5.6E-09	1.9E-07	0.0097
	Dermal			0.43	1.2E-09	2.5E-09	8.6E-08	0.0043
	Ingestion	Metals	Aluminum	12,000	7.8E-05	--	5.5E-03	0.0055
	Dermal			12,000	--	--	--	--
	Ingestion		Antimony	2.5	1.6E-08	--	1.1E-06	0.0028
	Dermal			2.5	--	--	--	--
	Ingestion		Arsenic	21	8.2E-08	1.2E-07	5.8E-06	0.019
	Dermal			21	1.3E-08	2.0E-08	9.1E-07	0.0030
	Ingestion		Cadmium	0.51	3.3E-09	--	2.3E-07	0.00023
	Dermal			0.51	1.0E-11	--	7.3E-10	2.9E-05
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	13	8.1E-08	--	5.7E-06	0.019
	Dermal			13	--	--	--	--
	Ingestion		Copper	91	5.9E-07	--	4.1E-05	0.0010
	Dermal			91	--	--	--	--
	Ingestion		Iron	28,000	1.8E-04	--	1.3E-02	0.018
	Dermal			28,000	--	--	--	--
	Ingestion		Manganese	470	3.0E-06	--	2.1E-04	0.0015
	Dermal			470	--	--	--	--
	Ingestion		Nickel	42	2.7E-07	--	1.9E-05	0.00095
	Dermal			42	--	--	--	--
	Ingestion		Thallium	3.4	2.2E-08	--	1.6E-06	0.16
	Dermal			3.4	--	--	--	--
	Ingestion		Vanadium	74	4.8E-07	--	3.4E-05	0.0067
	Dermal			74	--	--	--	--
	Ingestion		Zinc	200	1.3E-06	--	9.0E-05	3.0E-04
	Dermal			200	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	0.20	1.3E-09	9.4E-09	9.0E-08	--
	Dermal			0.20	5.3E-10	3.9E-09	3.7E-08	--
	Ingestion		Dibenz[a,h]anthracene	0.0083	5.4E-11	3.9E-10	3.8E-09	--
	Dermal			0.0083	2.2E-11	1.6E-10	1.5E-09	--
	Ingestion	Pesticides	Aldrin	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Heptachlor	0.0012	7.7E-12	3.5E-11	5.4E-10	1.1E-06
	Dermal			0.0012	--	--	--	--
	Ingestion		Heptachlor epoxide	0.0023	1.5E-11	1.4E-10	1.0E-09	8.0E-05
	Dermal			0.0023	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	--	--	--	--	--
	Dermal			--	--	--	--	--
	Cumulative	--	--	--	--	2.0E-07	--	0.20

Table 25. Excess Lifetime Cancer Risks and Noncancer Hazards from Marsh Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
Berry's Creek Marsh	Ingestion	Metals	Mercury	4.7	3.0E-08	--	2.1E-06	0.0071
	Dermal			4.7	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	0.38	2.4E-09	4.9E-09	1.7E-07	0.0086
	Dermal			0.38	1.1E-09	2.2E-09	7.6E-08	0.0038
	Ingestion	Metals	Aluminum	13,000	8.3E-05	--	5.8E-03	0.0058
	Dermal			13,000	--	--	--	--
	Ingestion		Antimony	2.5	1.6E-08	--	1.1E-06	0.0028
	Dermal			2.5	--	--	--	--
	Ingestion		Arsenic	25	9.5E-08	1.4E-07	6.7E-06	0.022
	Dermal			25	1.5E-08	2.3E-08	1.1E-06	0.0035
	Ingestion		Cadmium	1.4	8.7E-09	--	6.1E-07	0.00061
	Dermal			1.4	2.8E-11	--	1.9E-09	7.7E-05
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	14	8.9E-08	--	6.3E-06	0.021
	Dermal			14	--	--	--	--
	Ingestion		Copper	120	7.9E-07	--	5.5E-05	0.0014
	Dermal			120	--	--	--	--
	Ingestion		Iron	26,000	1.7E-04	--	1.2E-02	0.017
	Dermal			26,000	--	--	--	--
	Ingestion		Manganese	2,600	1.6E-05	--	1.2E-03	0.0082
	Dermal			2,600	--	--	--	--
	Ingestion		Nickel	73	4.7E-07	--	3.3E-05	0.0016
	Dermal			73	--	--	--	--
	Ingestion		Thallium	2.6	1.7E-08	--	1.2E-06	0.12
	Dermal			2.6	--	--	--	--
	Ingestion		Vanadium	63	4.0E-07	--	2.8E-05	0.0057
	Dermal			63	--	--	--	--
	Ingestion		Zinc	300	1.9E-06	--	1.3E-04	0.00045
	Dermal			300	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	0.30	1.9E-09	1.4E-08	1.4E-07	--
	Dermal			0.30	7.9E-10	5.8E-09	5.6E-08	--
	Ingestion		Dibenz[a,h]anthracene	0.077	5.0E-10	3.6E-09	3.5E-08	--
	Dermal			0.077	2.0E-10	1.5E-09	1.4E-08	--
	Ingestion	Pesticides	Aldrin	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Heptachlor	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Heptachlor epoxide	0.0015	9.7E-12	8.8E-11	6.8E-10	5.2E-05
	Dermal			0.0015	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	--	--	--	--	--
	Dermal			--	--	--	--	--
	Cumulative	--	--	--	--	2.0E-07	--	0.20

Table 25. Excess Lifetime Cancer Risks and Noncancer Hazards from Marsh Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
Former ENCAP Restoration Area	Ingestion	Metals	Mercury	6.9	4.5E-08	--	3.1E-06	0.010
	Dermal			6.9	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	0.20	1.3E-09	2.6E-09	9.1E-08	0.0046
	Dermal			0.20	5.8E-10	1.2E-09	4.0E-08	0.0020
	Ingestion	Metals	Aluminum	8,600	5.5E-05	--	3.9E-03	0.0039
	Dermal			8,600	--	--	--	--
	Ingestion		Antimony	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Arsenic	15	5.8E-08	8.7E-08	4.1E-06	0.014
	Dermal			15	9.2E-09	1.4E-08	6.4E-07	0.0021
	Ingestion		Cadmium	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	6.8	4.4E-08	--	3.1E-06	0.010
	Dermal			6.8	--	--	--	--
	Ingestion		Copper	110	7.3E-07	--	5.1E-05	0.0013
	Dermal			110	--	--	--	--
	Ingestion		Iron	14,000	9.0E-05	--	6.3E-03	0.009
	Dermal			14,000	--	--	--	--
	Ingestion		Manganese	160	1.0E-06	--	7.1E-05	5.00E-04
	Dermal			160	--	--	--	--
	Ingestion		Nickel	42	2.7E-07	--	1.9E-05	0.00096
	Dermal			42	--	--	--	--
	Ingestion		Thallium	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Vanadium	78	5.0E-07	--	3.5E-05	0.0071
	Dermal			78	--	--	--	--
	Ingestion		Zinc	140	9.3E-07	--	6.5E-05	0.00022
	Dermal			140	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	0.35	2.3E-09	1.7E-08	1.6E-07	--
	Dermal			0.35	9.3E-10	6.8E-09	6.5E-08	--
	Ingestion		Dibenz[a,h]anthracene	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion	Pesticides	Aldrin	0.0016	1.0E-11	1.8E-10	7.2E-10	2.4E-05
	Dermal			0.0016	--	--	--	--
	Ingestion		Heptachlor	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Heptachlor epoxide	0.0020	1.3E-11	1.2E-10	9.0E-10	7.0E-05
	Dermal			0.0020	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	--	--	--	--	--
	Dermal			--	--	--	--	--
	Cumulative	--	--	--	--	1.0E-07	--	0.070

Notes:

ADD = average daily dose
COPC = chemical of potential concern
EPC = exposure point concentration
HQ = hazard quotient
LADD = lifetime average daily dose
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
-- = no data/not applicable

Table 26. Excess Lifetime Cancer Risks and Noncancer Hazards from Waterway Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
UPIC	Ingestion	Metals	Mercury	210	1.4E-06	--	9.5E-05	0.32
	Dermal			210	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	11	6.9E-08	1.4E-07	4.9E-06	0.24
	Dermal			11	3.1E-08	6.1E-08	2.1E-06	0.11
	Ingestion	Metals	Aluminum	14,000	9.2E-05	--	6.4E-03	0.0064
	Dermal			14,000	--	--	--	--
	Ingestion		Antimony	1.9	1.2E-08	--	8.4E-07	0.0021
	Dermal			1.9	--	--	--	--
	Ingestion		Arsenic	45	1.8E-07	2.6E-07	1.2E-05	0.041
	Dermal			45	2.8E-08	4.2E-08	1.9E-06	0.0065
	Ingestion		Cadmium	92	5.9E-07	--	4.1E-05	0.041
	Dermal			92	1.9E-09	--	1.3E-07	0.0052
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	16	1.1E-07	--	7.4E-06	0.025
	Dermal			16	--	--	--	--
	Ingestion		Copper	1,800	1.2E-05	--	8.3E-04	0.021
	Dermal			1,800	--	--	--	--
	Ingestion		Iron	33,000	2.2E-04	--	1.5E-02	0.022
	Dermal			33,000	--	--	--	--
	Ingestion		Manganese	560	3.6E-06	--	2.5E-04	0.0018
	Dermal			560	--	--	--	--
	Ingestion		Nickel	310	2.0E-06	--	1.4E-04	0.0069
	Dermal			310	--	--	--	--
	Ingestion		Thallium	2.7	1.7E-08	--	1.2E-06	0.12
	Dermal			2.7	--	--	--	--
	Ingestion		Vanadium	55	3.5E-07	--	2.5E-05	0.0050
	Dermal			55	--	--	--	--
	Ingestion		Zinc	2,700	1.8E-05	--	1.2E-03	0.0041
	Dermal			2,700	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	1.2	7.5E-09	5.5E-08	5.3E-07	--
	Dermal			1.2	3.1E-09	2.3E-08	2.2E-07	--
	Ingestion		Dibenz[a,h]anthracene	0.31	2.0E-09	1.4E-08	1.4E-07	--
	Dermal			0.31	8.1E-10	5.9E-09	5.7E-08	--
	Ingestion	Pesticides	Aldrin	0.050	3.2E-10	5.5E-09	2.3E-08	0.00075
	Dermal			0.050	--	--	--	--
	Ingestion		Heptachlor	0.029	1.9E-10	8.4E-10	1.3E-08	2.6E-05
	Dermal			0.029	--	--	--	--
	Ingestion		Heptachlor epoxide	0.044	2.8E-10	2.6E-09	2.0E-08	0.0015
	Dermal			0.044	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	27	1.7E-07	8.0E-09	1.2E-05	0.024
	Dermal			27	--	--	--	--
	Cumulative	--	--	--	--	6.0E-07	--	1.0

Table 26. Excess Lifetime Cancer Risks and Noncancer Hazards from Waterway Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
UBC	Ingestion	Metals	Mercury	150	9.5E-07	--	6.6E-05	0.22
	Dermal			150	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	4.0	2.6E-08	5.1E-08	1.8E-06	0.090
	Dermal			4.0	1.1E-08	2.3E-08	7.9E-07	0.040
	Ingestion	Metals	Aluminum	11,000	6.9E-05	--	4.8E-03	0.0048
	Dermal			11,000	--	--	--	--
	Ingestion		Antimony	1.3	8.5E-09	--	6.0E-07	0.0015
	Dermal			1.3	--	--	--	--
	Ingestion		Arsenic	26	1.0E-07	1.5E-07	7.2E-06	0.024
	Dermal			26	1.6E-08	2.4E-08	1.1E-06	0.0038
	Ingestion		Cadmium	14	8.8E-08	--	6.2E-06	0.0062
	Dermal			14	2.8E-10	--	1.9E-08	0.00078
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	12	7.5E-08	--	5.3E-06	0.018
	Dermal			12	--	--	--	--
	Ingestion		Copper	210	1.4E-06	--	9.5E-05	0.0024
	Dermal			210	--	--	--	--
	Ingestion		Iron	26,000	1.7E-04	--	1.2E-02	0.017
	Dermal			26,000	--	--	--	--
	Ingestion		Manganese	540	3.5E-06	--	2.5E-04	0.0018
	Dermal			540	--	--	--	--
	Ingestion		Nickel	50	3.3E-07	--	2.3E-05	0.0011
	Dermal			50	--	--	--	--
	Ingestion		Thallium	1.6	1.0E-08	--	7.1E-07	0.071
	Dermal			1.6	--	--	--	--
	Ingestion		Vanadium	36	2.3E-07	--	1.6E-05	0.0032
	Dermal			36	--	--	--	--
	Ingestion		Zinc	1,700	1.1E-05	--	7.5E-04	0.0025
	Dermal			1,700	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	1.3	8.4E-09	6.2E-08	5.9E-07	--
	Dermal			1.3	3.5E-09	2.5E-08	2.4E-07	--
	Ingestion		Dibenz[a,h]anthracene	0.38	2.4E-09	1.8E-08	1.7E-07	--
	Dermal			0.38	1.0E-09	7.3E-09	7.0E-08	--
	Ingestion	Pesticides	Aldrin	0.026	1.7E-10	2.9E-09	1.2E-08	4.0E-04
	Dermal			0.026	--	--	--	--
	Ingestion		Heptachlor	0.015	9.6E-11	4.3E-10	6.7E-09	1.3E-05
	Dermal			0.015	--	--	--	--
	Ingestion		Heptachlor epoxide	0.047	3.0E-10	2.7E-09	2.1E-08	0.0016
	Dermal			0.047	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	0.0015	9.8E-12	4.5E-13	6.9E-10	1.4E-06
	Dermal			0.0015	--	--	--	--
	Cumulative	--	--	--	--	4.0E-07	--	0.50

Table 26. Excess Lifetime Cancer Risks and Noncancer Hazards from Waterway Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
MBC	Ingestion	Metals	Mercury	38	2.5E-07	--	1.7E-05	0.057
	Dermal			38	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	4.6	3.0E-08	6.0E-08	2.1E-06	0.10
	Dermal			4.6	1.3E-08	2.6E-08	9.2E-07	0.046
	Ingestion	Metals	Aluminum	12,000	7.9E-05	--	5.5E-03	0.0055
	Dermal			12,000	--	--	--	--
	Ingestion		Antimony	0.87	5.6E-09	--	3.9E-07	0.00098
	Dermal			0.87	--	--	--	--
	Ingestion		Arsenic	18	7.1E-08	1.1E-07	5.0E-06	0.017
	Dermal			18	1.1E-08	1.7E-08	7.9E-07	0.0026
	Ingestion		Cadmium	4.4	2.8E-08	--	2.0E-06	0.0020
	Dermal			4.4	8.9E-11	--	6.3E-09	0.00025
	Ingestion		Chromium (VI)	3.8	2.5E-08	1.2E-08	1.7E-06	0.00058
	Dermal			3.8	--	--	--	--
	Ingestion		Cobalt	11	6.9E-08	--	4.9E-06	0.016
	Dermal			11	--	--	--	--
	Ingestion		Copper	130	8.6E-07	--	6.1E-05	0.0015
	Dermal			130	--	--	--	--
	Ingestion		Iron	30,000	1.9E-04	--	1.3E-02	0.019
	Dermal			30,000	--	--	--	--
	Ingestion		Manganese	700	4.5E-06	--	3.1E-04	0.0022
	Dermal			700	--	--	--	--
	Ingestion		Nickel	37	2.4E-07	--	1.7E-05	0.00083
	Dermal			37	--	--	--	--
	Ingestion		Thallium	1.1	6.9E-09	--	4.8E-07	0.048
	Dermal			1.1	--	--	--	--
	Ingestion		Vanadium	33	2.1E-07	--	1.5E-05	0.0030
	Dermal			33	--	--	--	--
	Ingestion		Zinc	600	3.9E-06	--	2.7E-04	0.00091
	Dermal			600	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	0.78	5.1E-09	3.7E-08	3.5E-07	--
	Dermal			0.78	2.1E-09	1.5E-08	1.5E-07	--
	Ingestion		Dibenz[a,h]anthracene	0.28	1.8E-09	1.3E-08	1.3E-07	--
	Dermal			0.28	7.5E-10	5.5E-09	5.3E-08	--
	Ingestion	Pesticides	Aldrin	0.014	8.8E-11	1.5E-09	6.1E-09	2.0E-04
	Dermal			0.014	--	--	--	--
	Ingestion		Heptachlor	0.0048	3.1E-11	1.4E-10	2.2E-09	4.3E-06
	Dermal			0.0048	--	--	--	--
	Ingestion		Heptachlor epoxide	0.028	1.8E-10	1.6E-09	1.3E-08	0.00097
	Dermal			0.028	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	0.0012	7.7E-12	3.6E-13	5.4E-10	1.1E-06
	Dermal			0.0012	--	--	--	--
	Cumulative	--	--	--	--	3.0E-07	--	0.30

Table 26. Excess Lifetime Cancer Risks and Noncancer Hazards from Waterway Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
BCC	Ingestion	Metals	Mercury	11	6.8E-08	--	4.8E-06	0.016
	Dermal			11	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	0.99	6.4E-09	1.3E-08	4.5E-07	0.022
	Dermal			0.99	2.8E-09	5.6E-09	2.0E-07	0.0099
	Ingestion	Metals	Aluminum	11,000	7.2E-05	--	5.0E-03	0.0050
	Dermal			11,000	--	--	--	--
	Ingestion		Antimony	1.0	6.7E-09	--	4.7E-07	0.0012
	Dermal			1.0	--	--	--	--
	Ingestion		Arsenic	14	5.4E-08	8.1E-08	3.8E-06	0.013
	Dermal			14	8.5E-09	1.3E-08	6.0E-07	0.0020
	Ingestion		Cadmium	3.7	2.4E-08	--	1.7E-06	0.0017
	Dermal			3.7	7.6E-11	--	5.3E-09	0.00021
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	8.9	5.8E-08	--	4.0E-06	0.013
	Dermal			8.9	--	--	--	--
	Ingestion		Copper	130	8.7E-07	--	6.1E-05	0.0015
	Dermal			130	--	--	--	--
	Ingestion		Iron	27,000	1.8E-04	--	1.2E-02	0.018
	Dermal			27,000	--	--	--	--
	Ingestion		Manganese	390	2.5E-06	--	1.8E-04	0.0013
	Dermal			390	--	--	--	--
	Ingestion		Nickel	35	2.2E-07	--	1.6E-05	0.00078
	Dermal			35	--	--	--	--
	Ingestion		Thallium	1.5	9.7E-09	--	6.8E-07	0.068
	Dermal			1.5	--	--	--	--
	Ingestion		Vanadium	29	1.9E-07	--	1.3E-05	0.0027
	Dermal			29	--	--	--	--
	Ingestion		Zinc	360	2.3E-06	--	1.6E-04	0.00054
	Dermal			360	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	0.75	4.9E-09	3.6E-08	3.4E-07	--
	Dermal			0.75	2.0E-09	1.5E-08	1.4E-07	--
	Ingestion		Dibenz[a,h]anthracene	0.18	1.2E-09	8.5E-09	8.2E-08	--
	Dermal			0.18	4.8E-10	3.5E-09	3.3E-08	--
	Ingestion	Pesticides	Aldrin	0.010	6.5E-11	1.1E-09	4.5E-09	0.00015
	Dermal			0.010	--	--	--	--
	Ingestion		Heptachlor	0.0066	4.3E-11	1.9E-10	3.0E-09	6.0E-06
	Dermal			0.0066	--	--	--	--
	Ingestion		Heptachlor epoxide	0.0066	4.3E-11	3.9E-10	3.0E-09	0.00023
	Dermal			0.0066	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	--	--	--	--	--
	Dermal			--	--	--	--	--
	Cumulative	--	--	--	--	2.0E-07	--	0.20

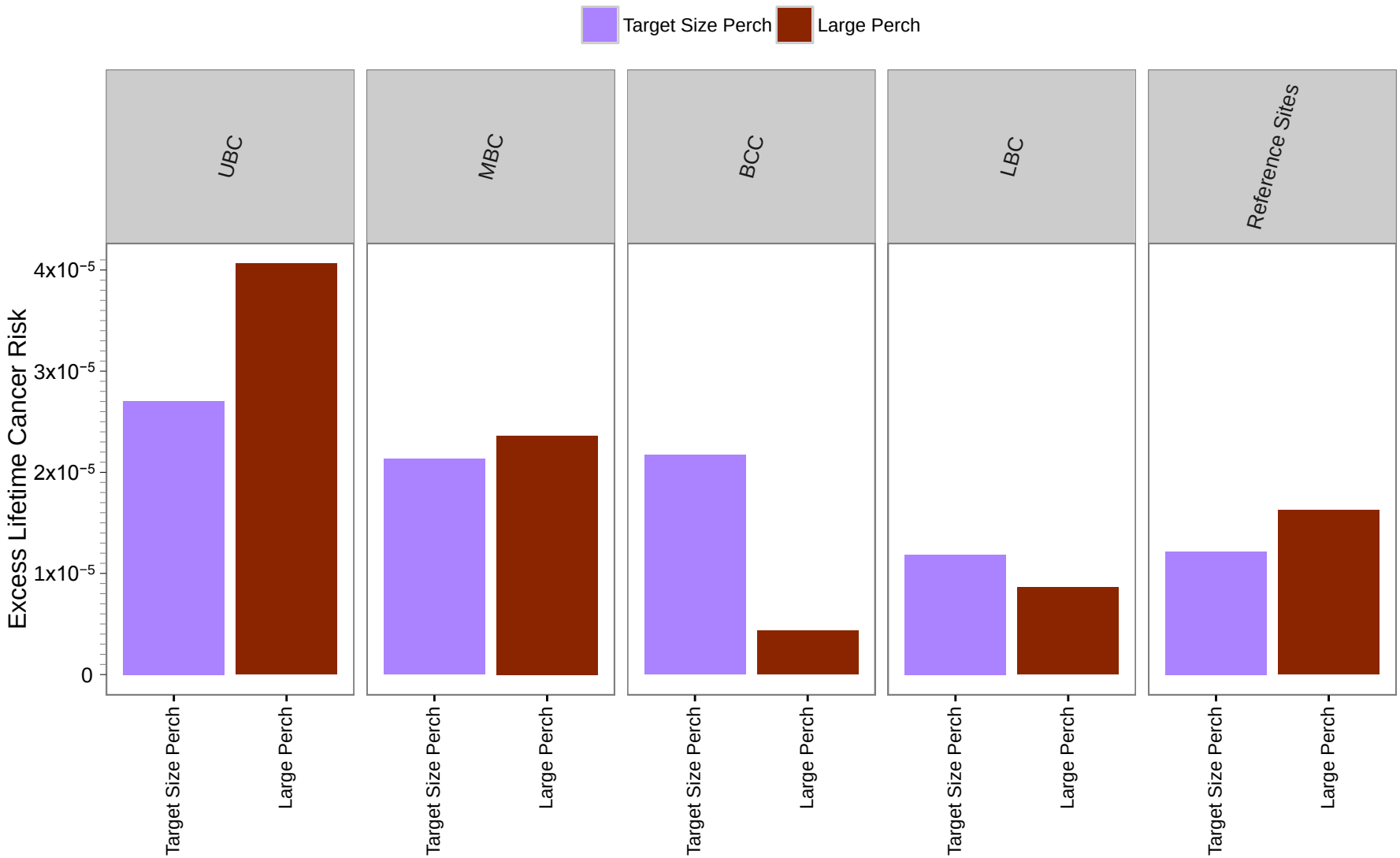
Table 26. Excess Lifetime Cancer Risks and Noncancer Hazards from Waterway Sediment (All Samples), Construction Workers

Exposure Unit	Exposure Route	Chemical Class	COPC	EPC (mg/kg)	Excess Lifetime Cancer Risk LADD (mg/kg-day)	Excess Lifetime Cancer Risk Risk	Noncancer Hazard ADD (mg/kg-day)	Noncancer Hazard HQ
LBC	Ingestion	Metals	Mercury	8.2	5.3E-08	--	3.7E-06	0.012
	Dermal			8.2	--	--	--	--
	Ingestion	PCBs	PCBs (total Aroclors)	0.62	4.0E-09	8.0E-09	2.8E-07	0.014
	Dermal			0.62	1.8E-09	3.5E-09	1.2E-07	0.0062
	Ingestion	Metals	Aluminum	13,000	8.1E-05	--	5.7E-03	0.0057
	Dermal			13,000	--	--	--	--
	Ingestion		Antimony	0.68	4.4E-09	--	3.1E-07	0.00077
	Dermal			0.68	--	--	--	--
	Ingestion		Arsenic	22	8.6E-08	1.3E-07	6.0E-06	0.020
	Dermal			22	1.4E-08	2.0E-08	9.5E-07	0.0032
	Ingestion		Cadmium	3.4	2.2E-08	--	1.5E-06	0.0015
	Dermal			3.4	6.9E-11	--	4.8E-09	0.00019
	Ingestion		Chromium (VI)	--	--	--	--	--
	Dermal			--	--	--	--	--
	Ingestion		Cobalt	12	7.8E-08	--	5.4E-06	0.018
	Dermal			12	--	--	--	--
	Ingestion		Copper	130	8.6E-07	--	6.0E-05	0.0015
	Dermal			130	--	--	--	--
	Ingestion		Iron	33,000	2.2E-04	--	1.5E-02	0.022
	Dermal			33,000	--	--	--	--
	Ingestion		Manganese	440	2.8E-06	--	2.0E-04	0.0014
	Dermal			440	--	--	--	--
	Ingestion		Nickel	41	2.7E-07	--	1.9E-05	0.00093
	Dermal			41	--	--	--	--
	Ingestion		Thallium	1.3	8.7E-09	--	6.1E-07	0.061
	Dermal			1.3	--	--	--	--
	Ingestion		Vanadium	36	2.4E-07	--	1.6E-05	0.0033
	Dermal			36	--	--	--	--
	Ingestion		Zinc	580	3.7E-06	--	2.6E-04	0.00087
	Dermal			580	--	--	--	--
	Ingestion	PAHs	Benzo[a]pyrene	1.3	8.6E-09	6.3E-08	6.0E-07	--
	Dermal			1.3	3.5E-09	2.6E-08	2.5E-07	--
	Ingestion		Dibenz[a,h]anthracene	0.31	2.0E-09	1.5E-08	1.4E-07	--
	Dermal			0.31	8.2E-10	6.0E-09	5.7E-08	--
	Ingestion	Pesticides	Aldrin	0.0061	3.9E-11	6.6E-10	2.7E-09	9.1E-05
	Dermal			0.0061	--	--	--	--
	Ingestion		Heptachlor	0.00056	3.6E-12	1.6E-11	2.5E-10	5.1E-07
	Dermal			0.00056	--	--	--	--
	Ingestion		Heptachlor epoxide	0.0027	1.8E-11	1.6E-10	1.2E-09	9.6E-05
	Dermal			0.0027	--	--	--	--
	Ingestion	Volatiles	Trichloroethene	0.0031	2.0E-11	9.2E-13	1.4E-09	2.8E-06
	Dermal			0.0031	--	--	--	--
	Cumulative	--	--	--	--	3.0E-07	--	0.20

Notes:

ADD = average daily dose
BCC = Berry's Creek Canal
COPC = chemical of potential concern
EPC = exposure point concentration
HQ = hazard quotient
LADD = lifetime average daily dose
LBC = Lower Berry's Creek
MBC = Middle Berry's Creek
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
UBC = Upper Berry's Creek
-- = no data/not applicable

FIGURES



Notes: Target white perch are composite samples consisting of fish primarily between 150−190 mm. Large white perch are individual samples of fish >200 mm. Risks represent PCBs (total Aroclors) only, which is the only carcinogenic COPC evaluated in white perch. Minor breaks denote intervals of $1x10^{-6}$.

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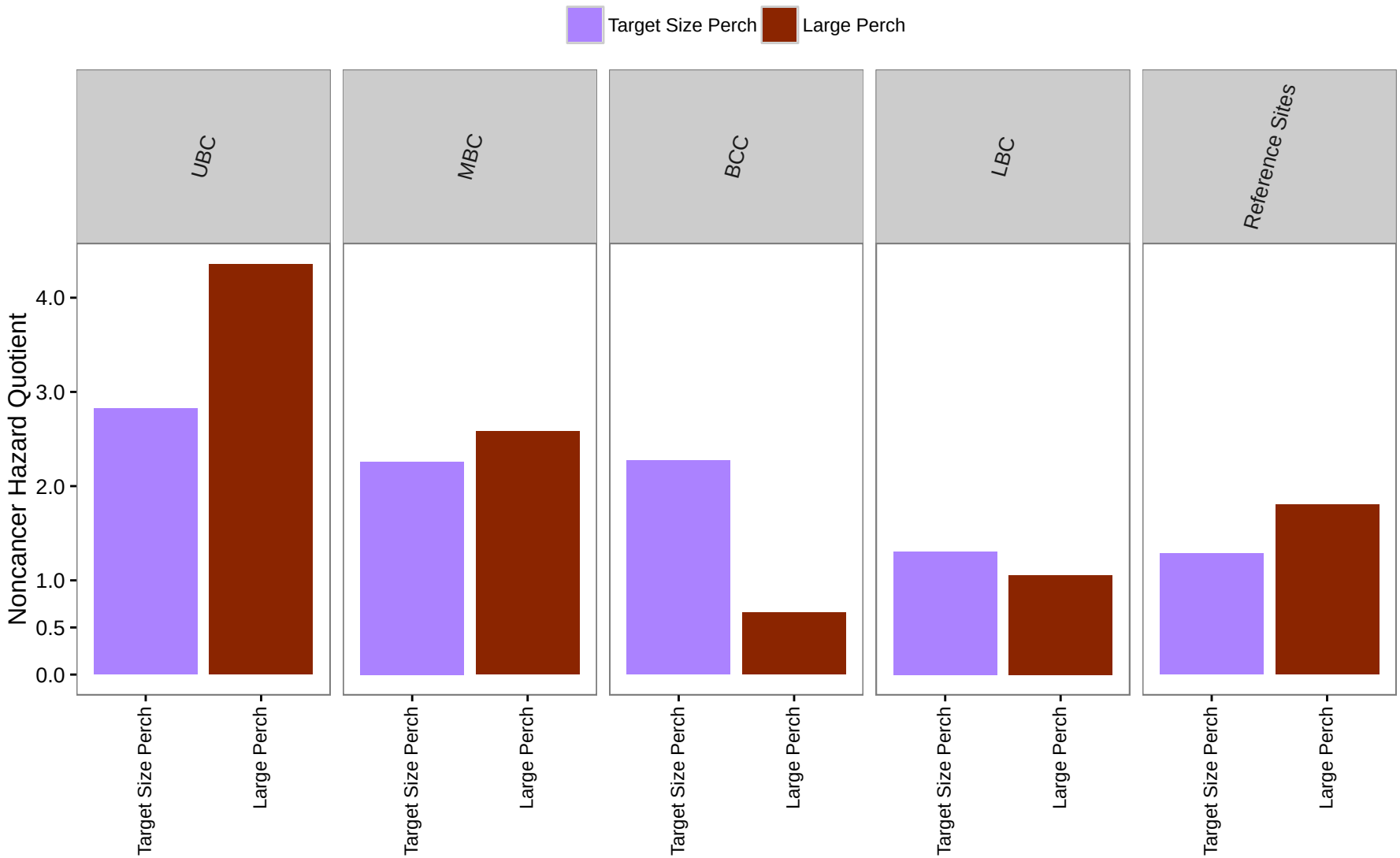
Excess Lifetime Cancer Risk for COPCs in Large White Perch and Perch of Target Size by Exposure Unit − Waterways

Attachment M5: Uncertainty Evaluation
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **1**



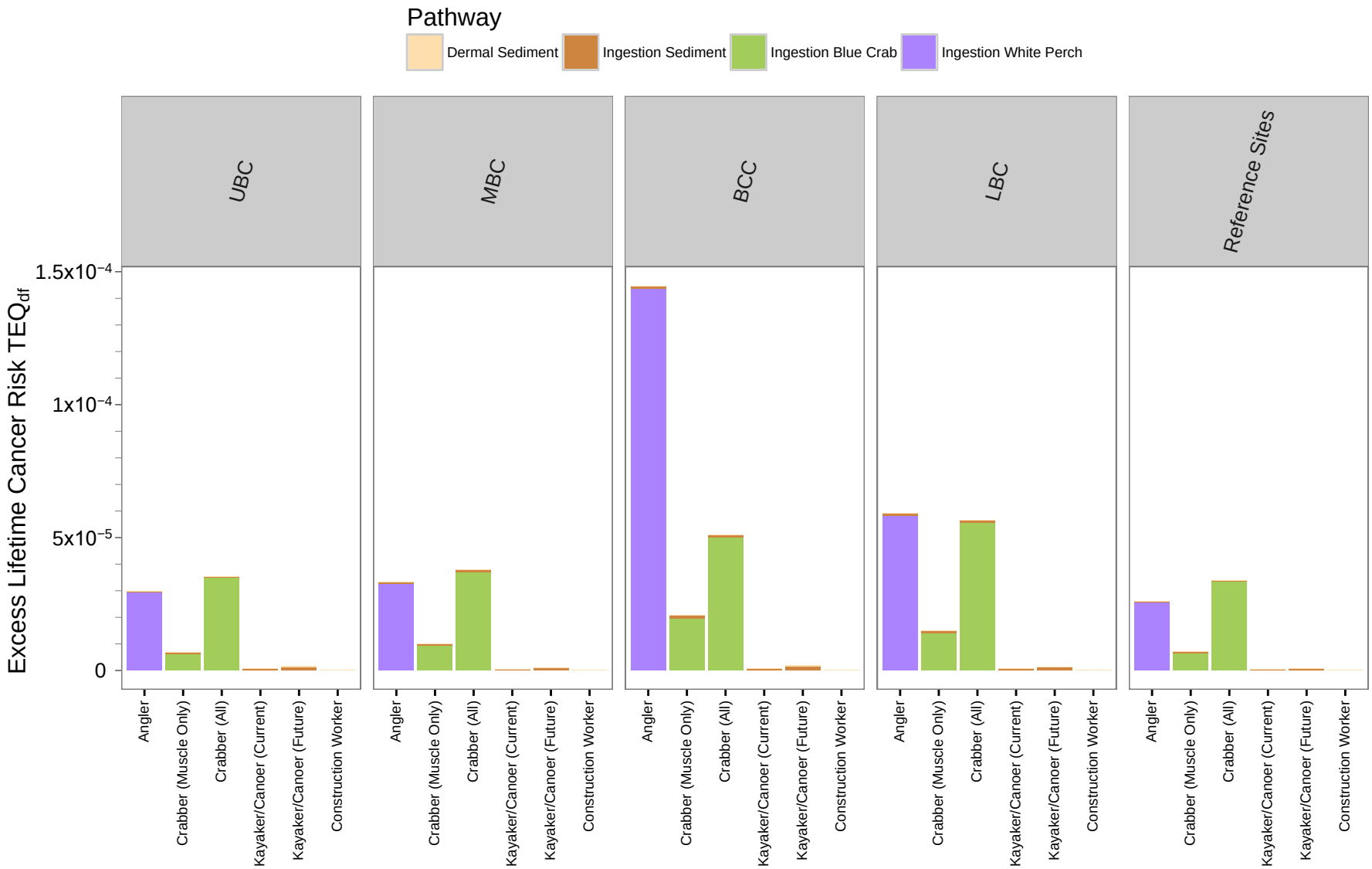
Notes: Target white perch are composite samples consisting of fish primarily between 150−190 mm. Large white perch are individual samples of fish >200 mm. Risks represent the subset of COPCs for which data are available in both large and target size white perch.

DRAFT

Noncancer Hazards for COPCs in Large White Perch and Perch of Target Size by Exposure Unit − Waterways

Attachment M5: Uncertainty Evaluation
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **2**



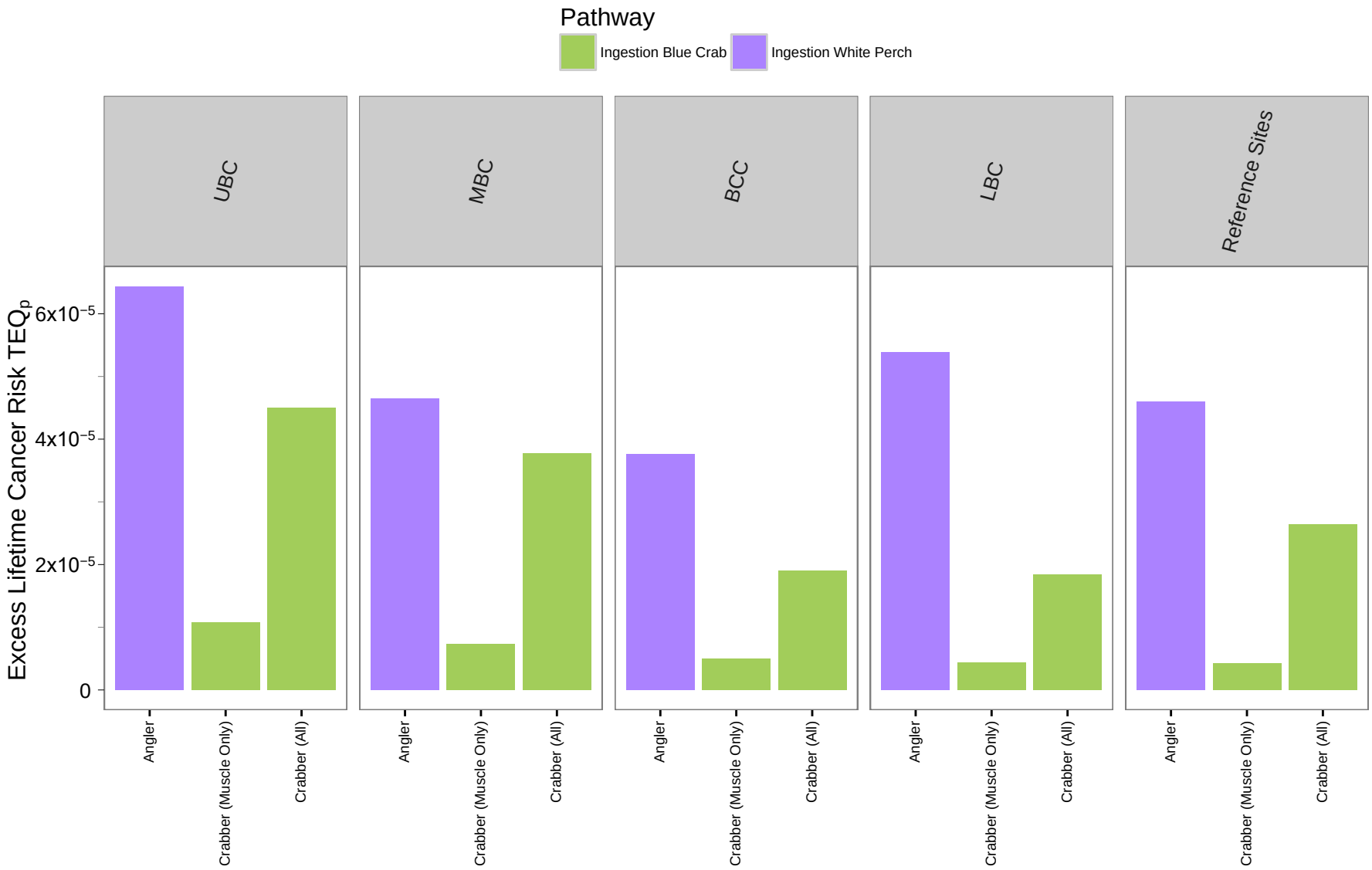
DRAFT

Notes:
Risks for construction worker were estimated using surface sediment (no TEQ_{df} data available for deep sediment). Crabber (all) = blue crab muscle & hepatopancreas. Minor breaks denote intervals of $1x10^{-5}$.

Excess Lifetime Cancer Risks for TEQ_{df} by Exposure Unit – Waterways

Attachment M5: Uncertainty Evaluation
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
3



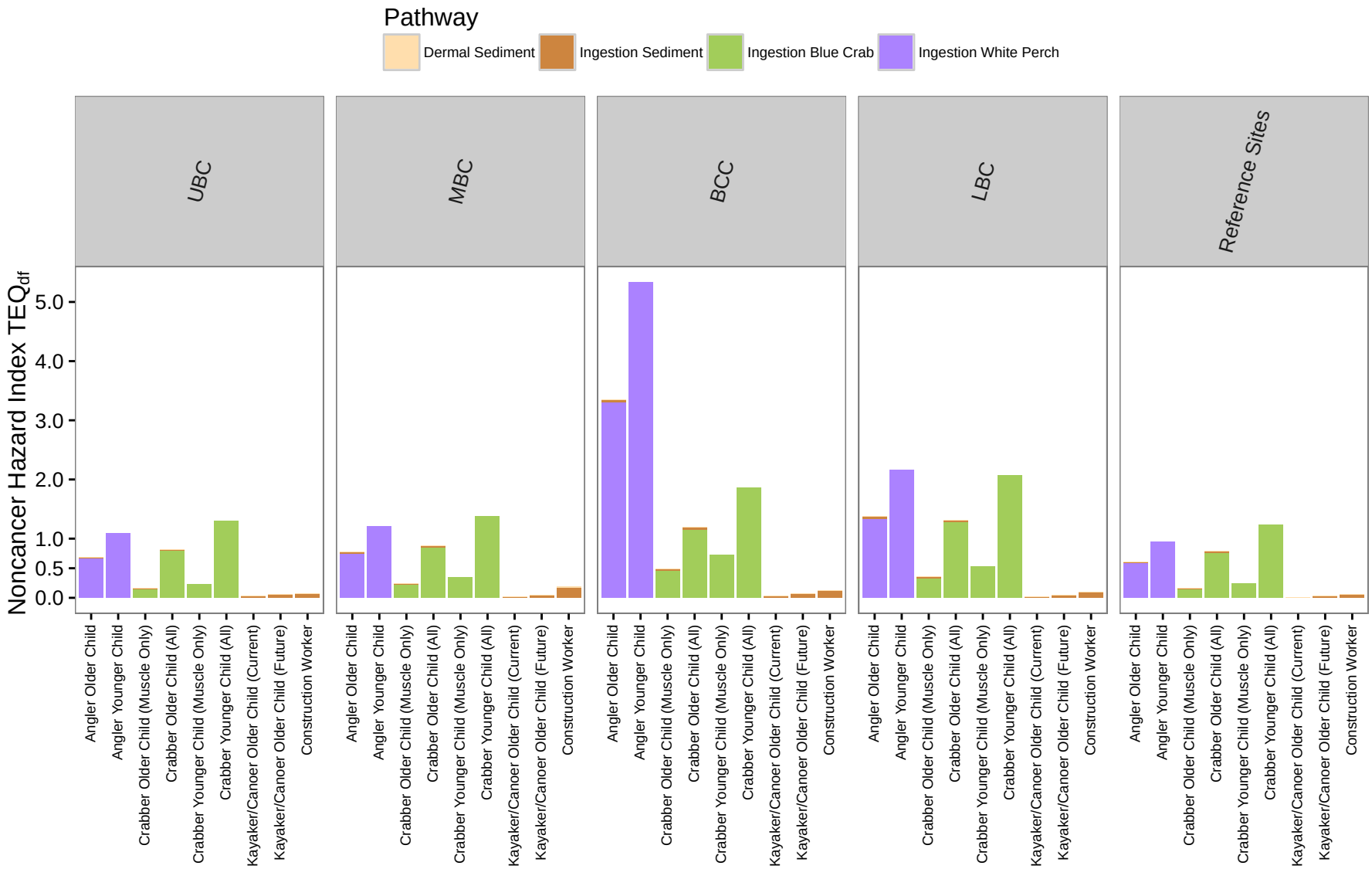
DRAFT

Notes:
No TEQ_p data available for sediment. Crabber (all) = blue crab muscle & hepatopancreas. Minor breaks denote intervals of $1x10^{-5}$.

Excess Lifetime Cancer Risks for TEQ_p by Exposure Unit – Waterways

Attachment M5: Uncertainty Evaluation
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **4**



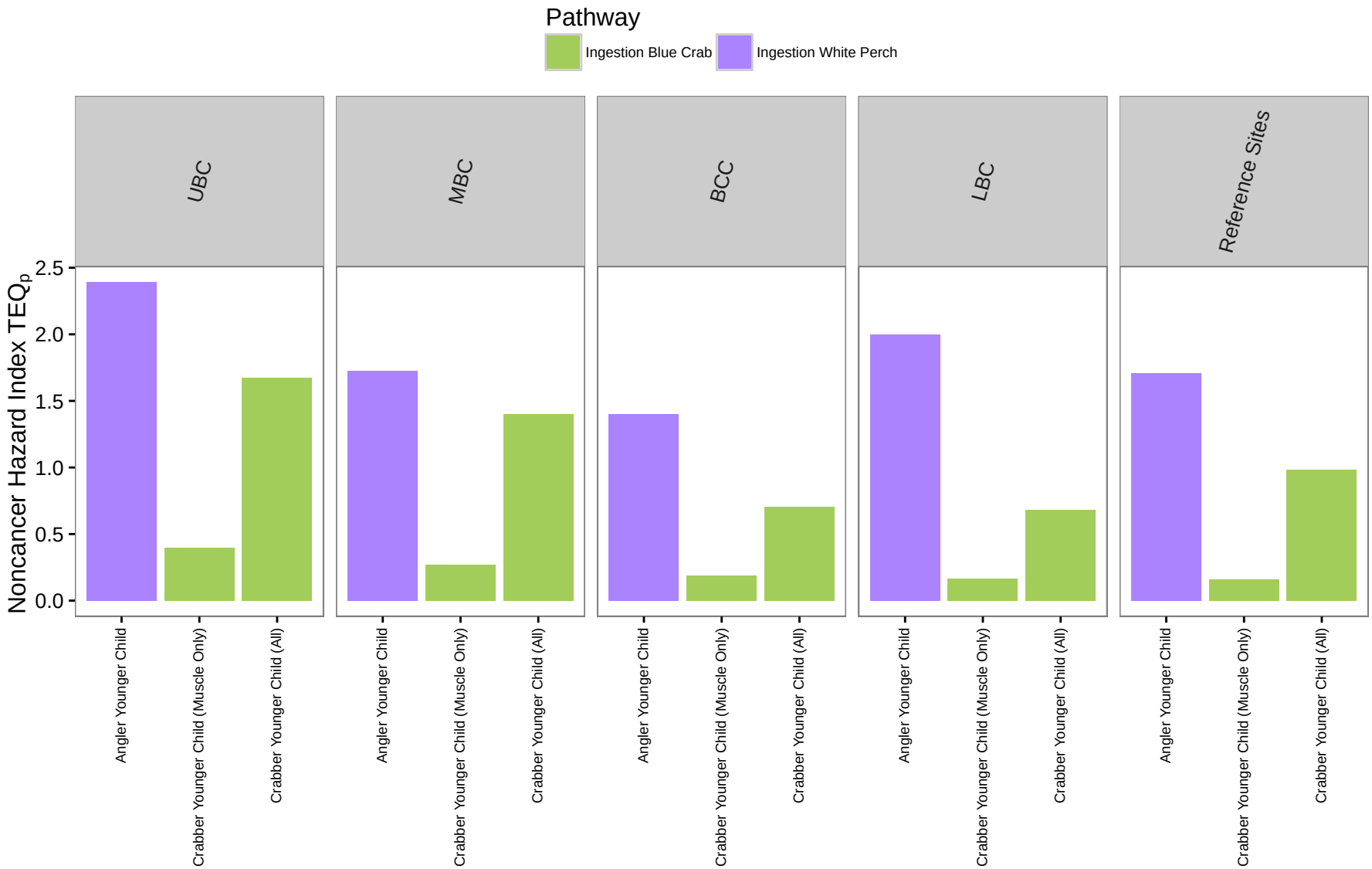
DRAFT

Notes:
Noncancer risks greater for older child than adult; therefore, adult age class not depicted for angler/crabber scenarios. Younger child exposed to tissue only. Construction worker risks based on surface sediment (no deep sediment TEQ_{df} data). Crabber (all) = blue crab muscle & hepatopancreas.

Noncancer Hazards for TEQ_{df} by Exposure Unit – Waterways

Attachment M5: Uncertainty Evaluation
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
5



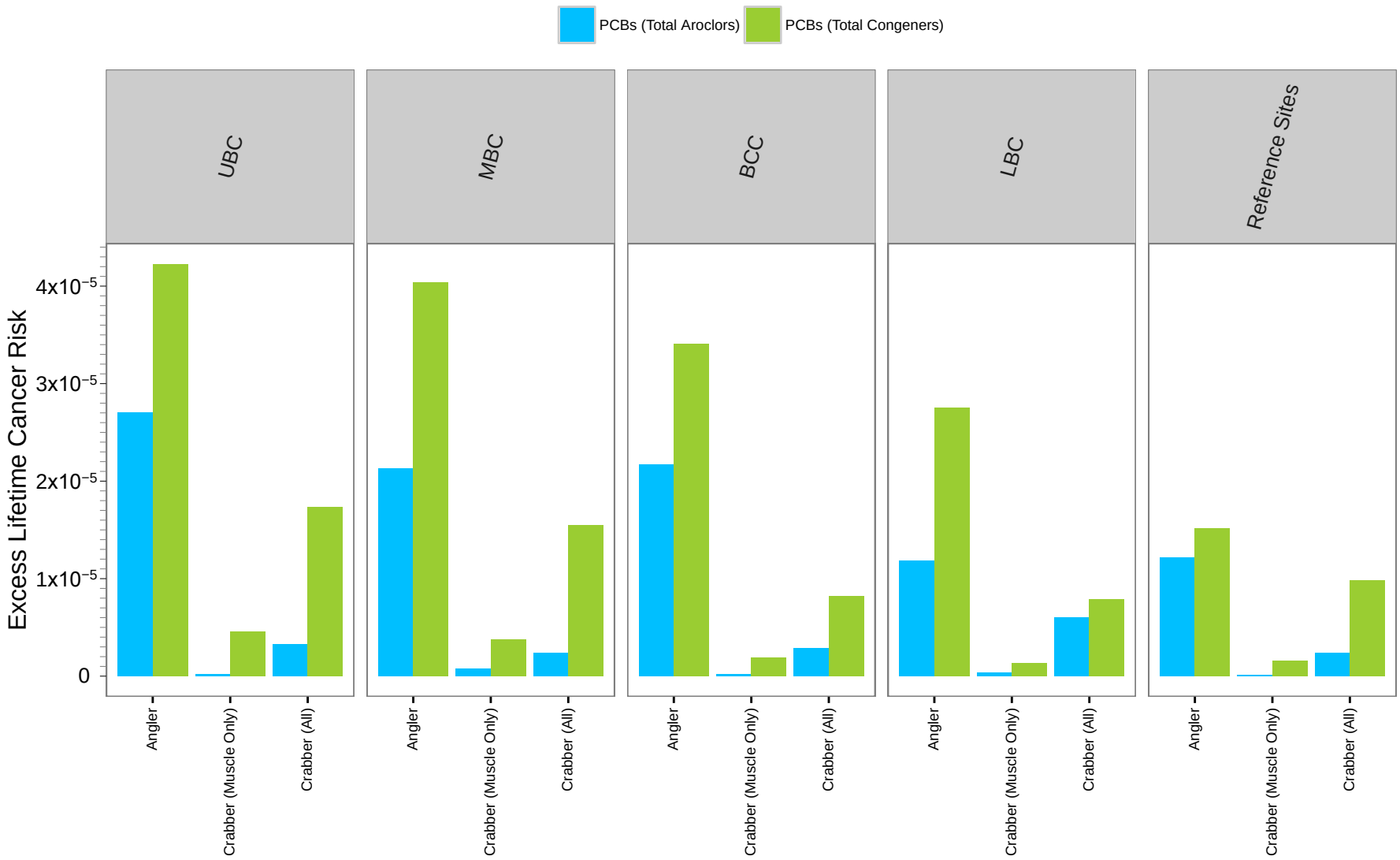
DRAFT

Notes:
No TEQ_p data available for sediment. Showing age class with maximum risk from tissue ingestion (younger child). Crabber (all) = blue crab muscle & hepatopancreas.

Noncancer Hazards for TEQ_p by Exposure Unit – Waterways

Attachment M5: Uncertainty Evaluation
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
6



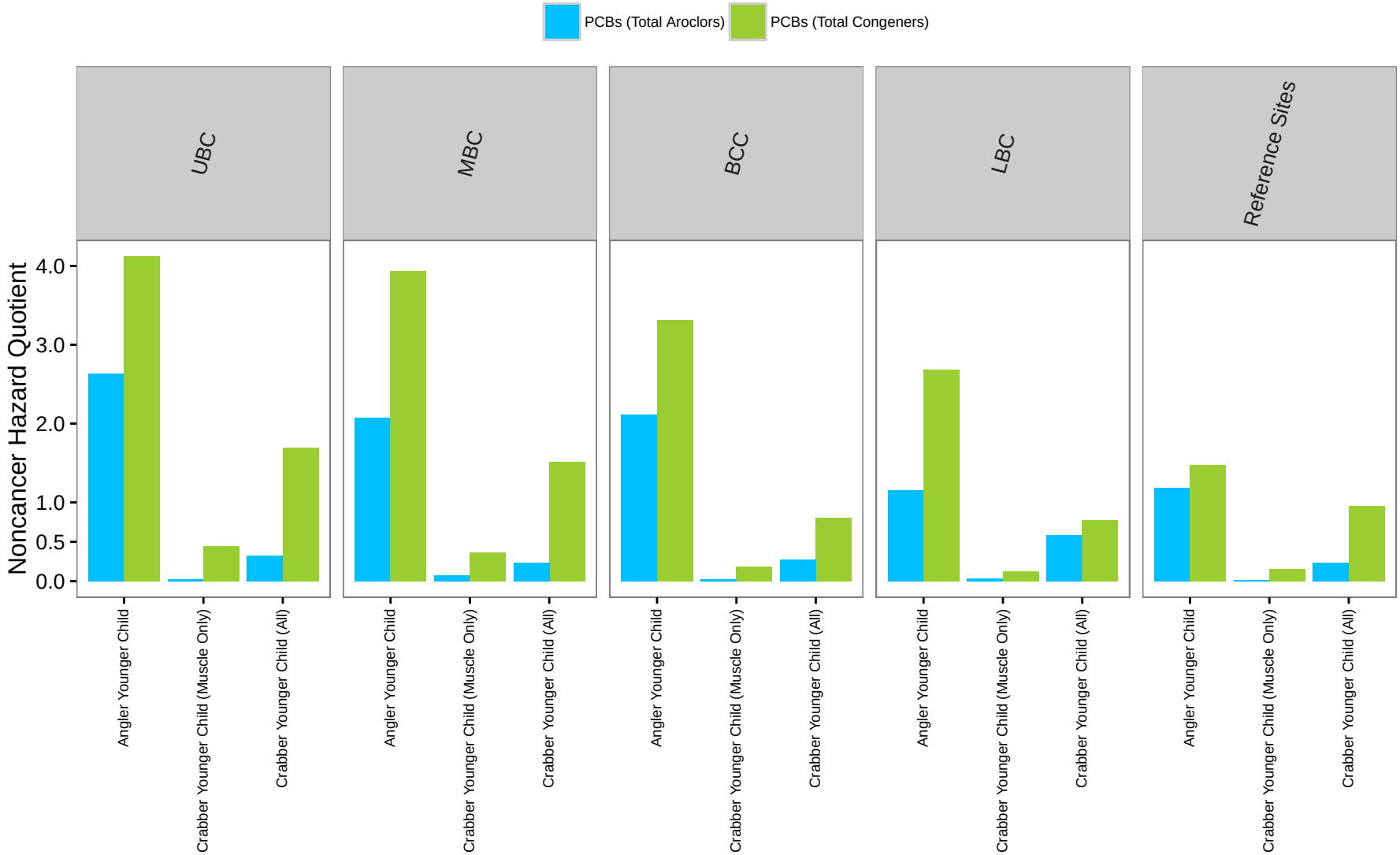
DRAFT

Notes:
Includes only dietary ingestion pathway. No PCBs (total congeners) data available for sediment.
Crabber (all) = blue crab muscle & hepatopancreas. Minor breaks denote intervals of $1x10^{-6}$.

Excess Lifetime Cancer Risks for Aroclor and Congener PCBs by Exposure Unit – Waterways

Attachment M5: Uncertainty Evaluation
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **7**



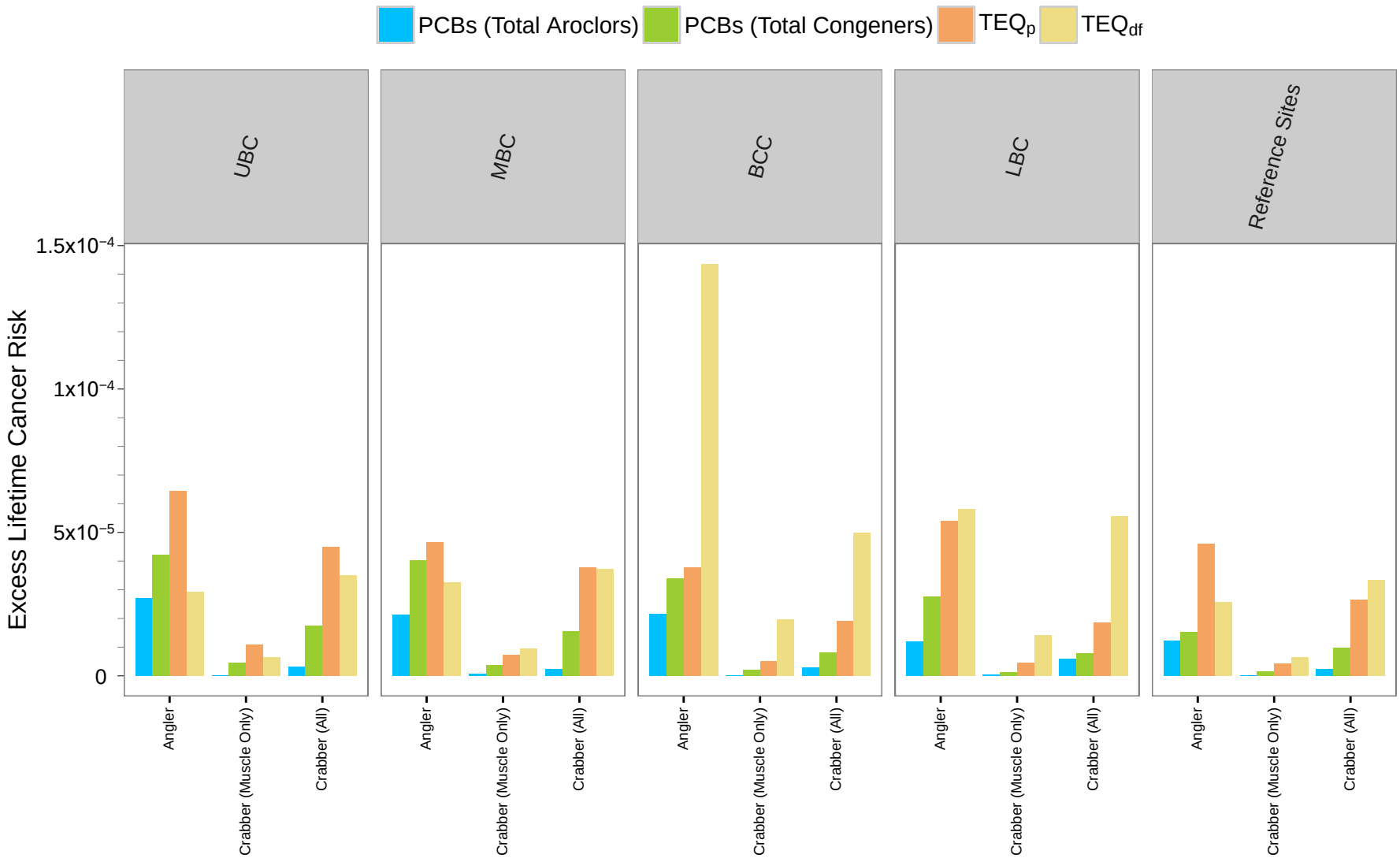
DRAFT

Notes:
Includes only dietary ingestion pathway. No PCBs (total congeners) data available for sediment.
Crabber (all) = blue crab muscle & hepatopancreas. Showing age class with maximum risk from tissue ingestion (younger child).

Noncancer Hazards for Aroclor and Congener PCBs by Exposure Unit – Waterways

Attachment M5: Uncertainty Evaluation
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure
8



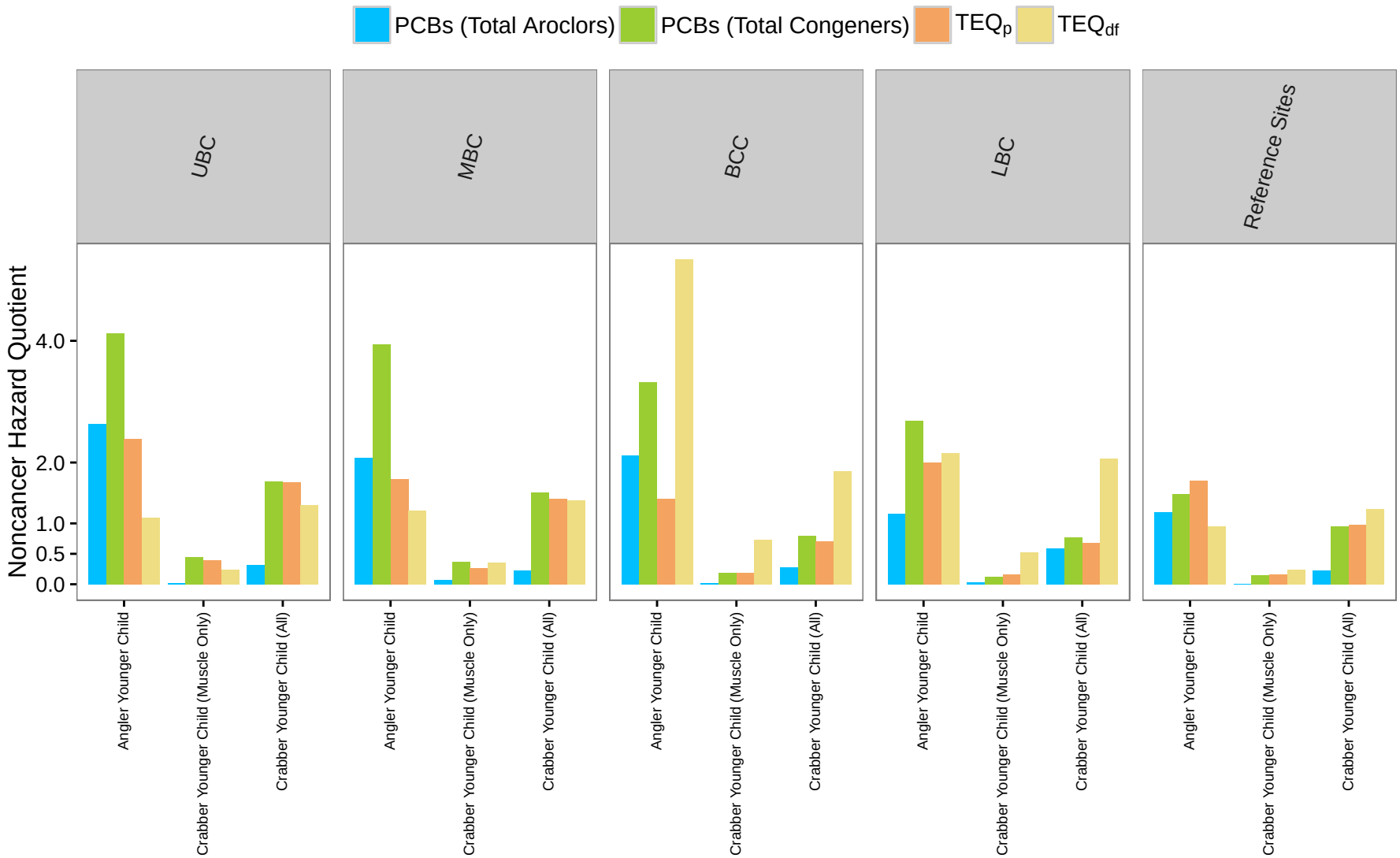
DRAFT

Notes:
Includes only ingestion pathway. Crabber (all) = blue crab muscle & hepatopancreas. Minor breaks denote intervals of $1x10^{-5}$.

Excess Lifetime Cancer Risks for Dioxins, Furans, and PCBs by Exposure Unit − Waterways

Attachment M5: Uncertainty Evaluation
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **9**



DRAFT

Notes:
Includes only ingestion pathway. Crabber (all) = blue crab muscle & hepatopancreas. Showing age class with maximum risk from tissue ingestion (younger child).

Noncancer Hazards for Dioxins, Furans, and PCBs by Exposure Unit – Waterways

Attachment M5: Uncertainty Evaluation
Baseline Human Health Risk Assessment
Berry's Creek Study Area Remedial Investigation

Figure **10**

Draft
Exhibit 1: EPC Distributions

Quantitative Risk Analysis to Support Uncertainty Evaluation

Berry's Creek Study Area Remedial Investigation

Submitted to

U.S. Environmental Protection Agency

Submitted by

Berry's Creek Study Area Cooperating PRP Group

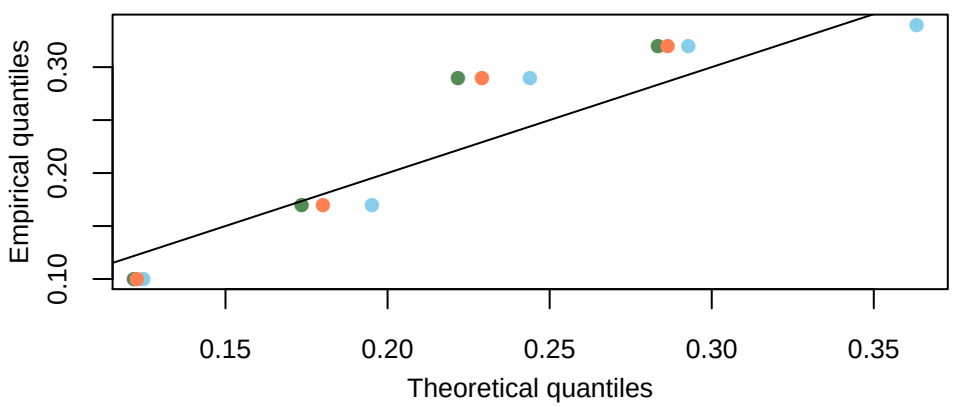
August 2016

Media:
Large White Perch Fillet (>200 mm)
Exposure Unit:
UBC
Chemical (mg/kg):
Mercury (Inorganic)

Legend

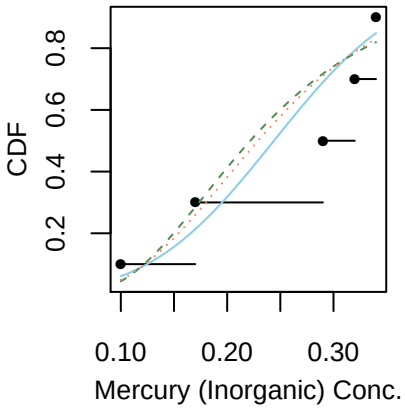
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

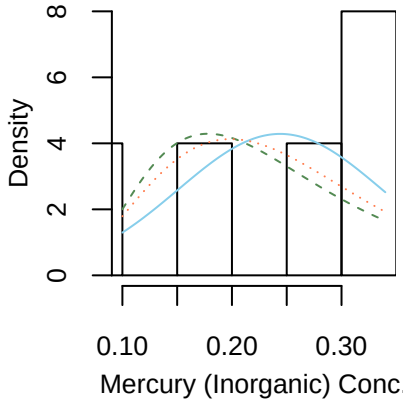


ECDF, Histogram & Q−Q (Detects Only)

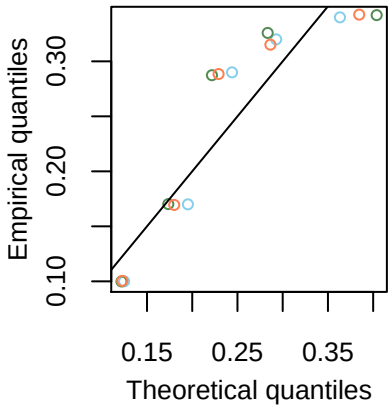
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.1	Arithmetic Mean = 0.24
N (detect) = 5	SD (log detect) = 0.52	Max (detect) = 0.1	Arithmetic SD = 0.1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.33	N<5	–	–	–	–	−5.55351	−6.33463
Lognormal	0.2	N<5	–	–	–	–	−4.46976	−5.25089
Gamma	–	–	NA	NA	NA	NA	−4.99036	−5.77148

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Large White Perch Fillet (>200 mm) in UBC−Mercury (Inorganic)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **1**

Media:
Large White Perch Fillet (>200 mm)
Exposure Unit:
UBC
Chemical (mg/kg):
Selenium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.75 J	Arithmetic Mean = 0.75
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.75 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Large White Perch Fillet (>200 mm) in UBC−Selenium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **2**

Media:
Large White Perch Fillet (>200 mm)

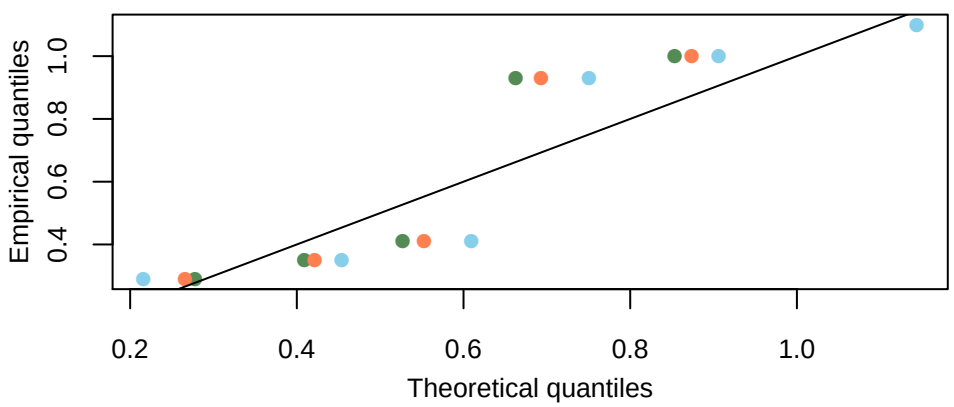
Exposure Unit:
UBC

Chemical (mg/kg):
Methyl Mercury

Legend

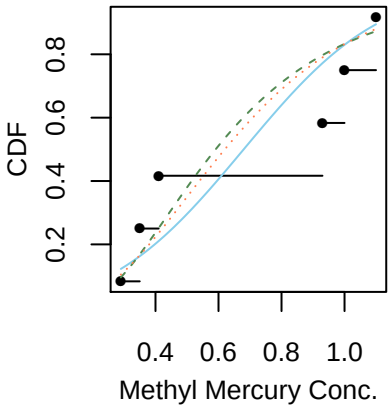
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

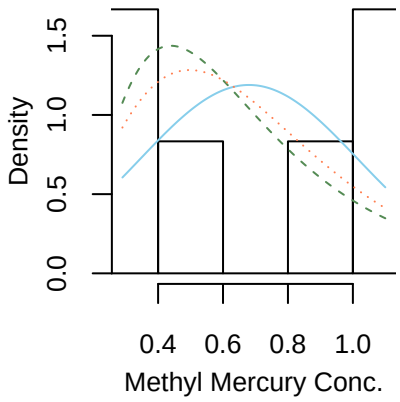


ECDF, Histogram & Q−Q (Detects Only)

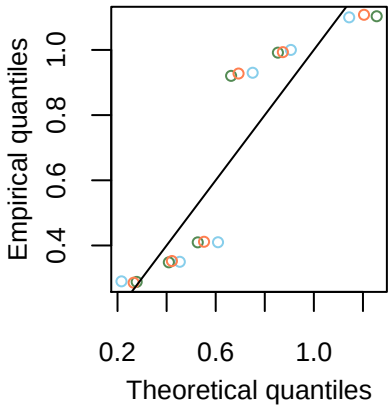
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 0.29	Arithmetic Mean = 0.68
N (detect) = 6	SD (log detect) = 0.6	Max (detect) = 0.29	Arithmetic SD = 0.37

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.11	0.19	–	–	–	–	7.92023	7.50375
Lognormal	0.13	0.16	–	–	–	–	7.43377	7.01729
Gamma	–	–	NA	NA	NA	NA	7.36879	6.95231

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Large White Perch Fillet (>200 mm) in UBC−Methyl Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **3**

Media:
Large White Perch Fillet (>200 mm)

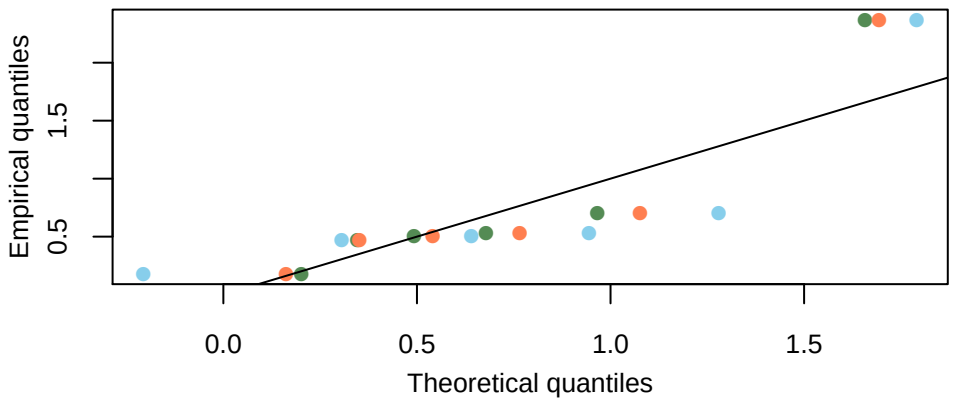
Exposure Unit:
UBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

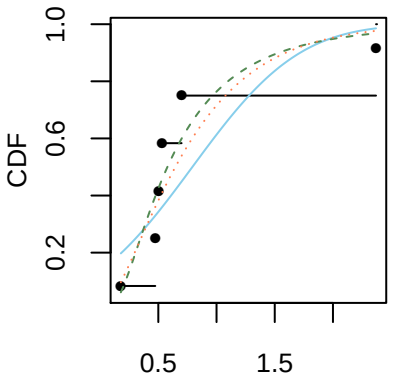
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

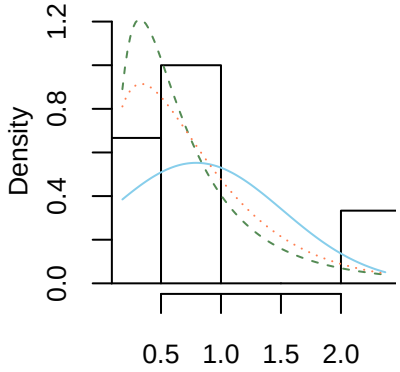


ECDF, Histogram & Q−Q (Detects Only)

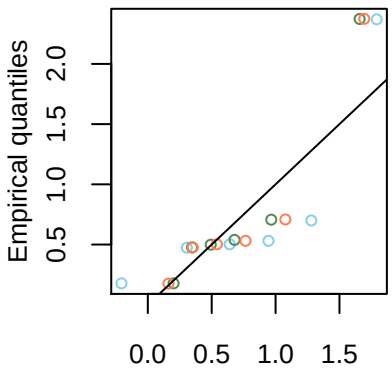
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 0.18	Arithmetic Mean = 0.79
N (detect) = 6	SD (log detect) = 0.83	Max (detect) = 0.18	Arithmetic SD = 0.79

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0056	0.007	–	–	–	–	17.1208	16.7043
Lognormal	0.43	0.33	–	–	–	–	11.1844	10.7679
Gamma	–	–	NA	NA	NA	NA	12.2838	11.8673

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Large White Perch Fillet (>200 mm) in UBC−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

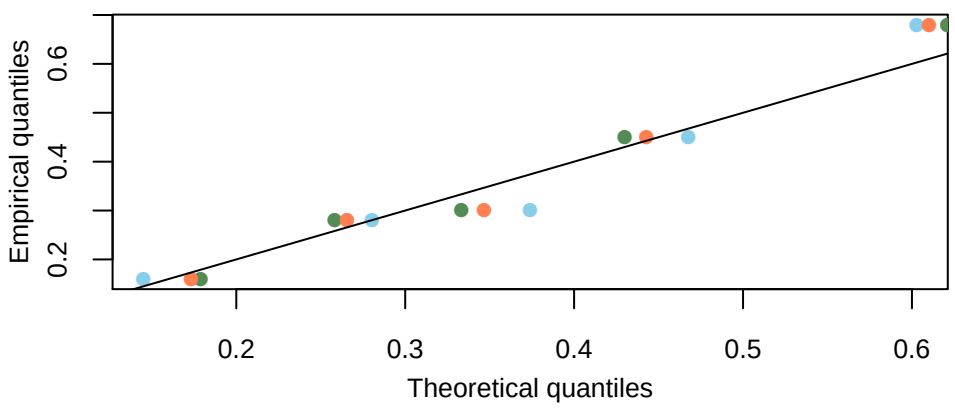
Figure **4**

Media:
Large White Perch Fillet (>200 mm)
Exposure Unit:
MBC
Chemical (mg/kg):
Mercury (Inorganic)

Legend

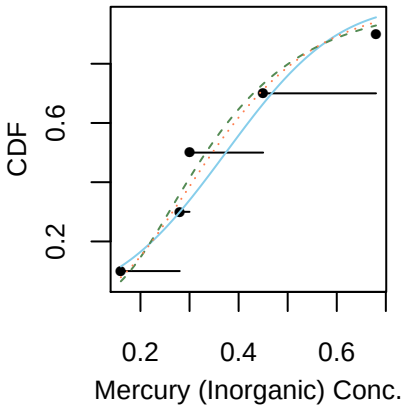
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

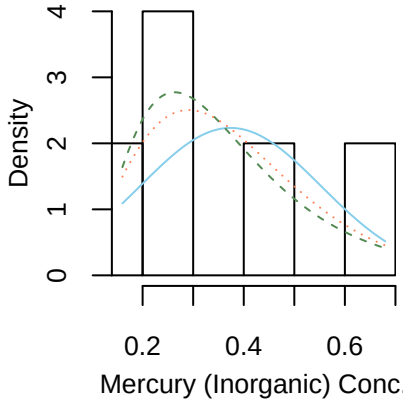


ECDF, Histogram & Q−Q (Detects Only)

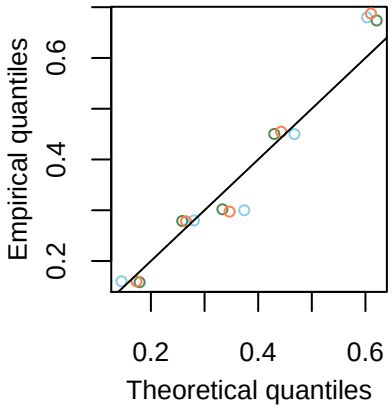
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.16	Arithmetic Mean = 0.37
N (detect) = 5	SD (log detect) = 0.54	Max (detect) = 0.16	Arithmetic SD = 0.2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.65	N<5	–	–	–	–	0.964266	0.183142
Lognormal	0.95	N<5	–	–	–	–	−0.0236721	−0.804796
Gamma	–	–	NA	NA	NA	NA	0.0522366	−0.728888

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Large White Perch Fillet (>200 mm) in MBC−Mercury (Inorganic)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **5**

Media:
Large White Perch Fillet (>200 mm)
Exposure Unit:
MBC
Chemical (mg/kg):
Selenium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 0.63 J	Arithmetic Mean = 0.86
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.63	Arithmetic SD = 0.33

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Large White Perch Fillet (>200 mm) in MBC−Selenium

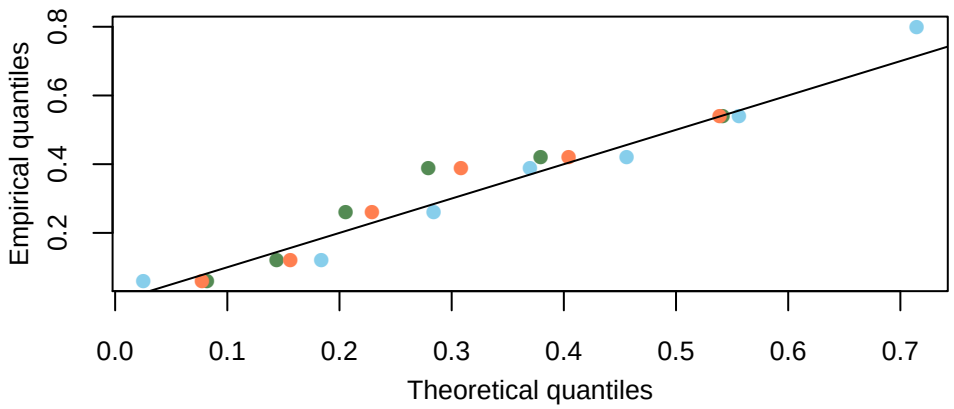
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **6**

Media:
Large White Perch Fillet (>200 mm)
Exposure Unit:
MBC
Chemical (mg/kg):
Methyl Mercury

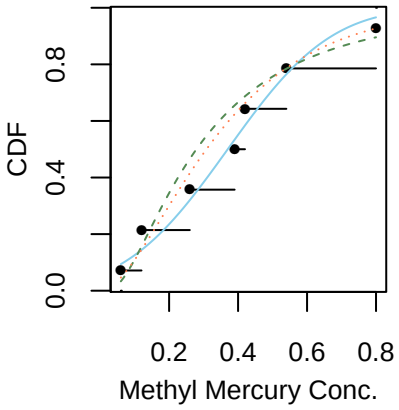
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

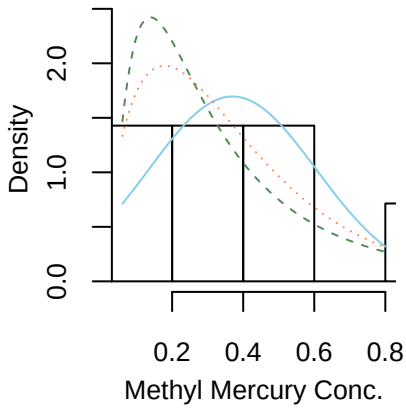


ECDF, Histogram & Q−Q (Detects Only)

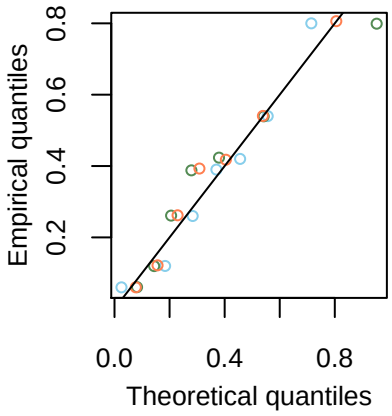
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 0.06	Arithmetic Mean = 0.37
N (detect) = 7	SD (log detect) = 0.9	Max (detect) = 0.06	Arithmetic SD = 0.25

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.85	0.96	–	–	–	–	3.60569	3.49751
Lognormal	0.56	0.42	–	–	–	–	3.51577	3.40759
Gamma	–	–	NA	NA	NA	NA	2.60552	2.49734

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Large White Perch Fillet (>200 mm) in MBC−Methyl Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

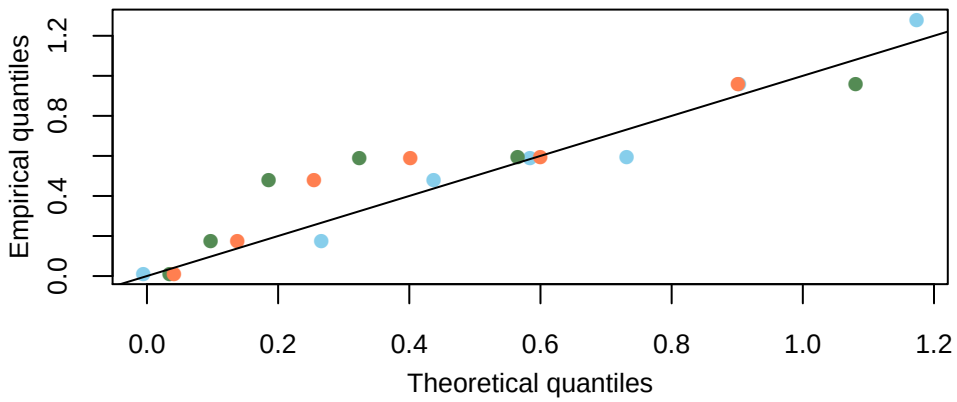
Figure **7**

Media:
Large White Perch Fillet (>200 mm)
Exposure Unit:
MBC
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

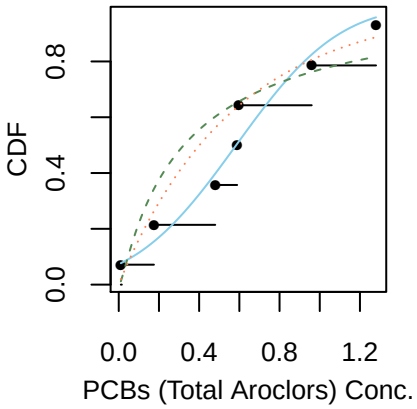
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

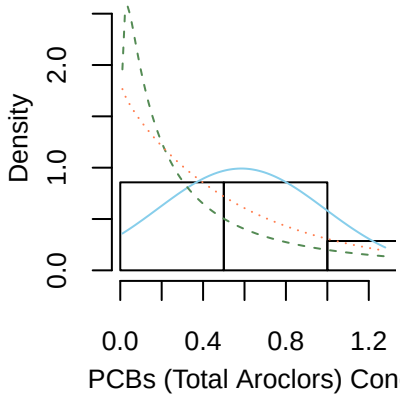


ECDF, Histogram & Q−Q (Detects Only)

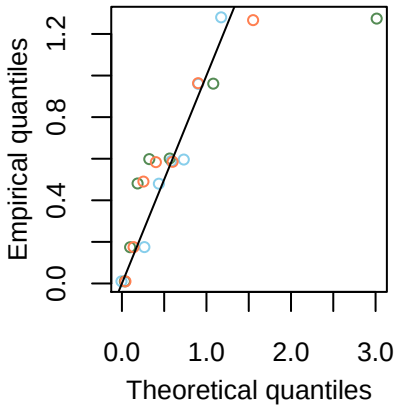
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 0.01 J	Arithmetic Mean = 0.58
N (detect) = 7	SD (log detect) = 1.6	Max (detect) = 0.01	Arithmetic SD = 0.43

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.86	0.51	–	–	–	–	11.119	11.0108
Lognormal	0.024	0.042	–	–	–	–	13.962	13.8538
Gamma	–	–	NA	NA	NA	NA	10.4761	10.3679

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Large White Perch Fillet (>200 mm) in MBC−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **8**

Media:
Large White Perch Fillet (>200 mm)

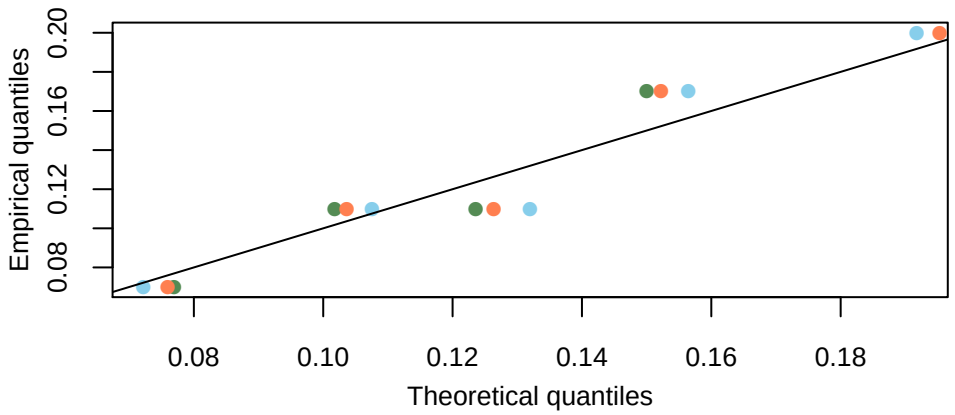
Exposure Unit:
BCC

Chemical (mg/kg):
Mercury (Inorganic)

Legend

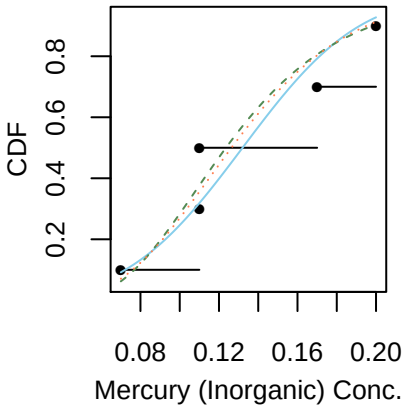
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

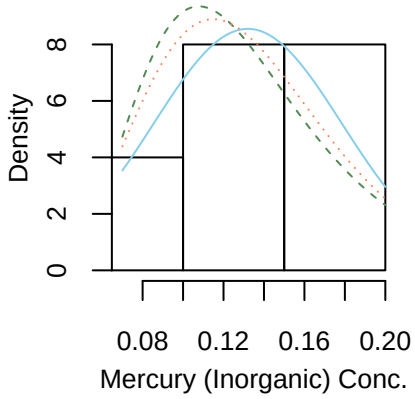


ECDF, Histogram & Q−Q (Detects Only)

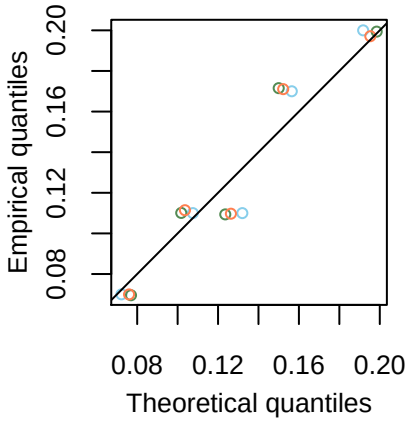
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.07	Arithmetic Mean = 0.13
N (detect) = 5	SD (log detect) = 0.41	Max (detect) = 0.07	Arithmetic SD = 0.052

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.63	N<5	–	–	–	–	−12.462	−13.2431
Lognormal	0.69	N<5	–	–	–	–	−12.6698	−13.4509
Gamma	–	–	NA	NA	NA	NA	−12.7303	−13.5114

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

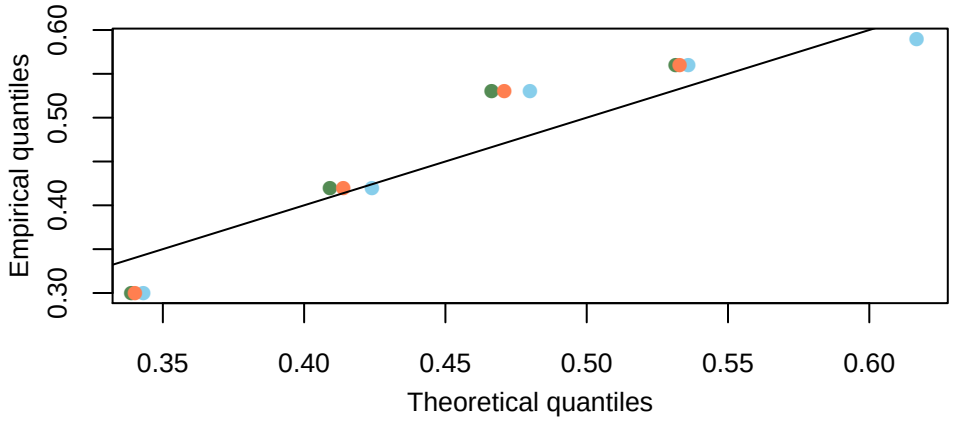
DRAFT

Distribution: Large White Perch Fillet (>200 mm) in BCC−Mercury (Inorganic)

Media:
Large White Perch Fillet (>200 mm)
Exposure Unit:
BCC
Chemical (mg/kg):
Methyl Mercury

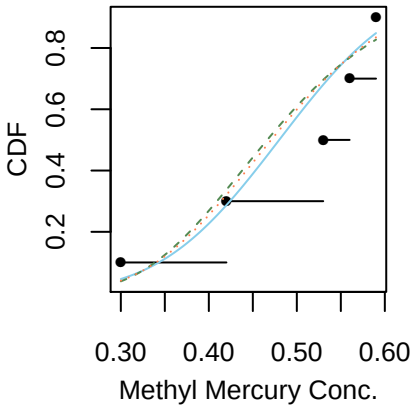
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

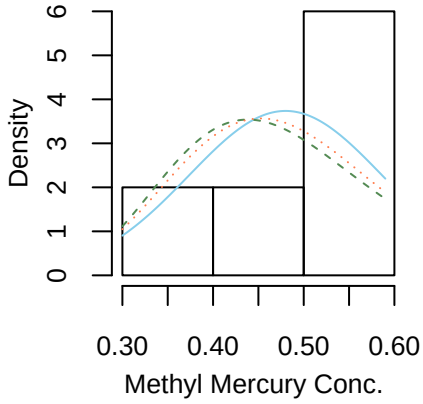


ECDF, Histogram & Q−Q (Detects Only)

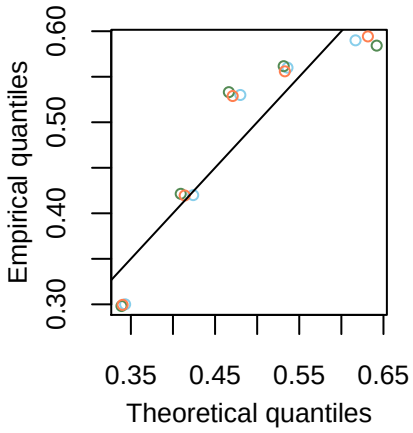
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.3	Arithmetic Mean = 0.48
N (detect) = 5	SD (log detect) = 0.28	Max (detect) = 0.3	Arithmetic SD = 0.12

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.41	N<5	–	–	–	–	−4.18132	−4.96245
Lognormal	0.25	N<5	–	–	–	–	−3.32931	−4.11044
Gamma	–	–	NA	NA	NA	NA	−3.66312	−4.44425

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Large White Perch Fillet (>200 mm) in BCC−Methyl Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **10**

Media:
Large White Perch Fillet (>200 mm)

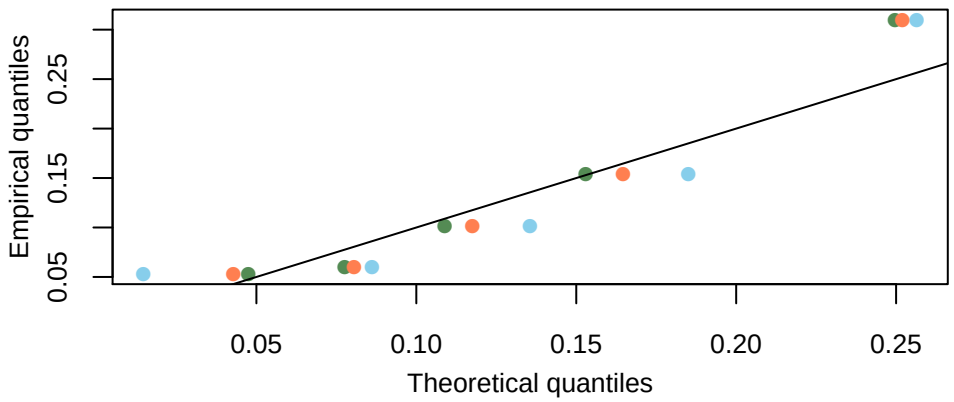
Exposure Unit:
BCC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

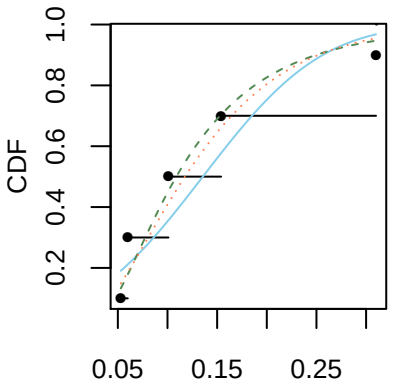
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

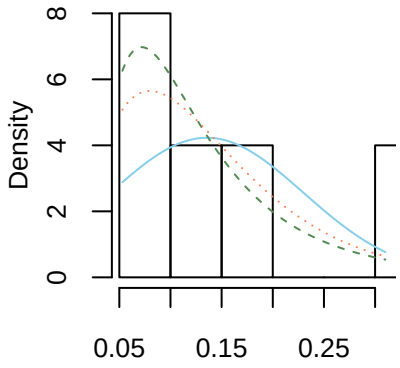


ECDF, Histogram & Q−Q (Detects Only)

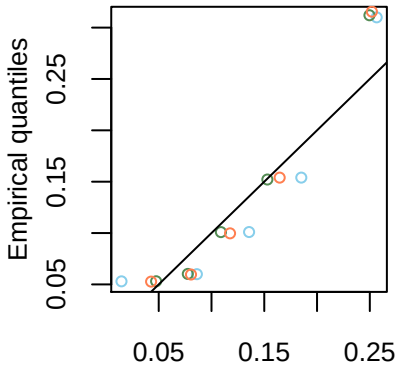
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.053	Arithmetic Mean = 0.14
N (detect) = 5	SD (log detect) = 0.72	Max (detect) = 0.053	Arithmetic SD = 0.11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.17	N<5	–	–	–	–	−5.42035	−6.20147
Lognormal	0.65	N<5	–	–	–	–	−8.33322	−9.11435
Gamma	–	–	NA	NA	NA	NA	−7.75701	−8.53813

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

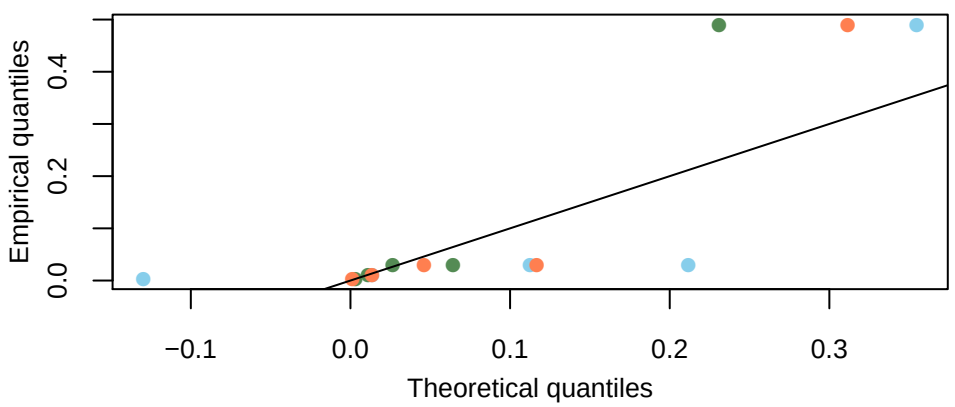
Distribution: Large White Perch Fillet (>200 mm) in BCC−PCBs (Total Aroclors)

Media:
Large White Perch Fillet (>200 mm)
Exposure Unit:
LBC
Chemical (mg/kg):
Mercury (Inorganic)

Legend

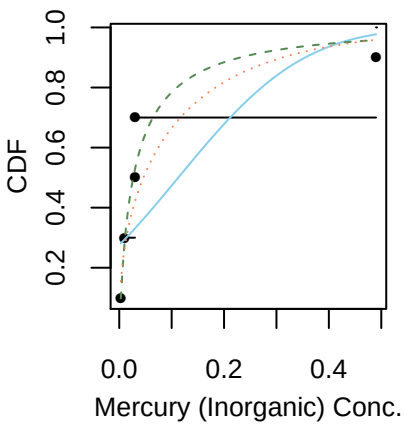
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

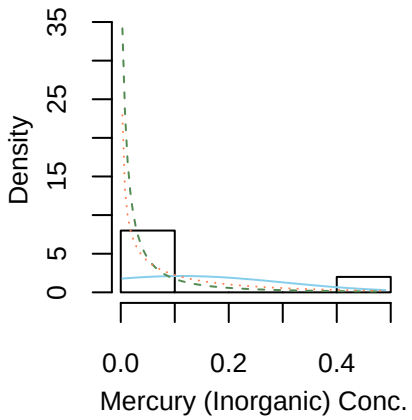


ECDF, Histogram & Q−Q (Detects Only)

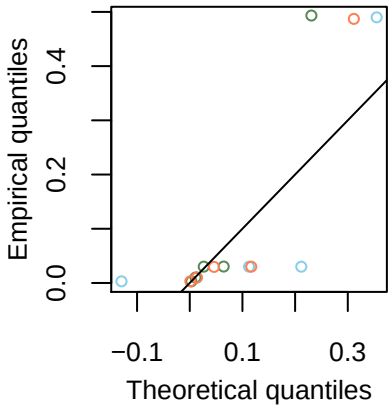
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.003	Arithmetic Mean = 0.11
N (detect) = 5	SD (log detect) = 1.9	Max (detect) = 0.003	Arithmetic SD = 0.21

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00071	N<5	–	–	–	–	1.52959	0.748464
Lognormal	0.64	N<5	–	–	–	–	−12.8602	−13.6413
Gamma	–	–	NA	NA	NA	NA	−10.9184	−11.6996

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

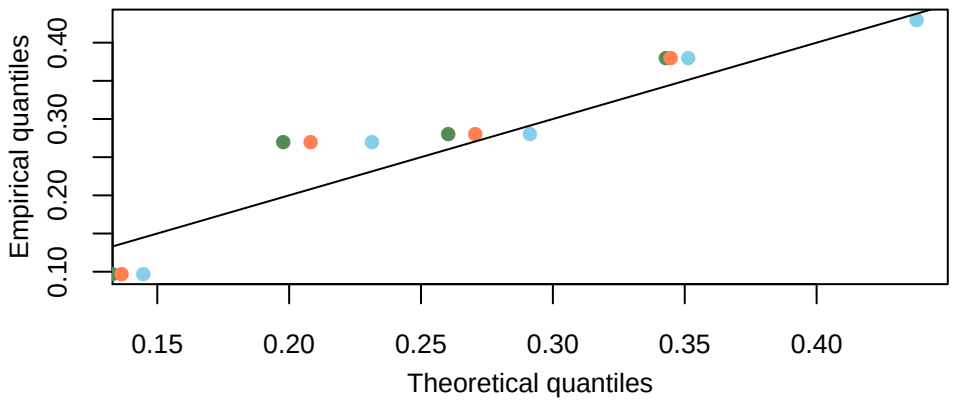
DRAFT

Distribution: Large White Perch Fillet (>200 mm) in LBC−Mercury (Inorganic)

Media:
Large White Perch Fillet (>200 mm)
Exposure Unit:
LBC
Chemical (mg/kg):
Methyl Mercury

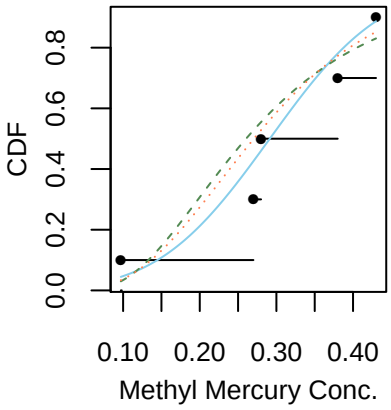
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

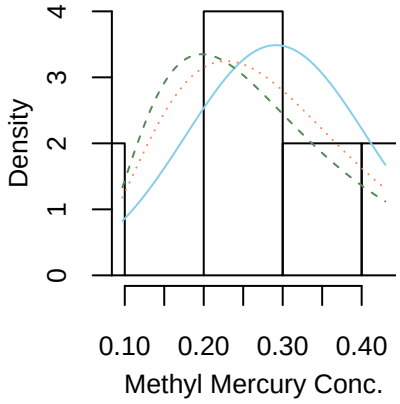


ECDF, Histogram & Q−Q (Detects Only)

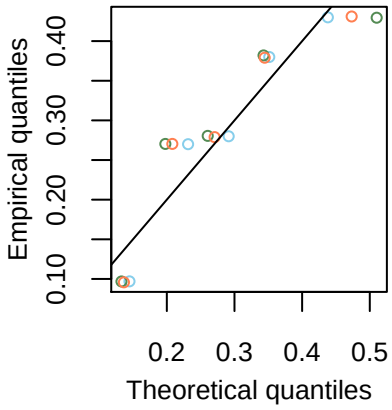
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.097	Arithmetic Mean = 0.29
N (detect) = 5	SD (log detect) = 0.59	Max (detect) = 0.097	Arithmetic SD = 0.13

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.66	N<5	–	–	–	–	−3.49097	−4.2721
Lognormal	0.15	N<5	–	–	–	–	−1.71509	−2.49622
Gamma	–	–	NA	NA	NA	NA	−2.54706	−3.32818

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Large White Perch Fillet (>200 mm) in LBC−Methyl Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **13**

Media:
Large White Perch Fillet (>200 mm)

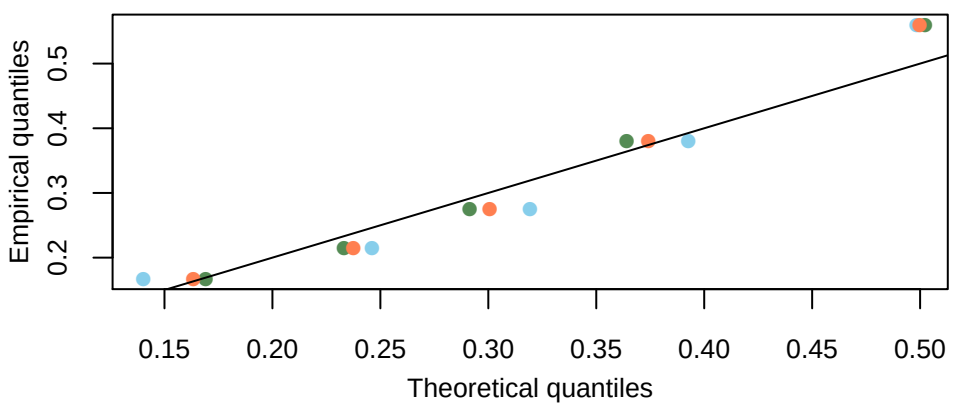
Exposure Unit:
LBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

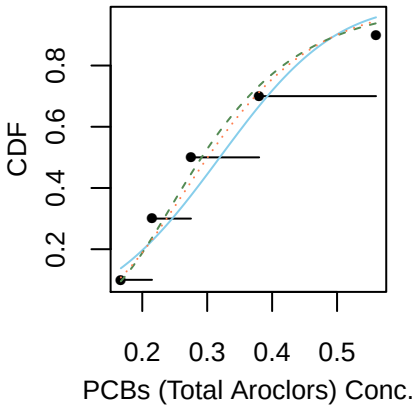
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

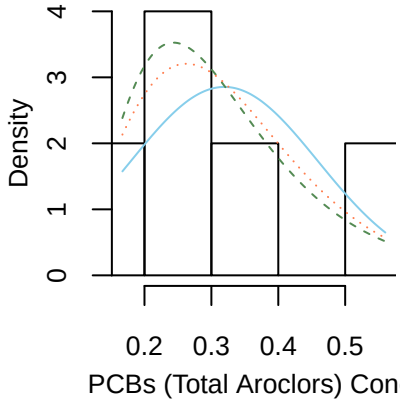


ECDF, Histogram & Q−Q (Detects Only)

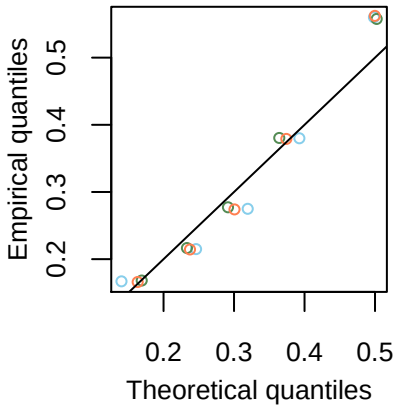
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.17	Arithmetic Mean = 0.32
N (detect) = 5	SD (log detect) = 0.48	Max (detect) = 0.17	Arithmetic SD = 0.16

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.58	N<5	–	–	–	–	−1.48926	−2.27039
Lognormal	0.95	N<5	–	–	–	–	−2.69892	−3.48004
Gamma	–	–	NA	NA	NA	NA	−2.46878	−3.24991

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

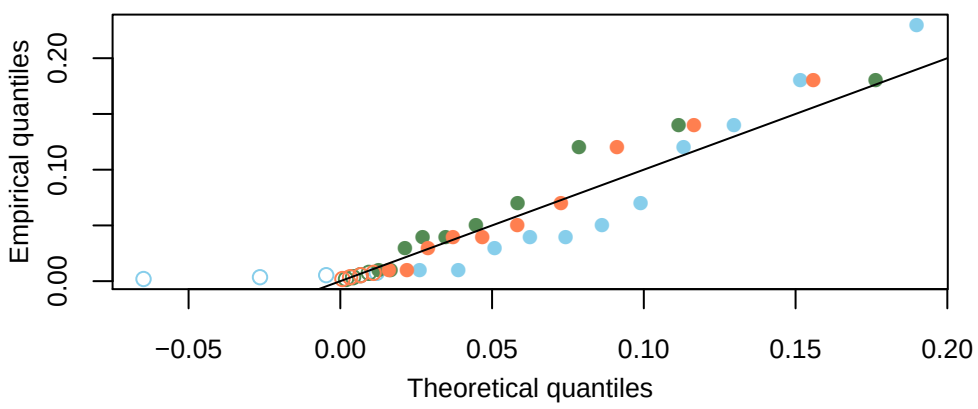
Distribution: Large White Perch Fillet (>200 mm) in LBC−PCBs (Total Aroclors)

Media:
Large White Perch Fillet (>200 mm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Mercury (Inorganic)

Legend

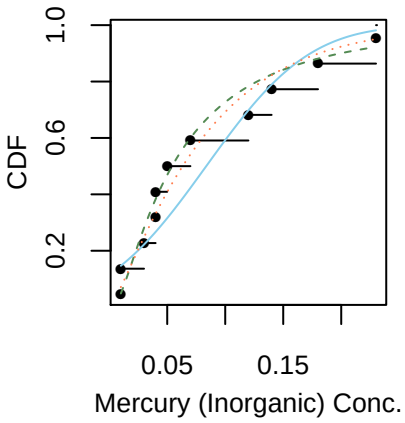
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

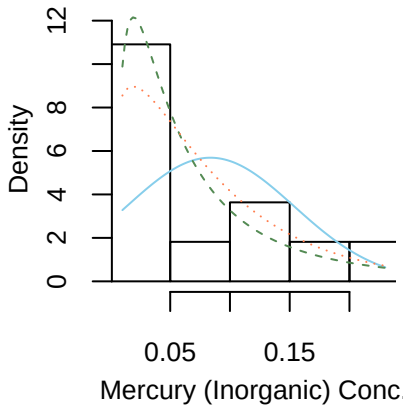


ECDF, Histogram & Q−Q (Detects Only)

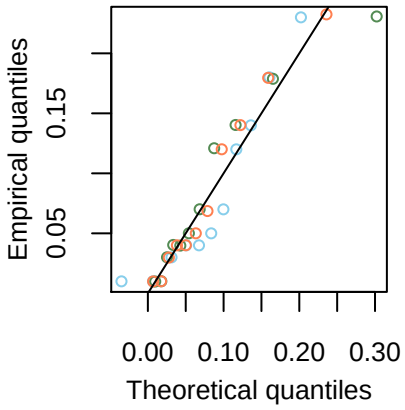
ECDF



Histogram



Q−Q



N = 15	FOD = 73%	Min (detect) = 0.01	Kaplan Meier Mean = 0.061
N (detect) = 11	SD (log detect) = 1.1	Max (detect) = 0.01	Kaplan Meier SD = 0.071

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0054	0.024	–	–	–	–	−33.4374	−32.0213
Lognormal	0.5	0.52	–	–	–	–	−50.2397	−48.8236
Gamma	–	–	0.1805	0.234	0.334	0.793	−50.337	−48.9209

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.1	0.14	–	–	–	–	−23.2556	−22.4598
Lognormal	0.44	0.83	–	–	–	–	−28.5695	−27.7737
Gamma	–	–	0.137	0.274	0.2728	0.748	−29.0001	−28.2043

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Large White Perch Fillet (>200 mm) in Reference Sites−Mercury (Inorganic)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

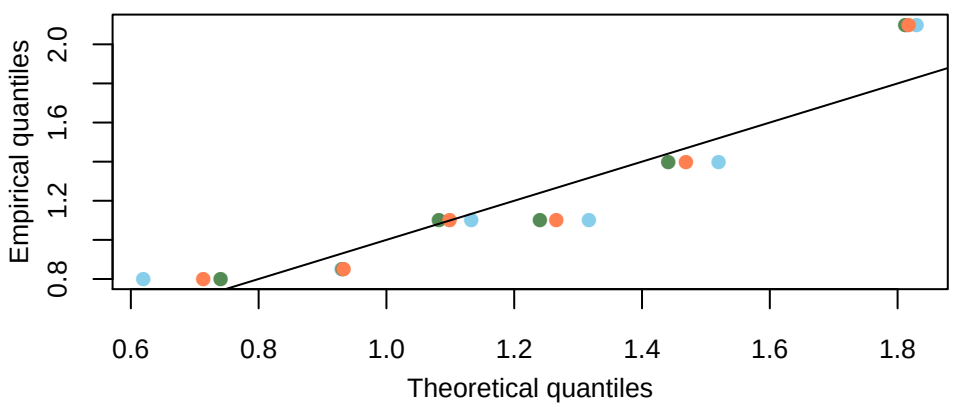
Figure **15**

Media:
Large White Perch Fillet (>200 mm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Selenium

Legend

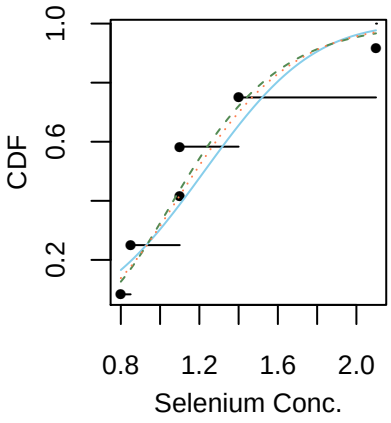
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

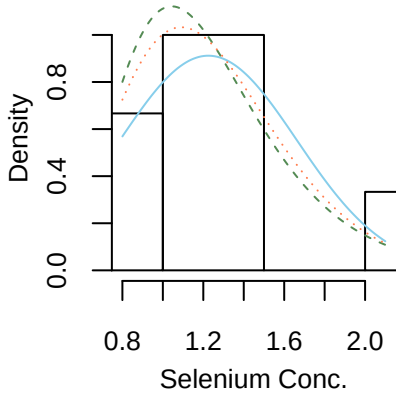


ECDF, Histogram & Q−Q (Detects Only)

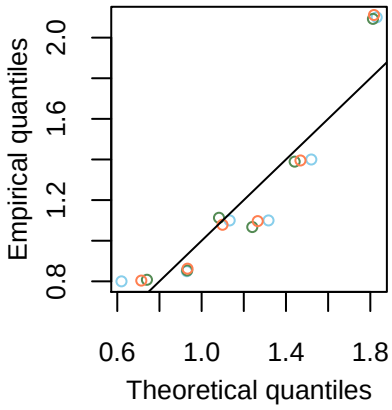
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 0.8 J	Arithmetic Mean = 1
N (detect) = 6	SD (log detect) = 0.35	Max (detect) = 0.8	Arithmetic SD = 0.48

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.17	0.19	–	–	–	–	11.1088	10.6923
Lognormal	0.51	0.45	–	–	–	–	9.25217	8.83569
Gamma	–	–	NA	NA	NA	NA	9.738	9.32151

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Large White Perch Fillet (>200 mm) in Reference Sites−Selenium

Media:
Large White Perch Fillet (>200 mm)

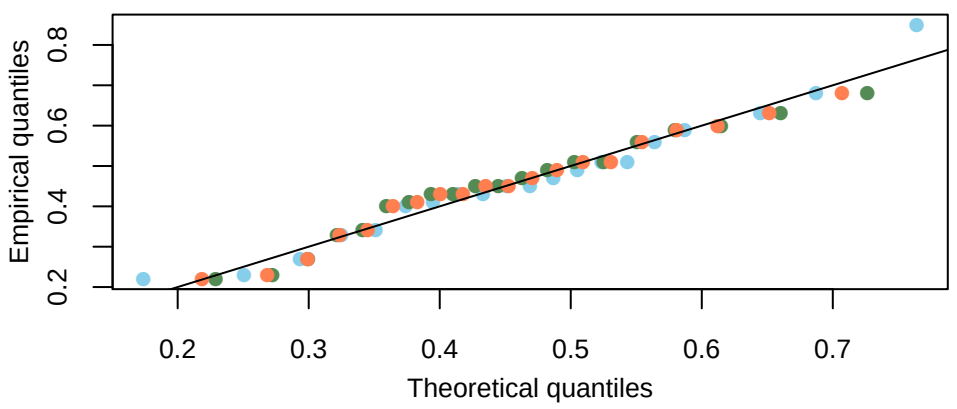
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Methyl Mercury

Legend

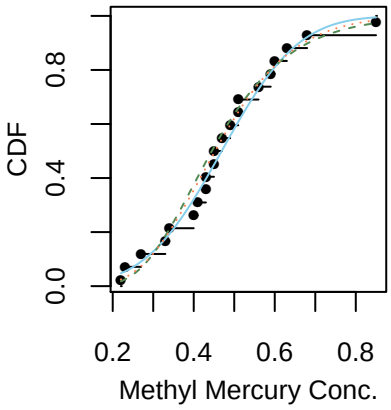
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

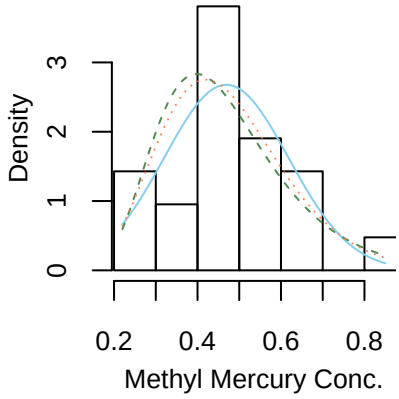


ECDF, Histogram & Q−Q (Detects Only)

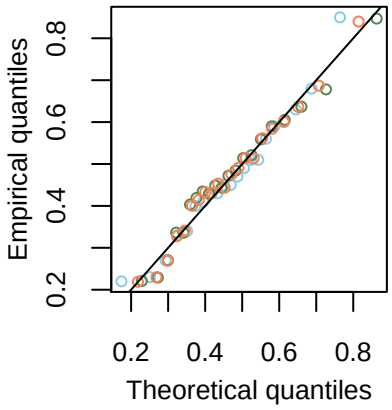
ECDF



Histogram



Q−Q



N = 21	FOD = 100%	Min (detect) = 0.22	Arithmetic Mean = 0.47
N (detect) = 21	SD (log detect) = 0.34	Max (detect) = 0.22	Arithmetic SD = 0.15

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.75	0.75	–	–	–	–	−16.3664	−14.2773
Lognormal	0.6	0.34	–	–	–	–	−16.3898	−14.3008
Gamma	–	–	0.1177	0.19	0.2383	0.745	−17.0879	−14.9988

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Large White Perch Fillet (>200 mm) in Reference Sites−Methyl Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

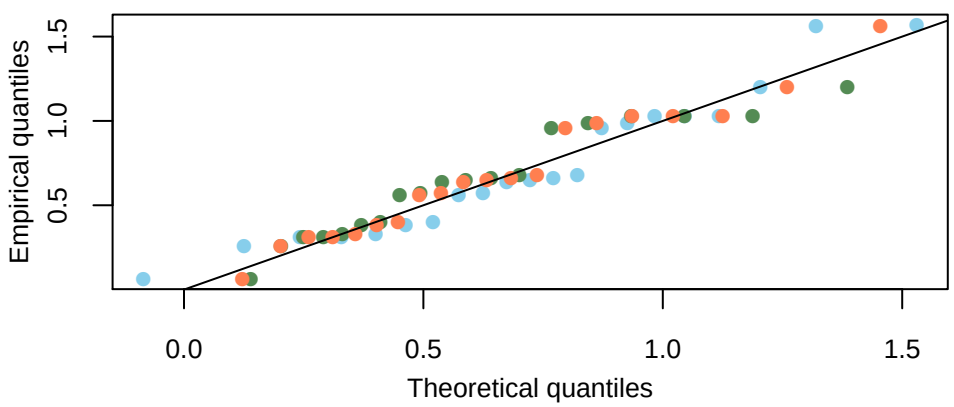
Figure **17**

Media:
Large White Perch Fillet (>200 mm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

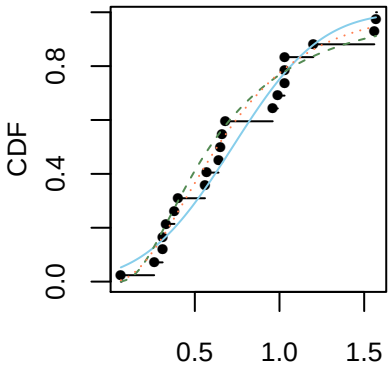
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

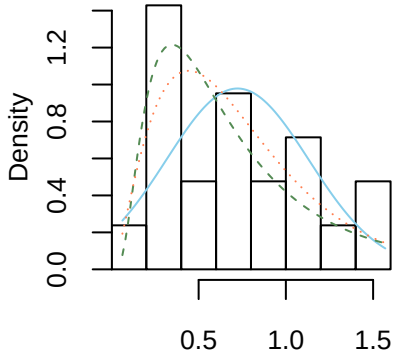


ECDF, Histogram & Q−Q (Detects Only)

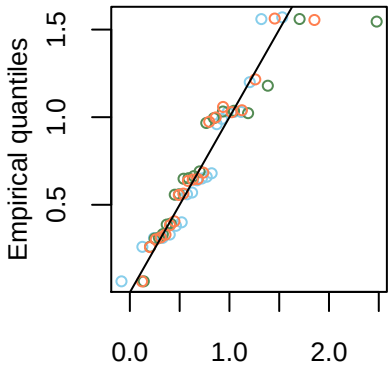
ECDF



Histogram



Q−Q



N = 21	FOD = 100%	Min (detect) = 0.063 J	Arithmetic Mean = 0.72
N (detect) = 21	SD (log detect) = 0.74	Max (detect) = 0.063	Arithmetic SD = 0.42

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.21	0.17	–	–	–	–	25.911	28
Lognormal	0.034	0.34	–	–	–	–	27.8692	29.9583
Gamma	–	–	0.1333	0.192	0.3422	0.754	24.1295	26.2186

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Large White Perch Fillet (>200 mm) in Reference Sites−PCBs (Total Aroclors)

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
UBC
Chemical (mg/kg):
TEQdf (Mammals)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 4.1e−05 J	Arithmetic Mean = 5.3e−05
N (detect) = 2	SD (log detect) = 0	Max (detect) = 4.1e−05 J	Arithmetic SD = 1.7e−05

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

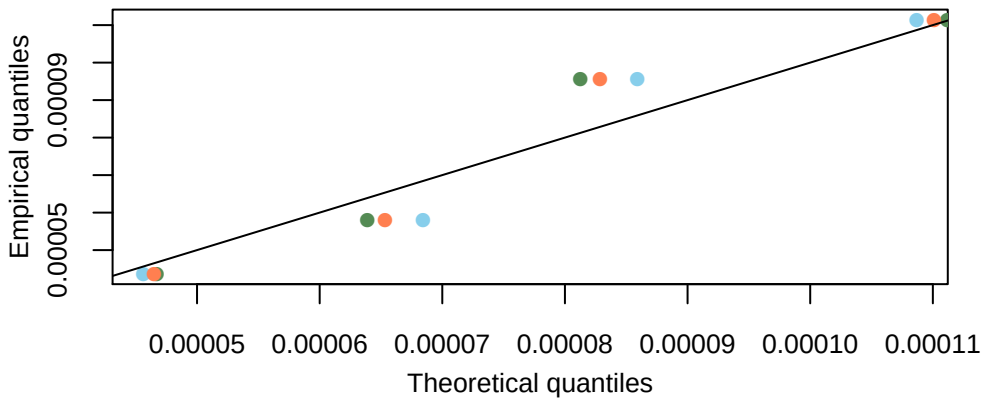
Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in UBC−TEQdf (Mammals)

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
MBC
Chemical (mg/kg):
TEQdf (Mammals)

Legend

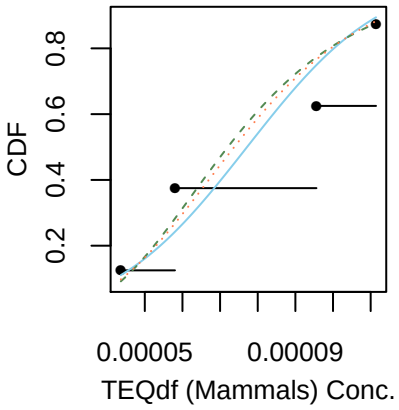
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

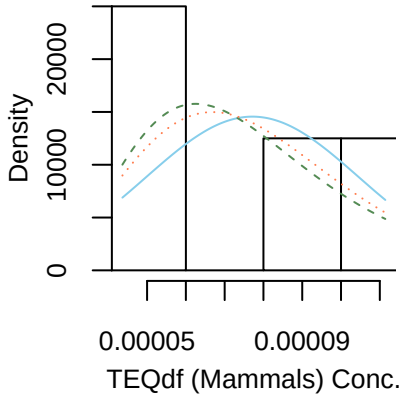


ECDF, Histogram & Q−Q (Detects Only)

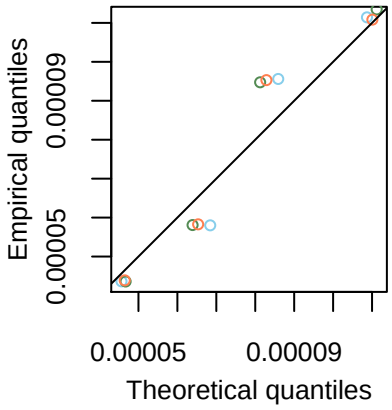
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 4.4e−05 J	Arithmetic Mean = 7.7e−05
N (detect) = 4	SD (log detect) = 0.44	Max (detect) = 4.4e−05 J	Arithmetic SD = 3.2e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.59	N<5	–	–	–	–	−68.6857	−69.9131
Lognormal	0.6	N<5	–	–	–	–	−68.7561	−69.9835
Gamma	–	–	NA	NA	NA	NA	−68.8144	−70.0418

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in MBC−TEQdf (Mammals)

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
BCC
Chemical (mg/kg):
TEQdf (Mammals)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 0.00014 J	Arithmetic Mean = 0.00015
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.00014 J	Arithmetic SD = 2.3e−05

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

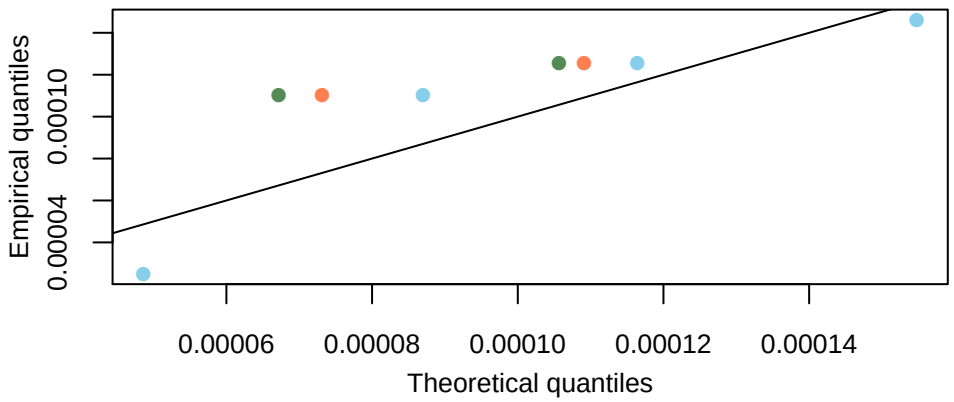
DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in BCC−TEQdf (Mammals)

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
LBC
Chemical (mg/kg):
TEQdf (Mammals)

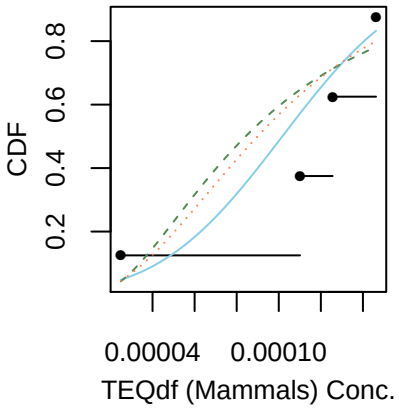
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

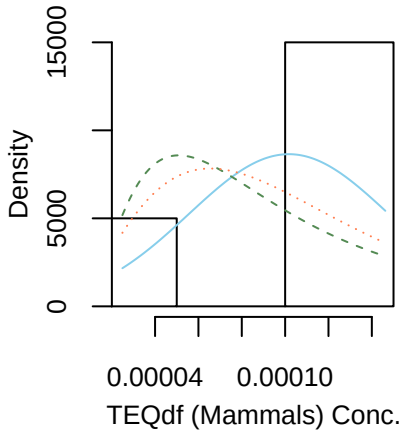


ECDF, Histogram & Q−Q (Detects Only)

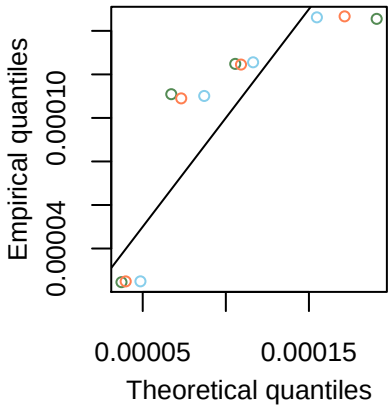
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 2.5e−05 J	Arithmetic Mean = 1e−04
N (detect) = 4	SD (log detect) = 0.82	Max (detect) = 2.5e−05 J	Arithmetic SD = 5.3e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.29	N<5	–	–	–	–	−64.5186	−65.746
Lognormal	0.047	N<5	–	–	–	–	−62.4384	−63.6658
Gamma	–	–	NA	NA	NA	NA	−63.3665	−64.5939

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

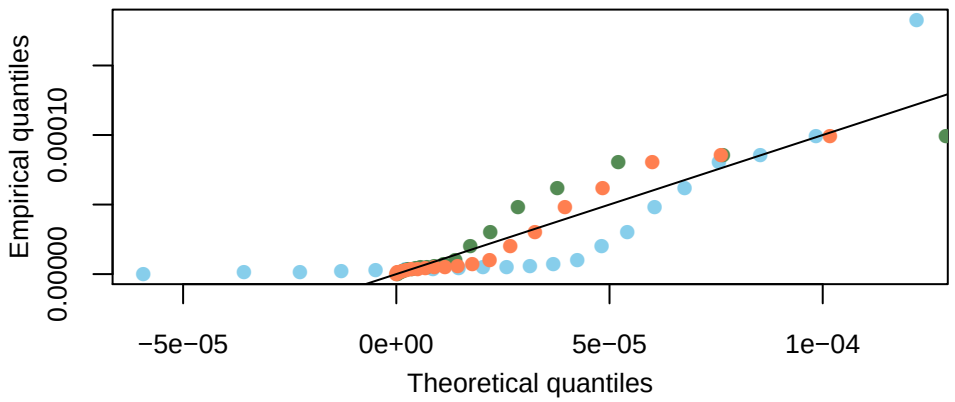
Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in LBC−TEQdf (Mammals)

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
TEQdf (Mammals)

Legend

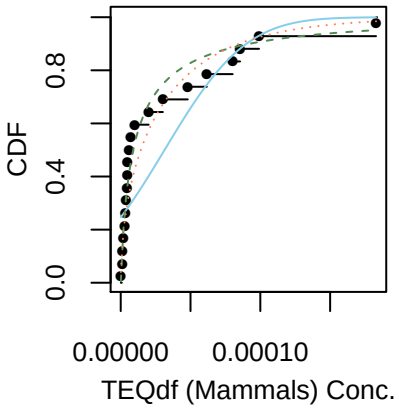
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

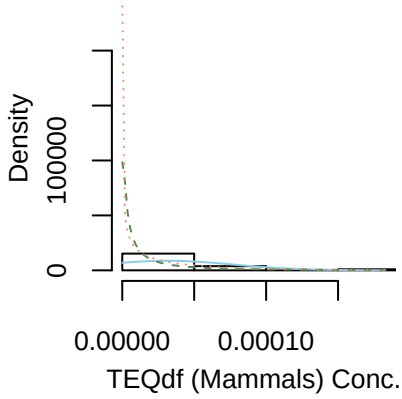


ECDF, Histogram & Q−Q (Detects Only)

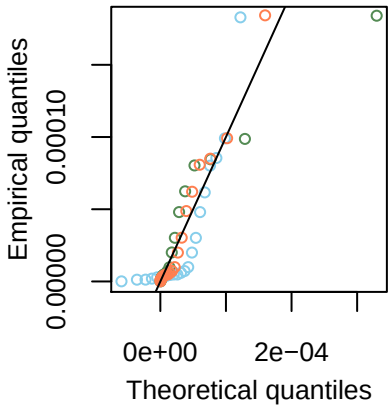
ECDF



Histogram



Q−Q



N = 21	FOD = 100%	Min (detect) = 8.5e−08 J	Arithmetic Mean = 3.1e−05
N (detect) = 21	SD (log detect) = 1.9	Max (detect) = 8.5e−08 J	Arithmetic SD = 4.7e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	3e−05	4.3e−05	–	–	–	–	−356.054	−353.965
Lognormal	0.33	0.64	–	–	–	–	−399.497	−397.408
Gamma	–	–	0.2052	0.2	0.7661	0.805	−398.295	−396.206

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

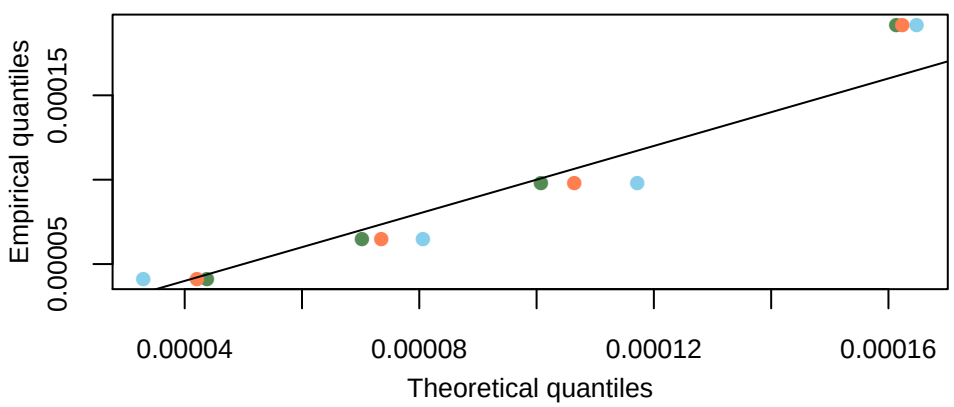
Distribution: Surface Sediment (0−15 cm) Marsh and Mudflat at Access Points in Reference Sites−TEQdf (Mammals)

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
UBC
Chemical (mg/kg):
TEQdf (Mammals)

Legend

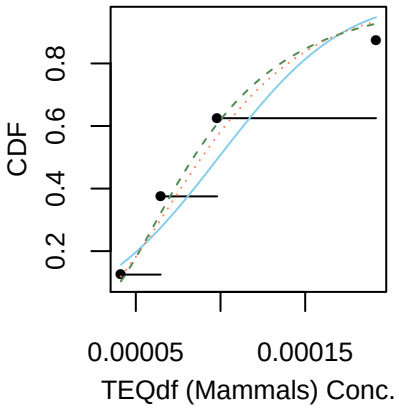
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

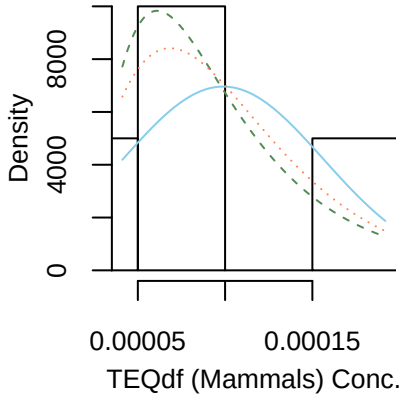


ECDF, Histogram & Q−Q (Detects Only)

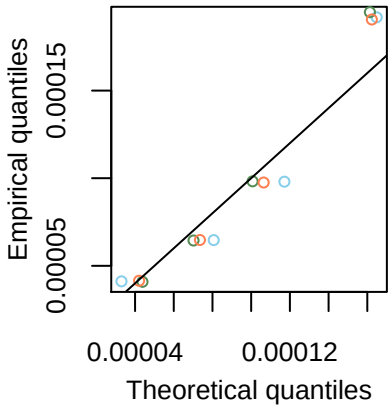
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 4.1e−05 J	Arithmetic Mean = 9.9e−05
N (detect) = 4	SD (log detect) = 0.65	Max (detect) = 4.1e−05 J	Arithmetic SD = 6.6e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.46	N<5	–	–	–	–	−62.7841	−64.0115
Lognormal	0.96	N<5	–	–	–	–	−64.264	−65.4914
Gamma	–	–	NA	NA	NA	NA	−64.0095	−65.2369

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in UBC−TEQdf (Mammals)

Media:
Surface Sediment (0−15 cm)

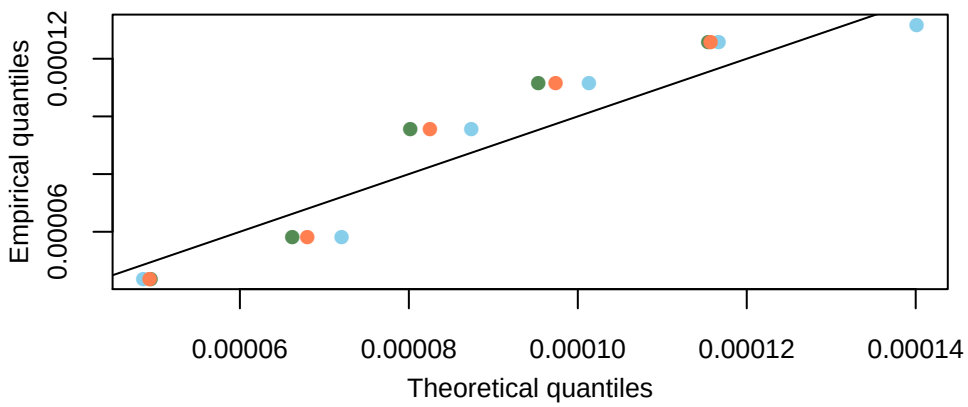
Exposure Unit:
MBC

Chemical (mg/kg):
TEQdf (Mammals)

Legend

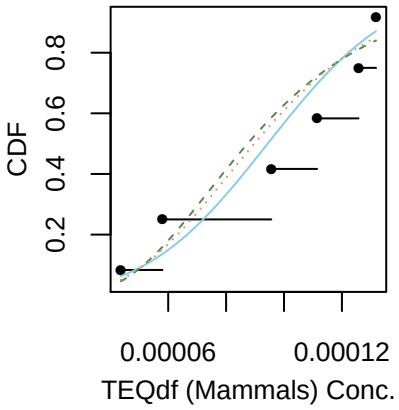
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

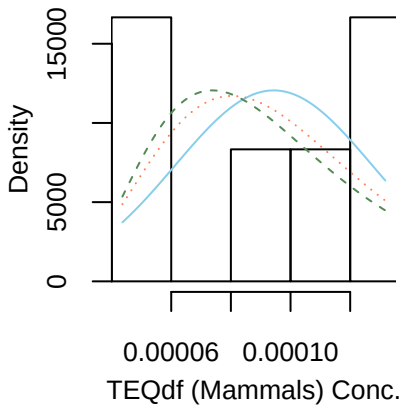


ECDF, Histogram & Q−Q (Detects Only)

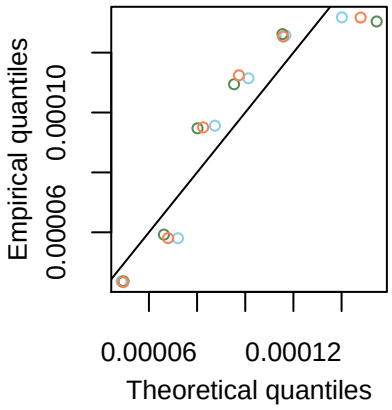
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 4.4e−05 J	Arithmetic Mean = 9.4e−05
N (detect) = 6	SD (log detect) = 0.45	Max (detect) = 4.4e−05 J	Arithmetic SD = 3.6e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.4	0.78	–	–	–	–	−102.766	−103.182
Lognormal	0.23	0.31	–	–	–	–	−101.749	−102.165
Gamma	–	–	NA	NA	NA	NA	−102.239	−102.655

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

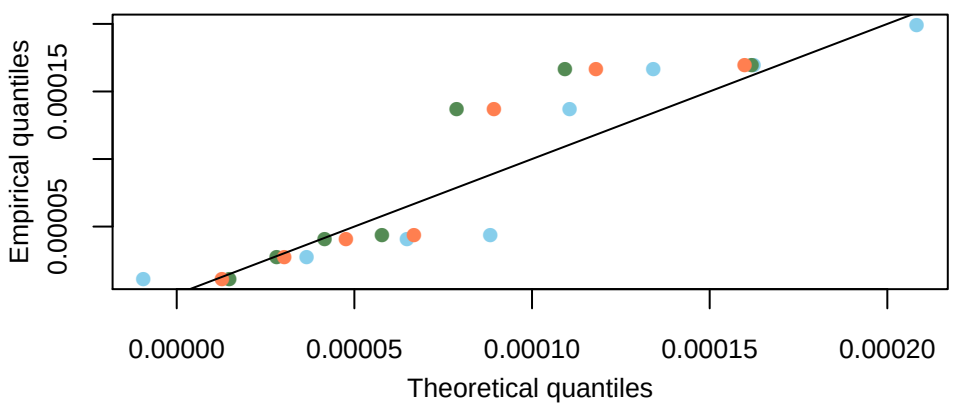
Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in MBC−TEQdf (Mammals)

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
BCC
Chemical (mg/kg):
TEQdf (Mammals)

Legend

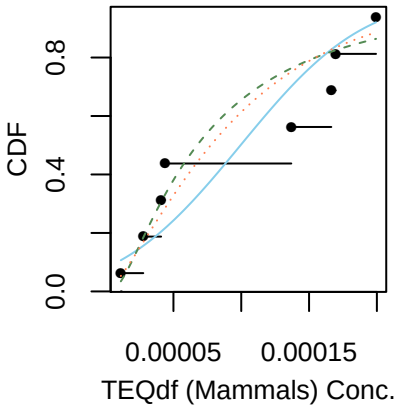
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

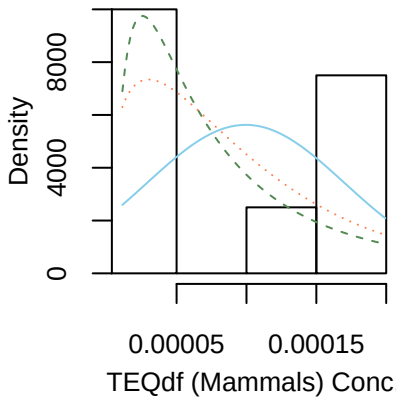


ECDF, Histogram & Q−Q (Detects Only)

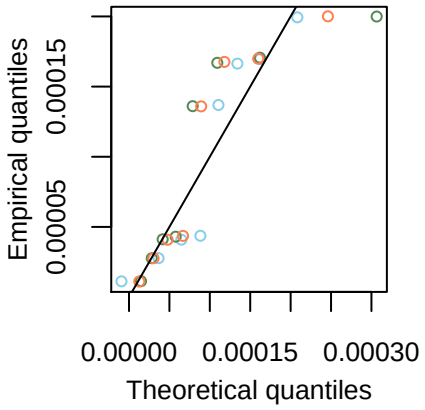
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 1.1e−05 J	Arithmetic Mean = 9.9e−05
N (detect) = 8	SD (log detect) = 1.1	Max (detect) = 1.1e−05 J	Arithmetic SD = 7.6e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.12	0.091	–	–	–	–	−126.157	−125.998
Lognormal	0.21	0.15	–	–	–	–	−127.176	−127.017
Gamma	–	–	0.2511	0.301	0.5309	0.736	−128.014	−127.855

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

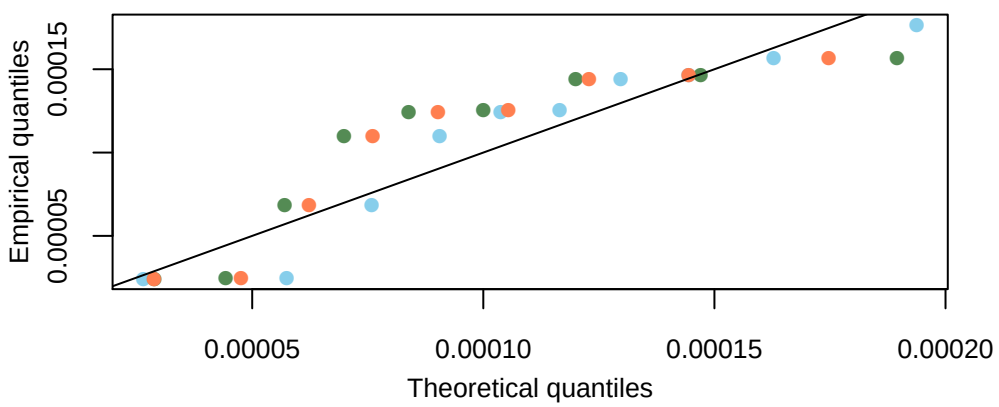
Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in BCC−TEQdf (Mammals)

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
LBC
Chemical (mg/kg):
TEQdf (Mammals)

Legend

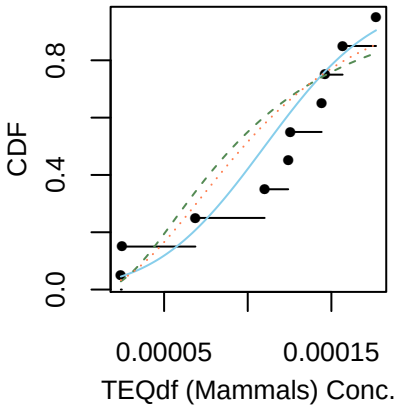
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

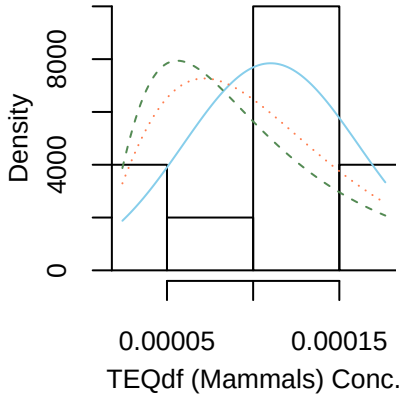


ECDF, Histogram & Q−Q (Detects Only)

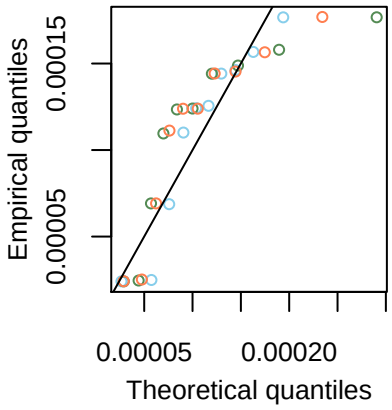
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 2.4e−05 J	Arithmetic Mean = 0.00011
N (detect) = 10	SD (log detect) = 0.74	Max (detect) = 2.4e−05 J	Arithmetic SD = 5.4e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.17	0.28	–	–	–	–	−165.35	−164.744
Lognormal	0.0056	0.012	–	–	–	–	−160.67	−160.065
Gamma	–	–	0.2785	0.27	0.9195	0.736	−162.951	−162.346

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

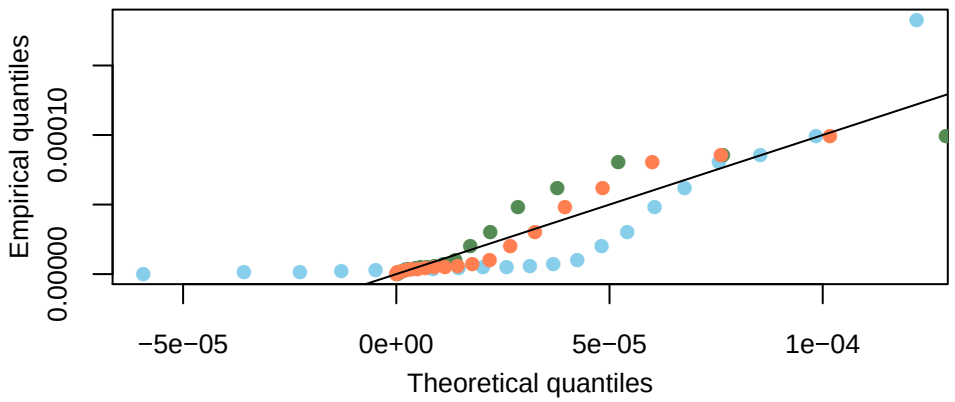
Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in LBC−TEQdf (Mammals)

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
TEQdf (Mammals)

Legend

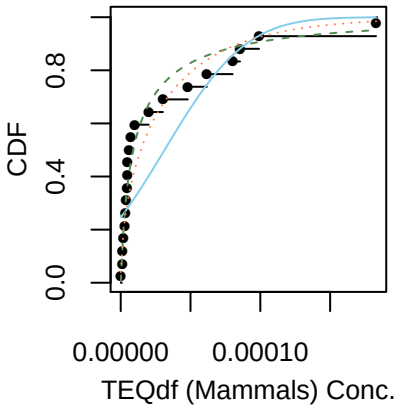
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

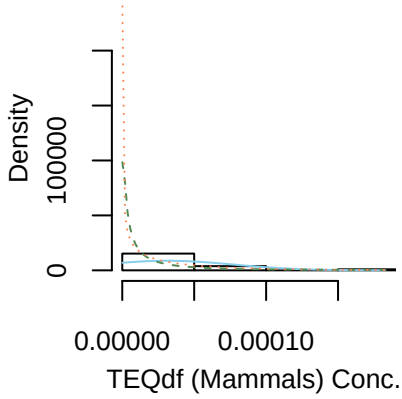


ECDF, Histogram & Q−Q (Detects Only)

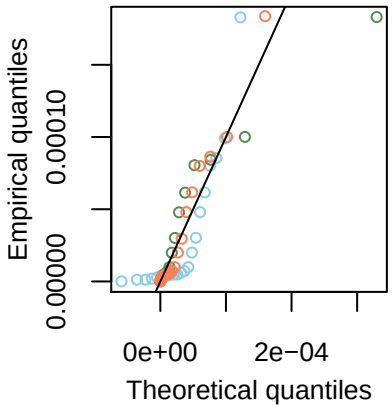
ECDF



Histogram



Q−Q



N = 21	FOD = 100%	Min (detect) = 8.5e−08 J	Arithmetic Mean = 3.1e−05
N (detect) = 21	SD (log detect) = 1.9	Max (detect) = 8.5e−08 J	Arithmetic SD = 4.7e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	3e−05	4.3e−05	–	–	–	–	−356.054	−353.965
Lognormal	0.33	0.64	–	–	–	–	−399.497	−397.408
Gamma	–	–	0.2052	0.2	0.7661	0.805	−398.295	−396.206

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) Marsh at Access Points & All Mudflats in Reference Sites−TEQdf (Mammals)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

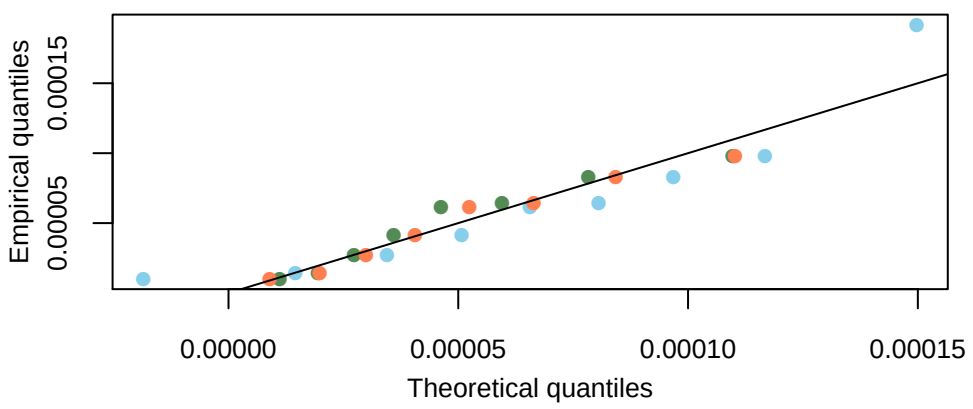
Figure **28**

Media:
Waterway Sediment All Depths
Exposure Unit:
UBC
Chemical (mg/kg):
TEQdf (Mammals)

Legend

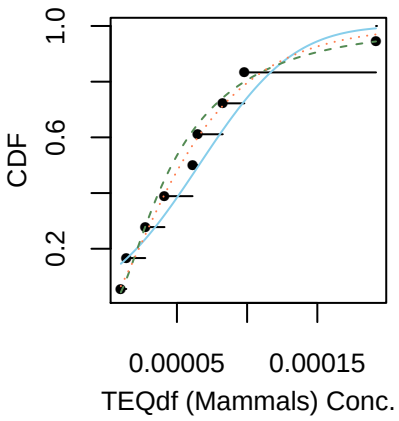
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

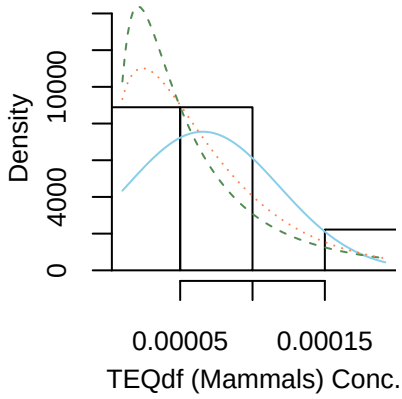


ECDF, Histogram & Q−Q (Detects Only)

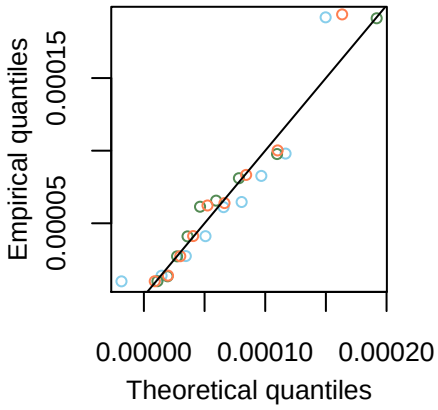
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 1e−05 J	Arithmetic Mean = 6.6e−05
N (detect) = 9	SD (log detect) = 0.95	Max (detect) = 1e−05 J	Arithmetic SD = 5.6e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.11	0.6	–	–	–	–	−147.737	−147.343
Lognormal	0.85	0.63	–	–	–	–	−152.162	−151.768
Gamma	–	–	0.1273	0.287	0.1781	0.743	−152.345	−151.951

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

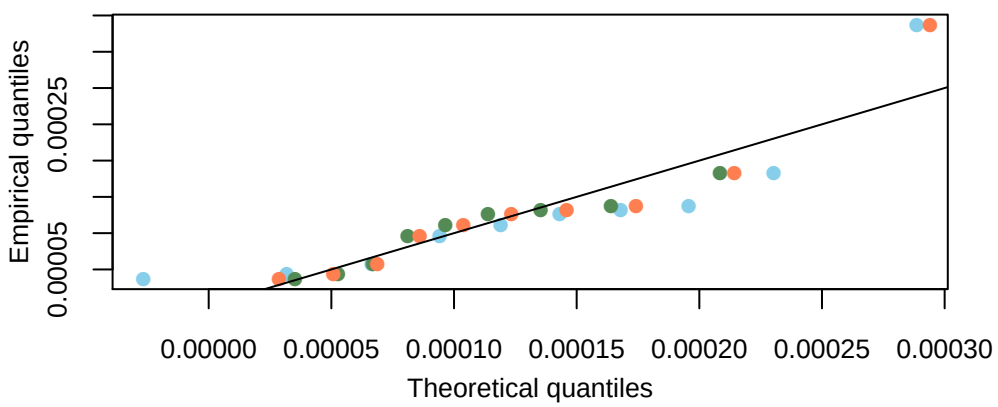
Distribution: Waterway Sediment All Depths in UBC−TEQdf (Mammals)

Media:
Waterway Sediment All Depths
Exposure Unit:
MBC
Chemical (mg/kg):
TEQdf (Mammals)

Legend

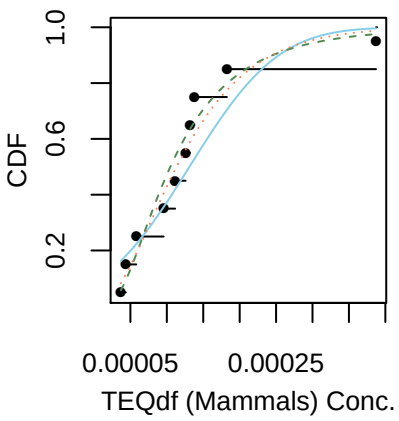
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

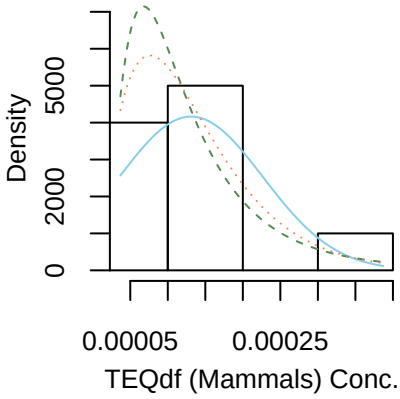


ECDF, Histogram & Q−Q (Detects Only)

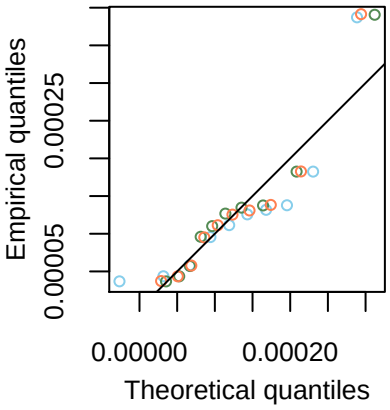
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 3.7e−05 J	Arithmetic Mean = 0.00013
N (detect) = 10	SD (log detect) = 0.7	Max (detect) = 3.7e−05 J	Arithmetic SD = 1e−04

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.01	0.033	–	–	–	–	−152.68	−152.075
Lognormal	0.73	0.77	–	–	–	–	−159.097	−158.492
Gamma	–	–	0.1841	0.27	0.3431	0.736	−158.232	−157.627

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in MBC−TEQdf (Mammals)

Media:
Waterway Sediment All Depths

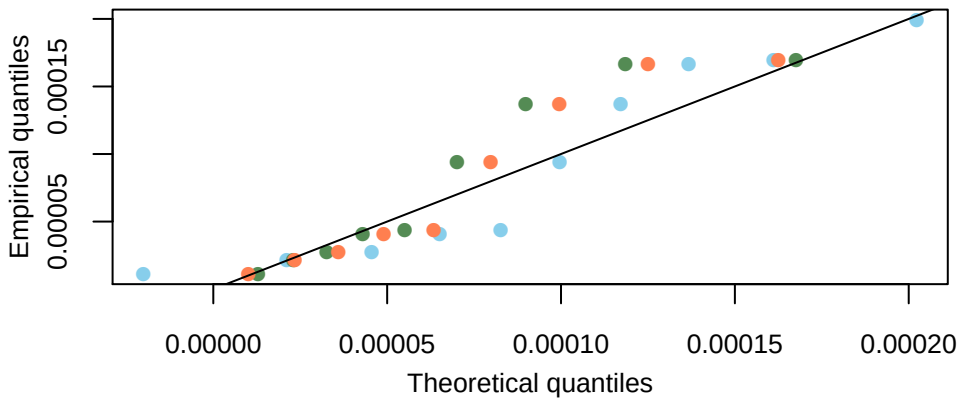
Exposure Unit:
BCC

Chemical (mg/kg):
TEQdf (Mammals)

Legend

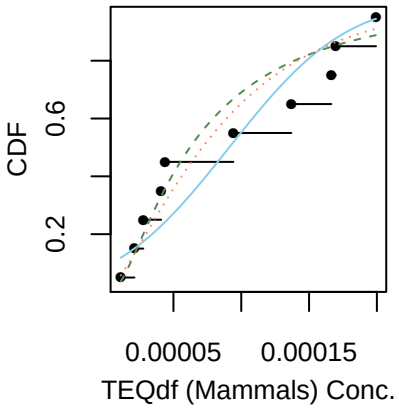
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

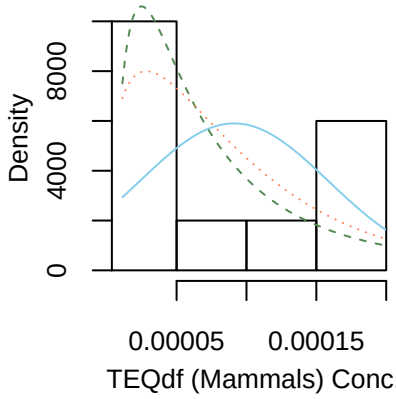


ECDF, Histogram & Q−Q (Detects Only)

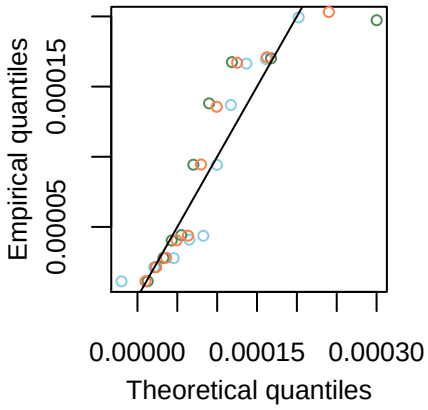
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 1.1e−05 J	Arithmetic Mean = 9.1e−05
N (detect) = 10	SD (log detect) = 1	Max (detect) = 1.1e−05 J	Arithmetic SD = 7.1e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.12	0.084	–	–	–	–	−159.657	−159.052
Lognormal	0.32	0.45	–	–	–	–	−162.214	−161.609
Gamma	–	–	0.1902	0.274	0.4379	0.748	−162.82	−162.215

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in BCC−TEQdf (Mammals)

Media:
Waterway Sediment All Depths

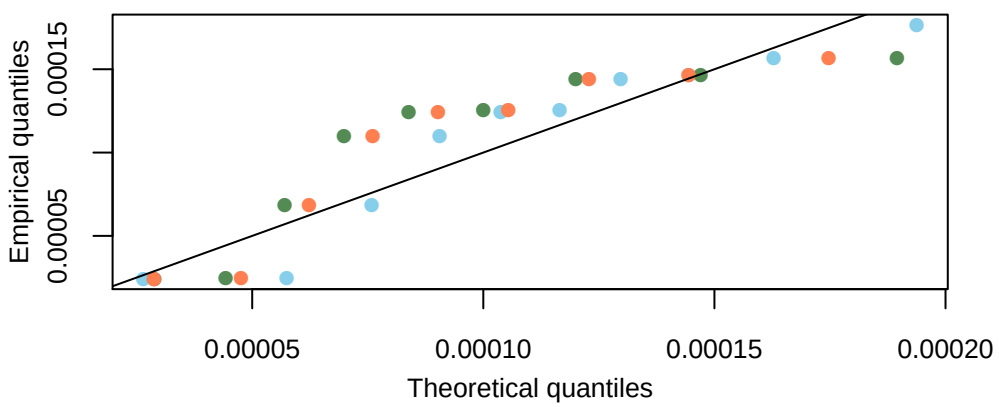
Exposure Unit:
LBC

Chemical (mg/kg):
TEQdf (Mammals)

Legend

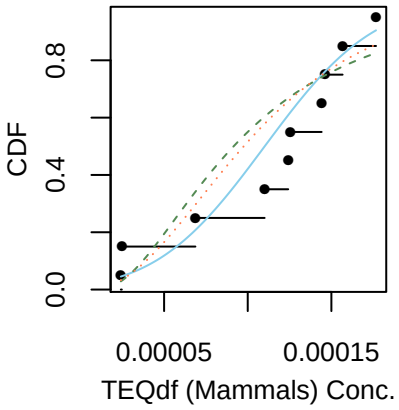
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

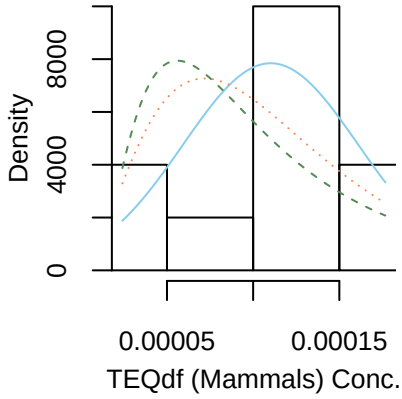


ECDF, Histogram & Q−Q (Detects Only)

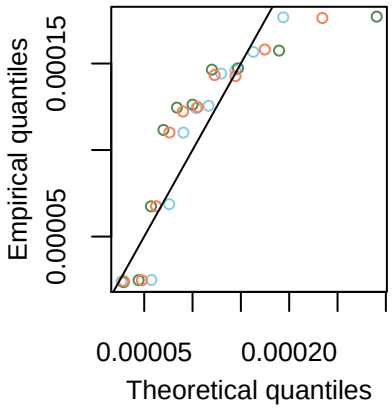
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 2.4e−05 J	Arithmetic Mean = 0.00011
N (detect) = 10	SD (log detect) = 0.74	Max (detect) = 2.4e−05 J	Arithmetic SD = 5.4e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.17	0.28	–	–	–	–	−165.35	−164.744
Lognormal	0.0056	0.012	–	–	–	–	−160.67	−160.065
Gamma	–	–	0.2785	0.27	0.9195	0.736	−162.951	−162.346

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment All Depths in LBC−TEQdf (Mammals)

Media:
Waterway Sediment All Depths

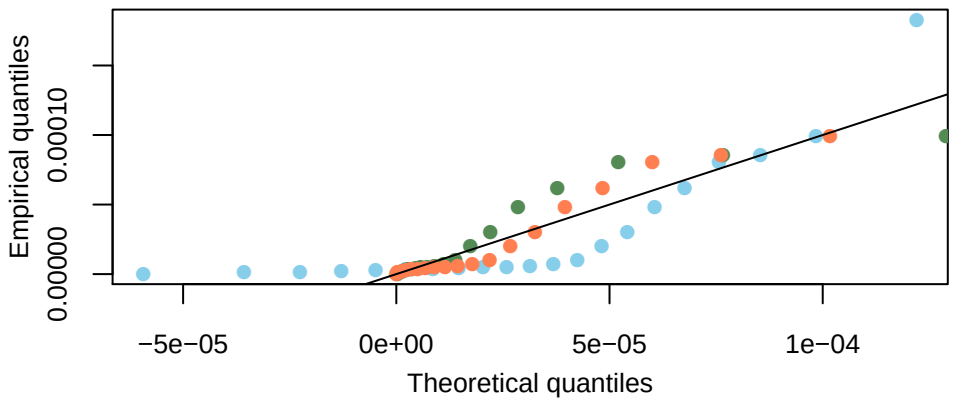
Exposure Unit:
Reference Sites

Chemical (mg/kg):
TEQdf (Mammals)

Legend

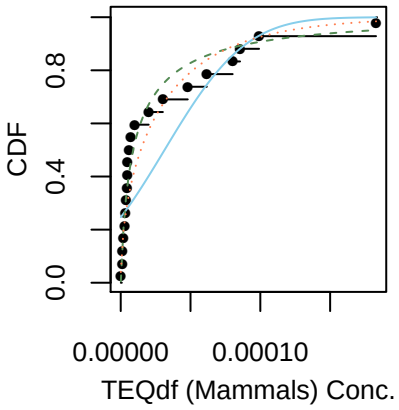
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

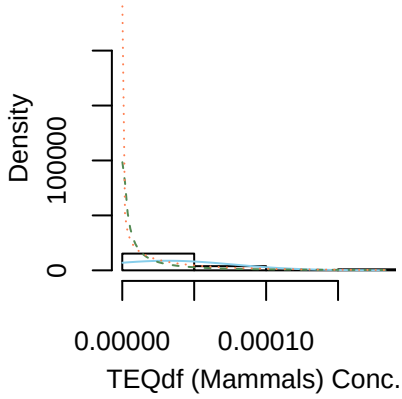


ECDF, Histogram & Q−Q (Detects Only)

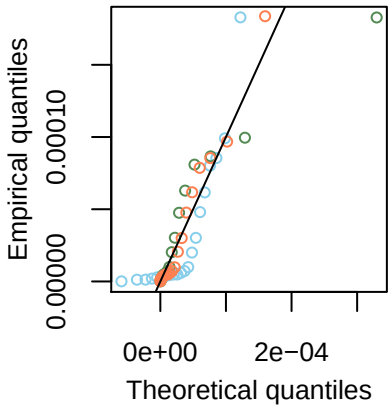
ECDF



Histogram



Q−Q



N = 21	FOD = 100%	Min (detect) = 8.5e−08 J	Arithmetic Mean = 3.1e−05
N (detect) = 21	SD (log detect) = 1.9	Max (detect) = 8.5e−08 J	Arithmetic SD = 4.7e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	3e−05	4.3e−05	–	–	–	–	−356.054	−353.965
Lognormal	0.33	0.64	–	–	–	–	−399.497	−397.408
Gamma	–	–	0.2052	0.2	0.7661	0.805	−398.295	−396.206

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

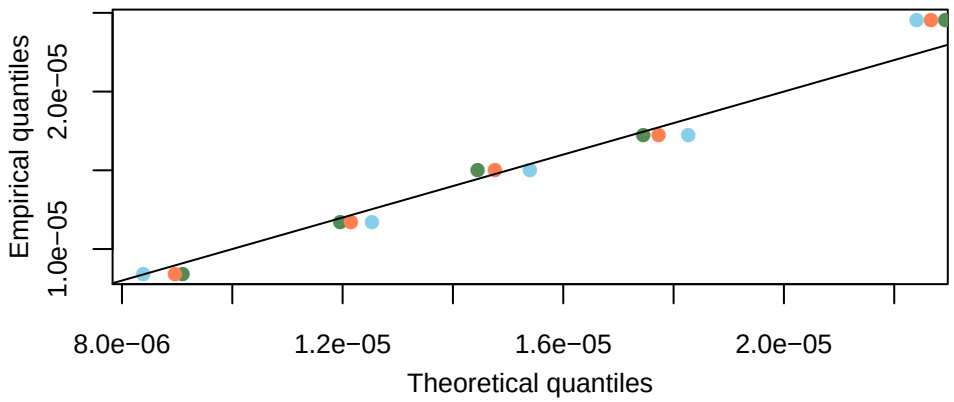
DRAFT

Distribution: Waterway Sediment All Depths in Reference Sites−TEQdf (Mammals)

Media:
White Perch Fillet
Exposure Unit:
UBC
Chemical (mg/kg):
TEQdf (Mammals)

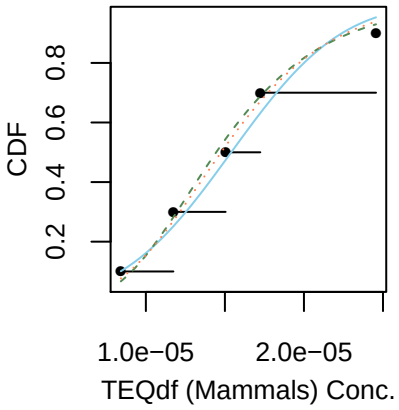
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

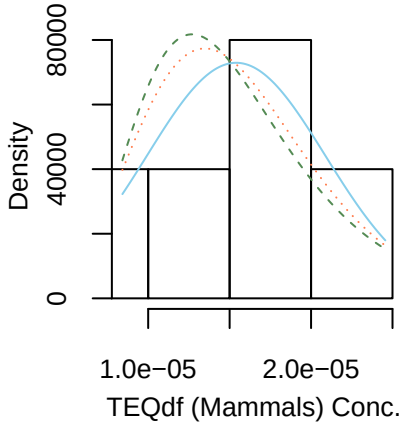


ECDF, Histogram & Q−Q (Detects Only)

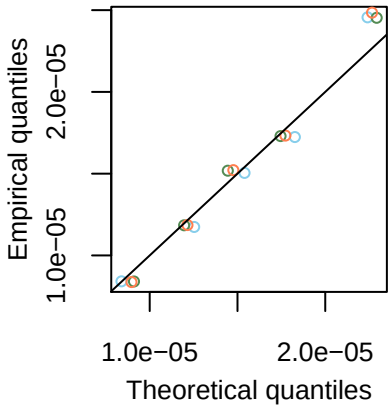
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 8.4e−06 J	Arithmetic Mean = 1.5e−05
N (detect) = 5	SD (log detect) = 0.4	Max (detect) = 8.4e−06 J	Arithmetic SD = 6.1e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.89	N<5	–	–	–	–	−102.974	−103.755
Lognormal	1	N<5	–	–	–	–	−103.465	−104.247
Gamma	–	–	NA	NA	NA	NA	−103.444	−104.225

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

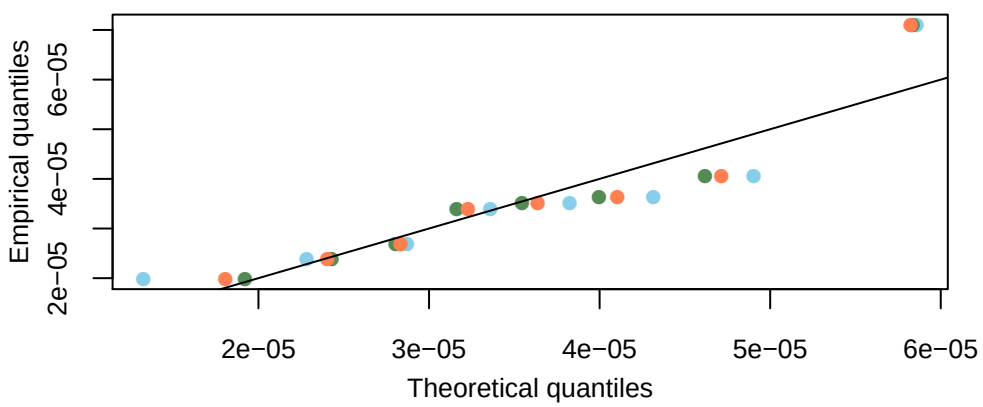
DRAFT

Distribution: White Perch Fillet in UBC−TEQdf (Mammals)

Media:
White Perch Fillet
Exposure Unit:
UBC
Chemical (mg/kg):
TEQp (Mammals)

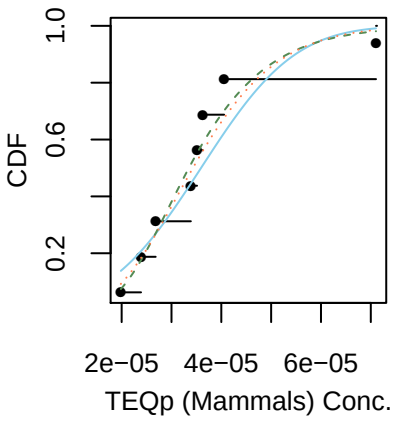
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

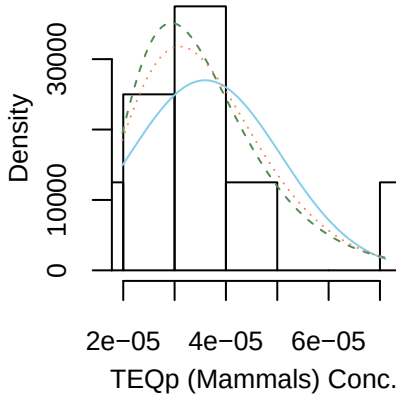


ECDF, Histogram & Q−Q (Detects Only)

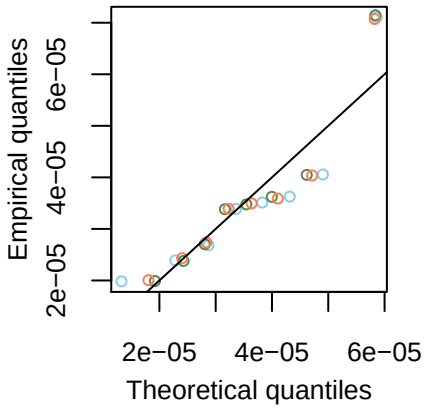
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 2e−05 J	Arithmetic Mean = 3.6e−05
N (detect) = 8	SD (log detect) = 0.39	Max (detect) = 2e−05 J	Arithmetic SD = 1.6e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.054	0.12	–	–	–	–	−151.257	−151.098
Lognormal	0.64	0.58	–	–	–	–	−154.419	−154.26
Gamma	–	–	0.1992	0.295	0.3818	0.719	−153.662	−153.503

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

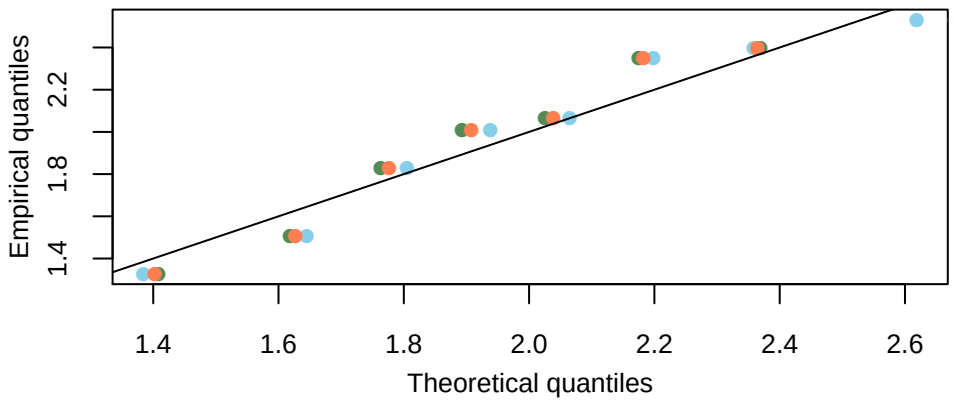
DRAFT

Distribution: White Perch Fillet in UBC−TEQp (Mammals)

Media:
White Perch Fillet
Exposure Unit:
UBC
Chemical (mg/kg):
PCBs (Total Congeners)

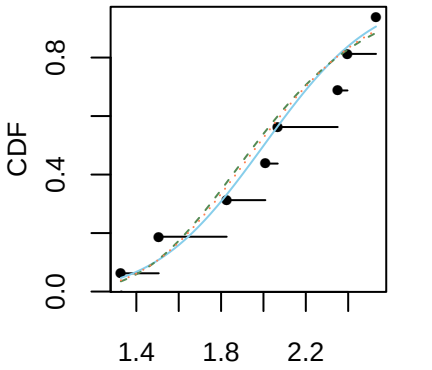
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

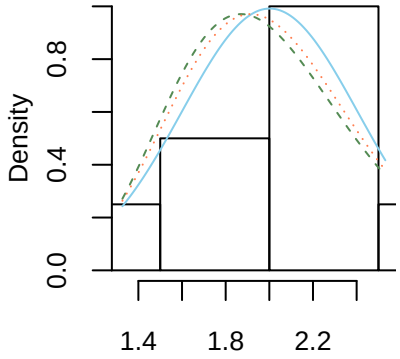


ECDF, Histogram & Q−Q (Detects Only)

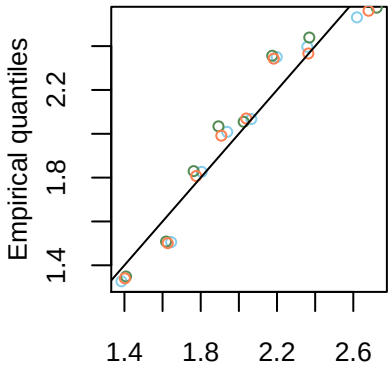
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 2
N (detect) = 8	SD (log detect) = 0.23	Max (detect) = 2 J	Arithmetic SD = 0.43

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.65	0.74	–	–	–	–	12.1351	12.294
Lognormal	0.45	0.71	–	–	–	–	12.8463	13.0052
Gamma	–	–	0.1795	0.294	0.3113	0.716	12.5398	12.6987

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in UBC−PCBs (Total Congeners)

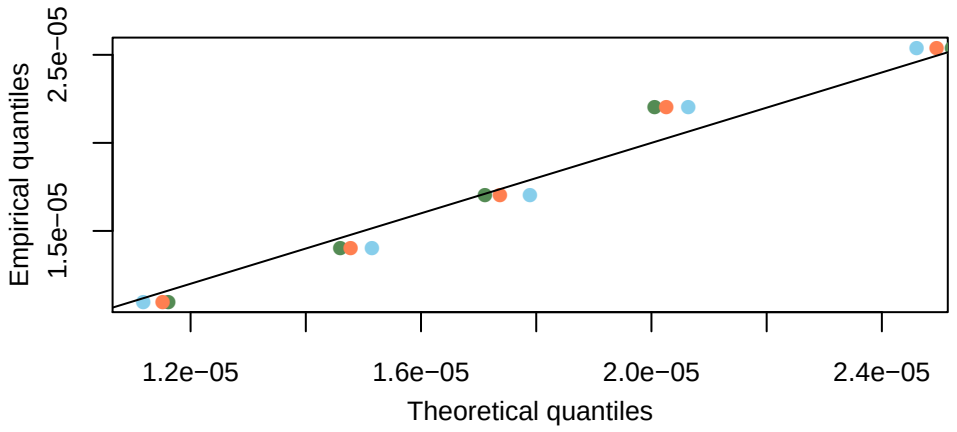
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **36**

Media:
White Perch Fillet
Exposure Unit:
MBC
Chemical (mg/kg):
TEQdf (Mammals)

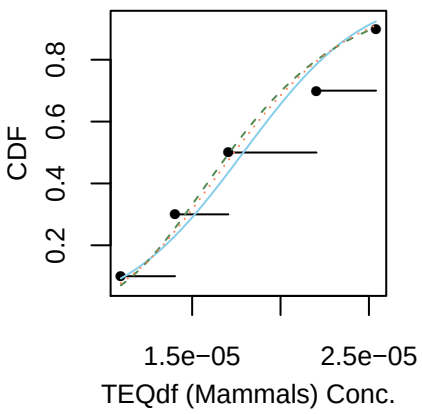
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

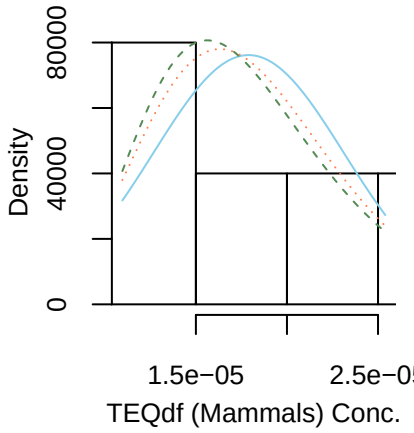


ECDF, Histogram & Q−Q (Detects Only)

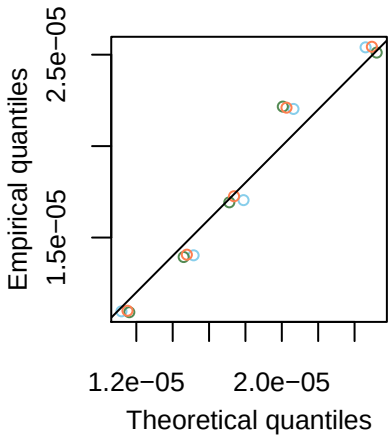
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 1.1e−05 J	Arithmetic Mean = 1.8e−05
N (detect) = 5	SD (log detect) = 0.34	Max (detect) = 1.1e−05 J	Arithmetic SD = 5.9e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.87	N<5	–	–	–	–	−103.407	−104.188
Lognormal	0.9	N<5	–	–	–	–	−103.524	−104.306
Gamma	–	–	NA	NA	NA	NA	−103.567	−104.348

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

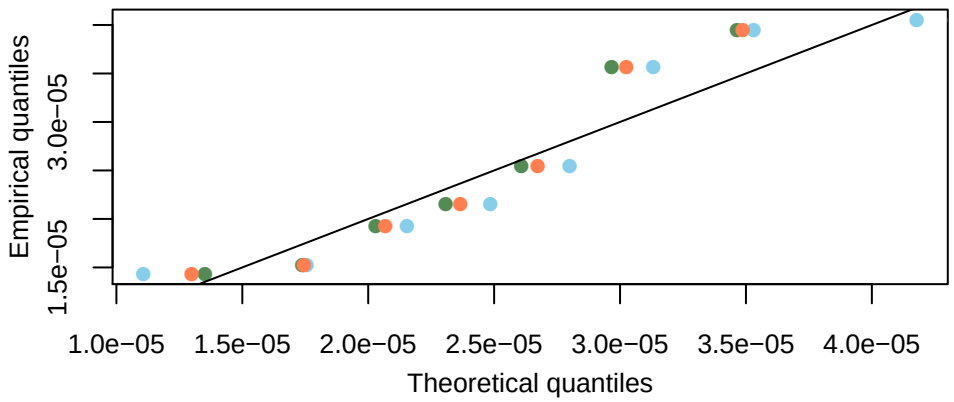
DRAFT

Distribution: White Perch Fillet in MBC−TEQdf (Mammals)

Media:
White Perch Fillet
Exposure Unit:
MBC
Chemical (mg/kg):
TEQp (Mammals)

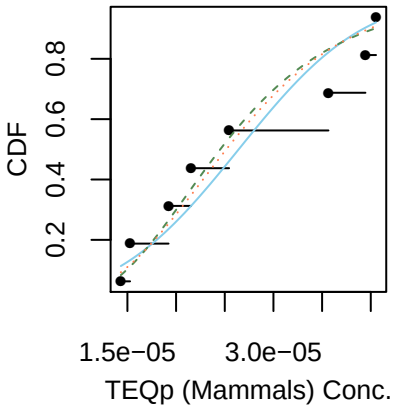
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

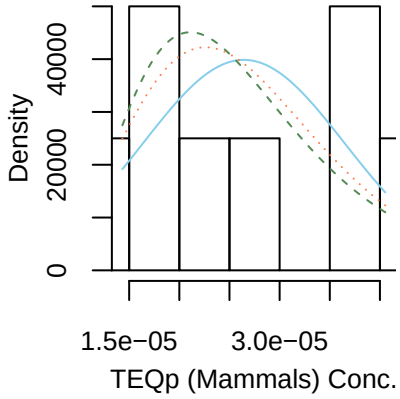


ECDF, Histogram & Q−Q (Detects Only)

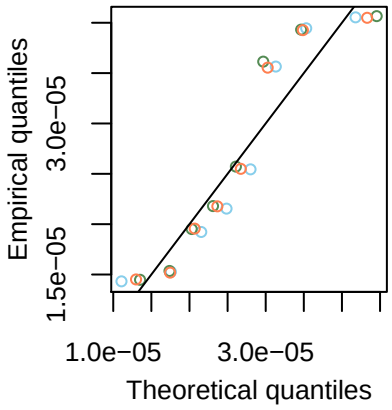
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 1.4e−05 J	Arithmetic Mean = 2.6e−05
N (detect) = 8	SD (log detect) = 0.42	Max (detect) = 1.4e−05 J	Arithmetic SD = 1.1e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.2	0.62	–	–	–	–	−157.49	−157.331
Lognormal	0.33	0.53	–	–	–	–	−158.256	−158.097
Gamma	–	–	0.2042	0.295	0.3955	0.719	−158.196	−158.037

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in MBC−TEQp (Mammals)

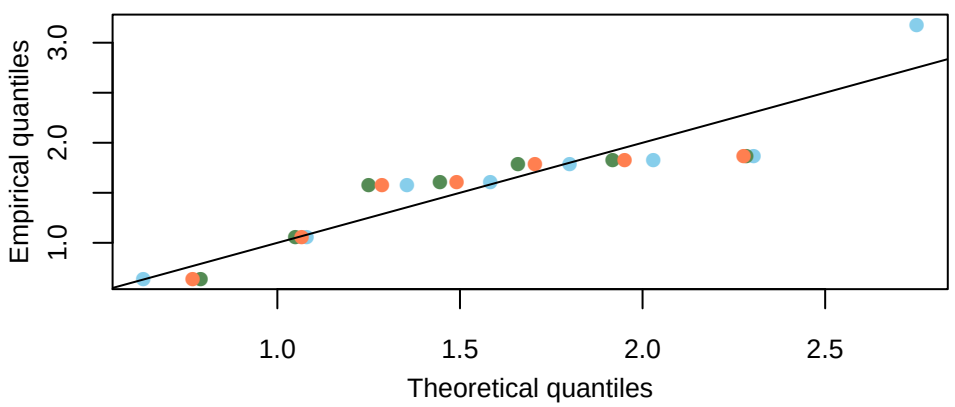
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **38**

Media:
White Perch Fillet
Exposure Unit:
MBC
Chemical (mg/kg):
PCBs (Total Congeners)

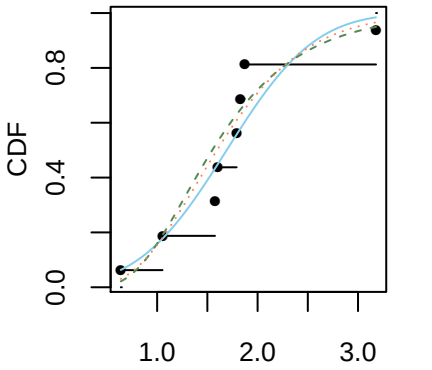
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

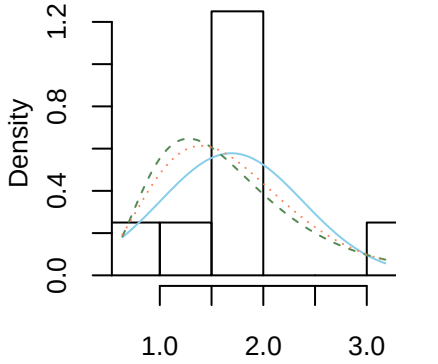


ECDF, Histogram & Q−Q (Detects Only)

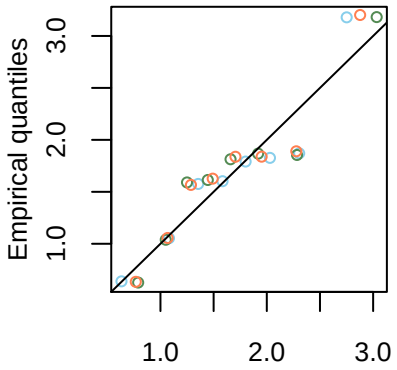
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 0.64 J	Arithmetic Mean = 1
N (detect) = 8	SD (log detect) = 0.47	Max (detect) = 0.64 J	Arithmetic SD = 0.74

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.28	0.066	–	–	–	–	20.7698	20.9287
Lognormal	0.38	0.1	–	–	–	–	20.4998	20.6587
Gamma	–	–	0.2382	0.295	0.437	0.719	20.1068	20.2657

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in MBC−PCBs (Total Congeners)

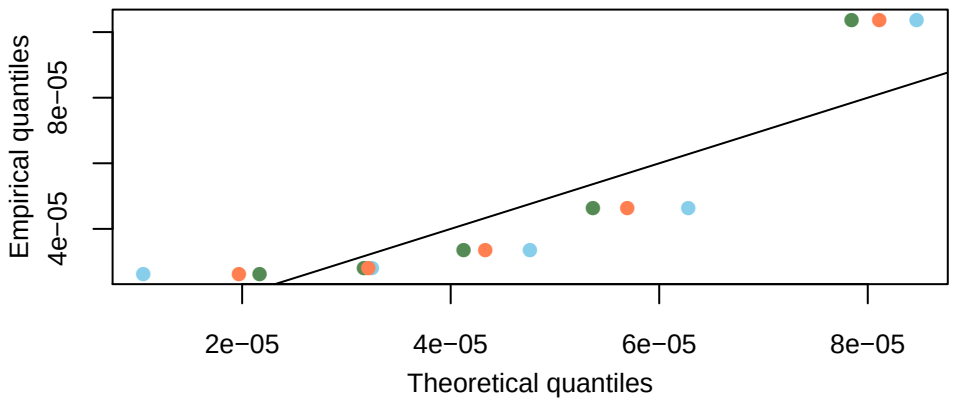
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **39**

Media:
White Perch Fillet
Exposure Unit:
BCC
Chemical (mg/kg):
TEQdf (Mammals)

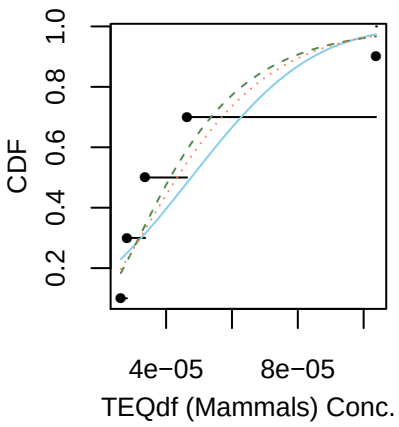
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

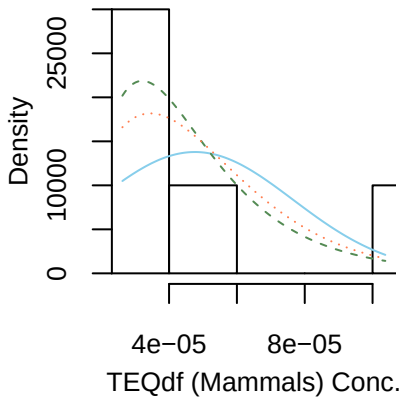


ECDF, Histogram & Q−Q (Detects Only)

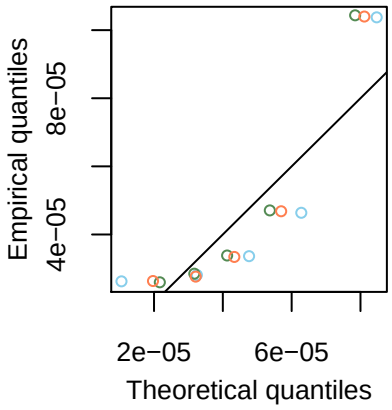
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 2.6e−05 J	Arithmetic Mean = 4.8e−05
N (detect) = 5	SD (log detect) = 0.56	Max (detect) = 2.6e−05 J	Arithmetic SD = 3.2e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.028	N<5	–	–	–	–	−86.3145	−87.0956
Lognormal	0.2	N<5	–	–	–	–	−89.6693	−90.4504
Gamma	–	–	NA	NA	NA	NA	−88.7679	−89.549

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in BCC−TEQdf (Mammals)

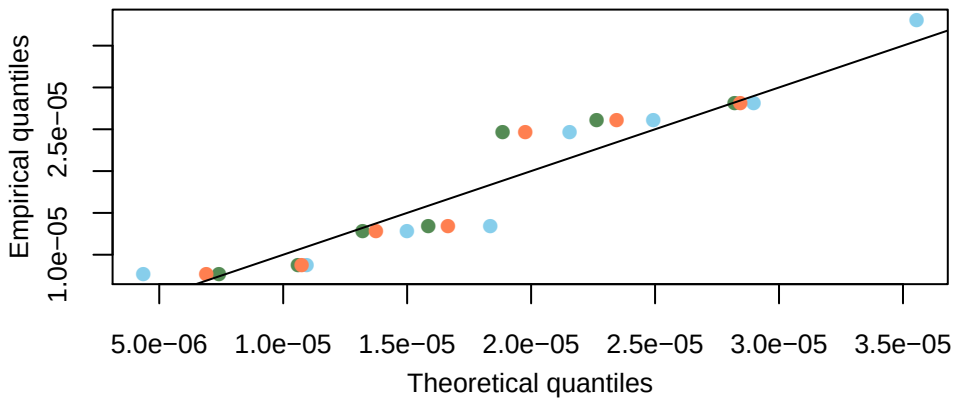
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **40**

Media:
White Perch Fillet
Exposure Unit:
BCC
Chemical (mg/kg):
TEQp (Mammals)

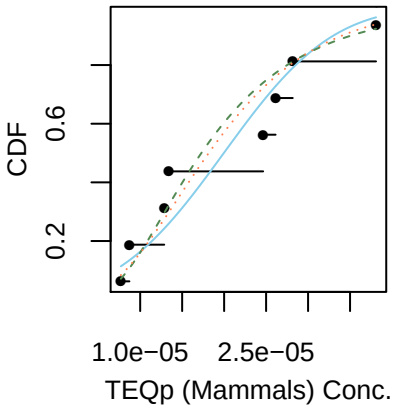
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

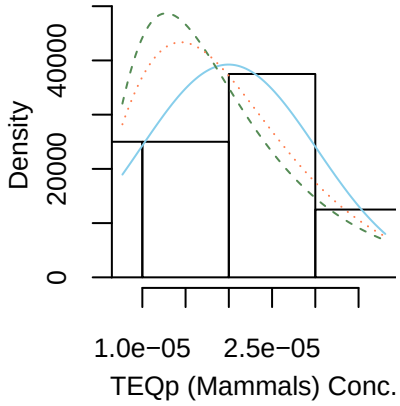


ECDF, Histogram & Q−Q (Detects Only)

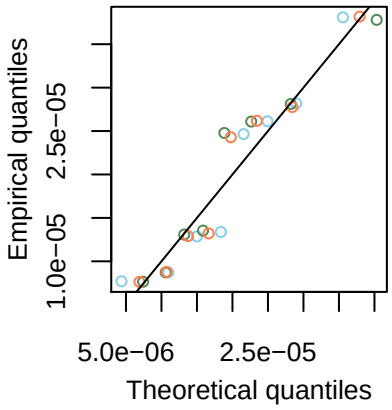
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 7.7e−06 J	Arithmetic Mean = 2e−05
N (detect) = 8	SD (log detect) = 0.59	Max (detect) = 7.7e−06 J	Arithmetic SD = 1.1e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.39	0.26	–	–	–	–	−157.239	−157.08
Lognormal	0.43	0.27	–	–	–	–	−158.256	−158.097
Gamma	–	–	0.2222	0.297	0.3822	0.724	−158.338	−158.179

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

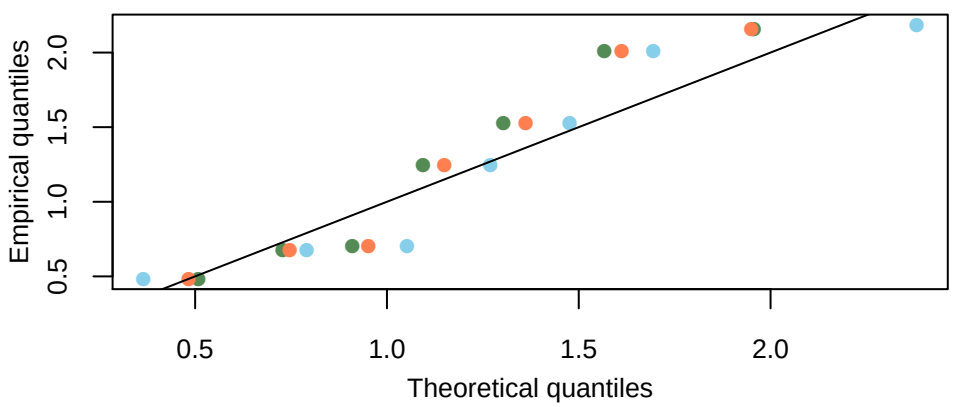
DRAFT

Distribution: White Perch Fillet in BCC−TEQp (Mammals)

Media:
White Perch Fillet
Exposure Unit:
BCC
Chemical (mg/kg):
PCBs (Total Congeners)

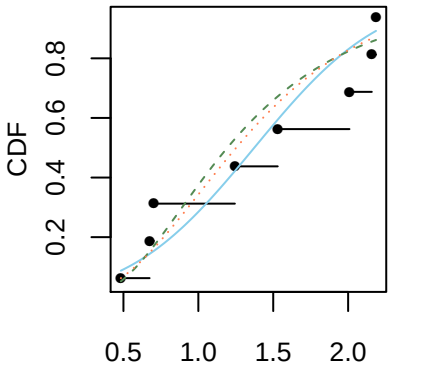
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

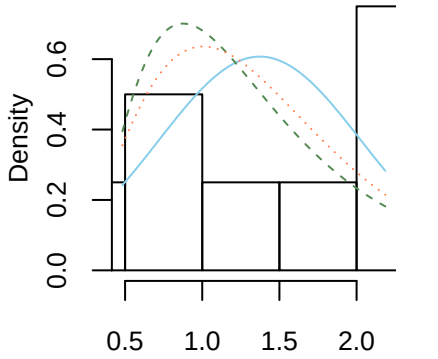


ECDF, Histogram & Q−Q (Detects Only)

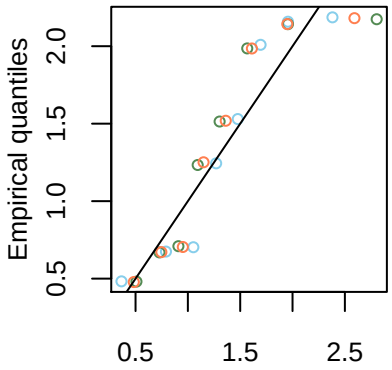
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 0.48 J	Arithmetic Mean = 1
N (detect) = 8	SD (log detect) = 0.59	Max (detect) = 0.48 J	Arithmetic SD = 0.7

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.2	0.41	–	–	–	–	19.9823	20.1412
Lognormal	0.19	0.55	–	–	–	–	20.1618	20.3207
Gamma	–	–	0.2121	0.297	0.4731	0.724	19.7243	19.8832

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in BCC−PCBs (Total Congeners)

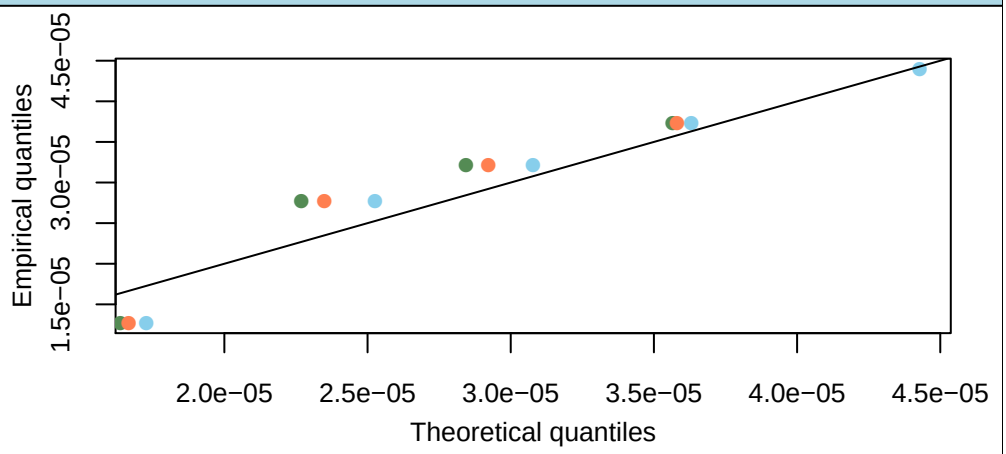
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **42**

Media:
White Perch Fillet
Exposure Unit:
LBC
Chemical (mg/kg):
TEQdf (Mammals)

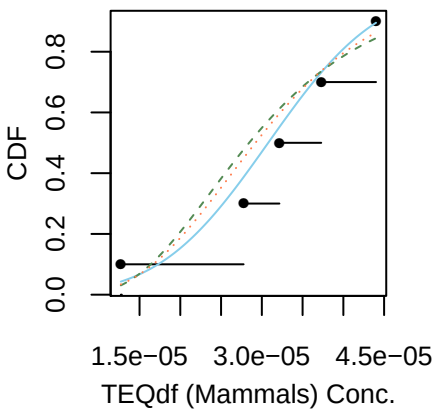
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

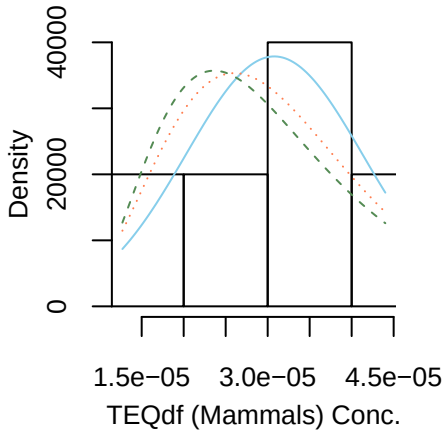


ECDF, Histogram & Q−Q (Detects Only)

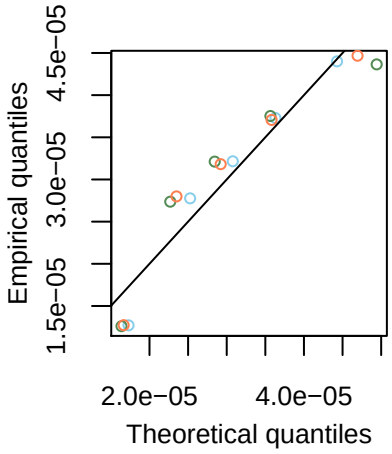
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 1.3e−05 J	Arithmetic Mean = 3.1e−05
N (detect) = 5	SD (log detect) = 0.48	Max (detect) = 1.3e−05 J	Arithmetic SD = 1.2e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.82	N<5	–	–	–	–	−96.4179	−97.199
Lognormal	0.25	N<5	–	–	–	–	−94.9024	−95.6835
Gamma	–	–	NA	NA	NA	NA	−95.5745	−96.3556

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in LBC−TEQdf (Mammals)

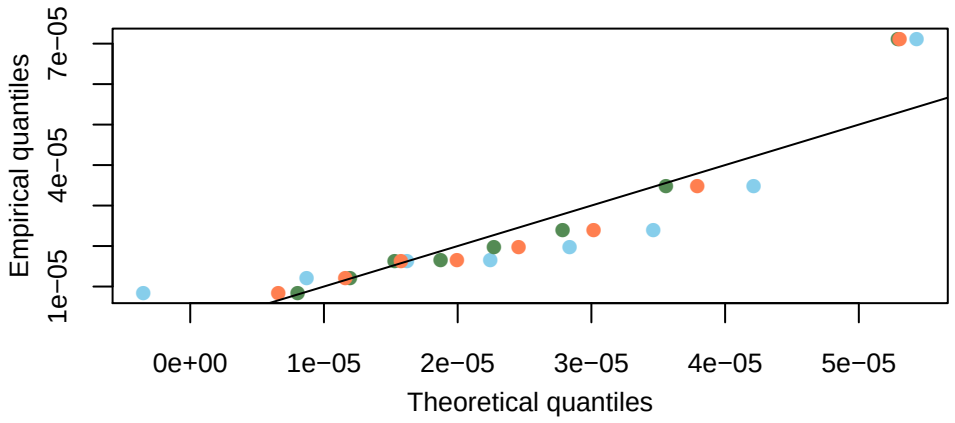
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **43**

Media:
White Perch Fillet
Exposure Unit:
LBC
Chemical (mg/kg):
TEQp (Mammals)

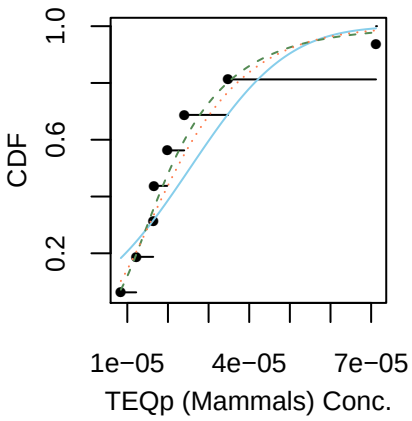
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

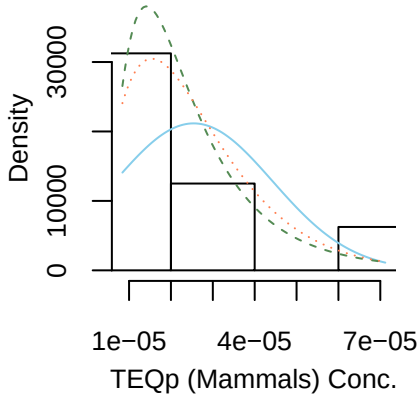


ECDF, Histogram & Q−Q (Detects Only)

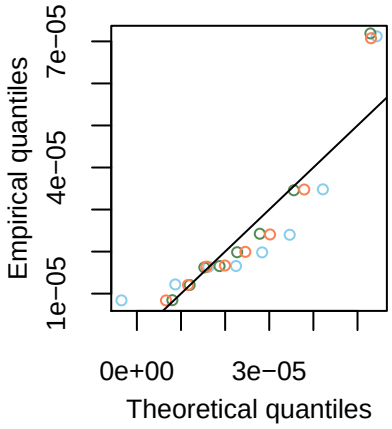
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 8.4e−06 J	Arithmetic Mean = 2.5e−05
N (detect) = 8	SD (log detect) = 0.66	Max (detect) = 8.4e−06 J	Arithmetic SD = 2e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.012	0.069	–	–	–	–	−147.362	−147.203
Lognormal	0.81	0.8	–	–	–	–	−153.719	−153.56
Gamma	–	–	0.202	0.297	0.4031	0.724	−152.361	−152.202

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

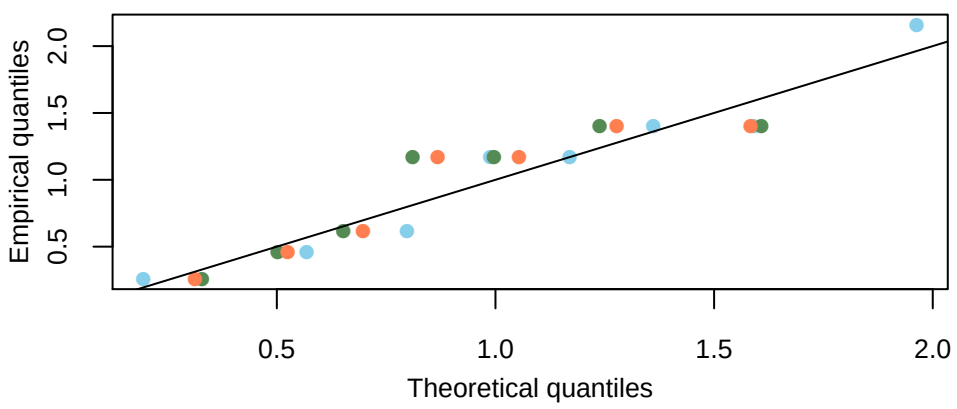
DRAFT

Distribution: White Perch Fillet in LBC−TEQp (Mammals)

Media:
White Perch Fillet
Exposure Unit:
LBC
Chemical (mg/kg):
PCBs (Total Congeners)

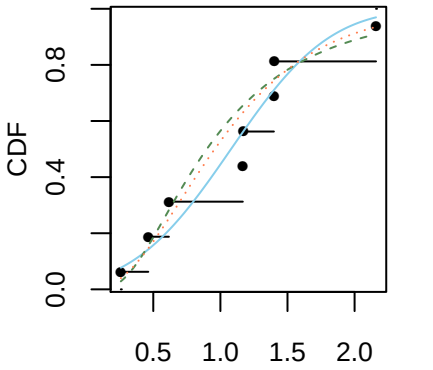
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

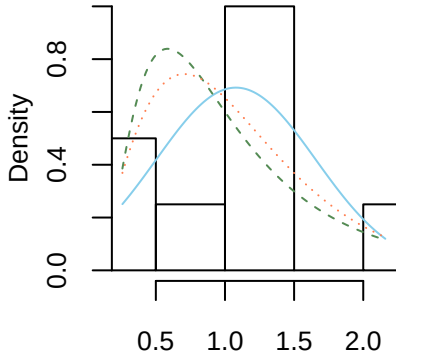


ECDF, Histogram & Q−Q (Detects Only)

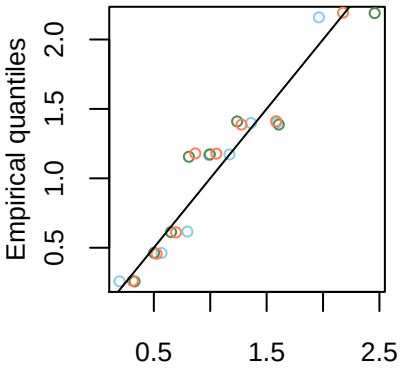
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 0.26 J	Arithmetic Mean = 1
N (detect) = 8	SD (log detect) = 0.7	Max (detect) = 0.26 J	Arithmetic SD = 0.62

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.66	0.61	–	–	–	–	17.8878	18.0467
Lognormal	0.44	0.088	–	–	–	–	18.2437	18.4025
Gamma	–	–	0.2546	0.297	0.3471	0.724	17.432	17.5909

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in LBC−PCBs (Total Congeners)

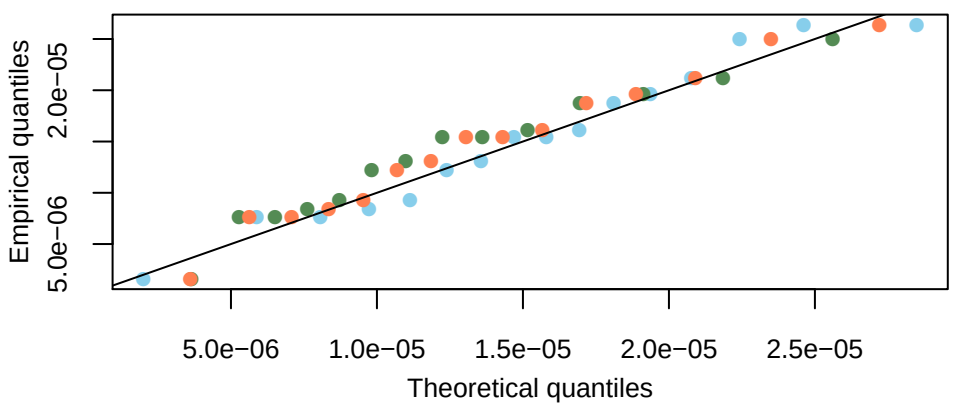
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **45**

Media:
White Perch Fillet
Exposure Unit:
Reference Sites
Chemical (mg/kg):
TEQdf (Mammals)

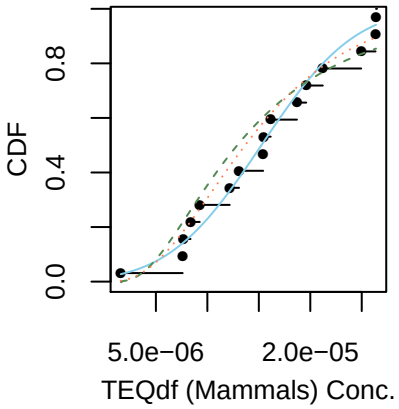
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

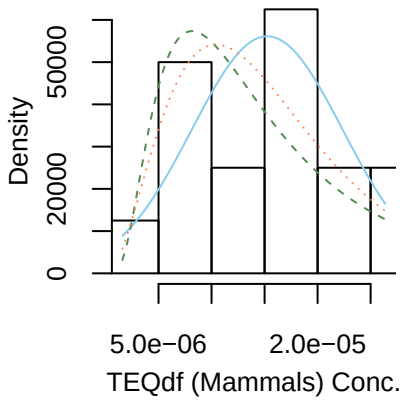


ECDF, Histogram & Q−Q (Detects Only)

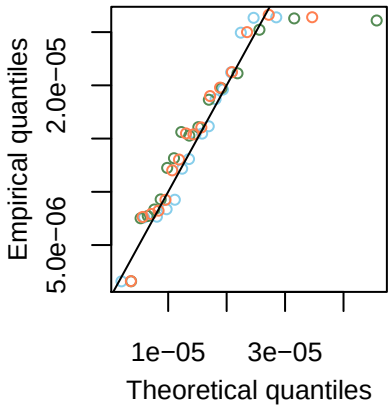
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 1.6e−06 J	Arithmetic Mean = 1.5e−05
N (detect) = 16	SD (log detect) = 0.7	Max (detect) = 1.6e−06 J	Arithmetic SD = 7.3e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.7	0.91	–	–	–	–	−329.925	−328.38
Lognormal	0.0068	0.31	–	–	–	–	−323.255	−321.71
Gamma	–	–	0.1453	0.218	0.4203	0.75	−327.559	−326.013

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

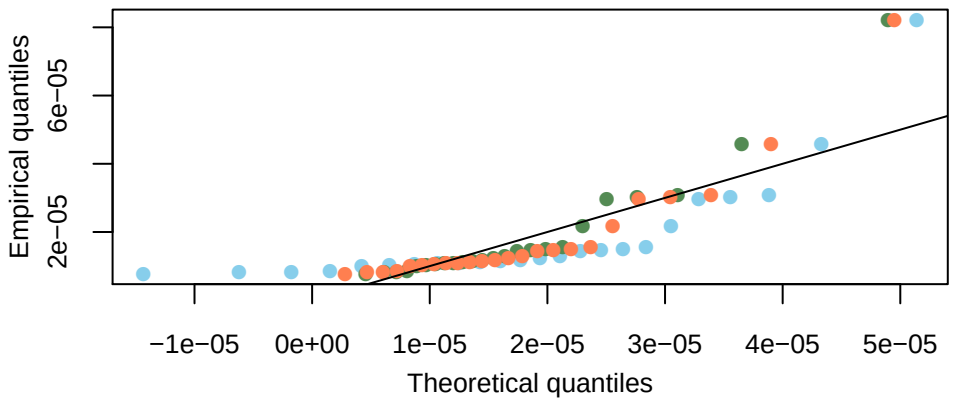
DRAFT

Distribution: White Perch Fillet in Reference Sites−TEQdf (Mammals)

Media:
White Perch Fillet
Exposure Unit:
Reference Sites
Chemical (mg/kg):
TEQp (Mammals)

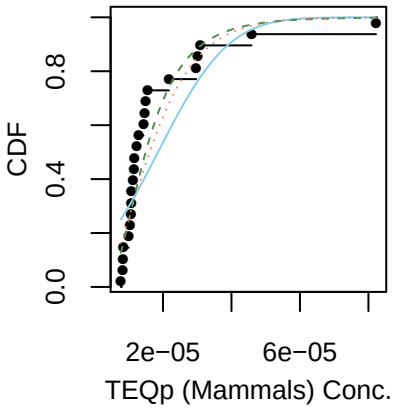
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

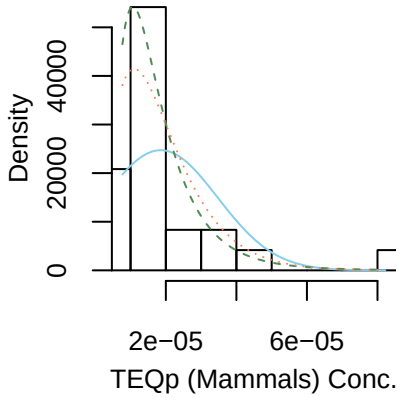


ECDF, Histogram & Q−Q (Detects Only)

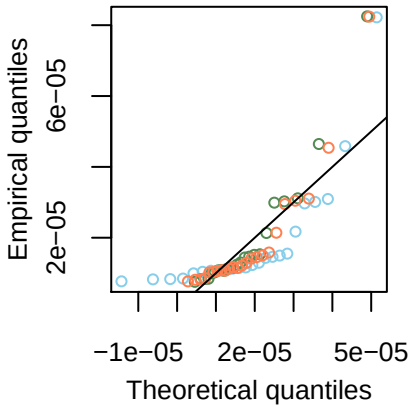
ECDF



Histogram



Q−Q



N = 24	FOD = 100%	Min (detect) = 7.7e−06 J	Arithmetic Mean = 1.9e−05
N (detect) = 24	SD (log detect) = 0.6	Max (detect) = 7.7e−06 J	Arithmetic SD = 1.6e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.4e−07	–	–	–	–	−457.539	−455.183
Lognormal	0.0022	0.0029	–	–	–	–	−487.174	−484.818
Gamma	–	–	0.272	0.18	1.936	0.755	−479.726	−477.369

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Fillet in Reference Sites−TEQp (Mammals)

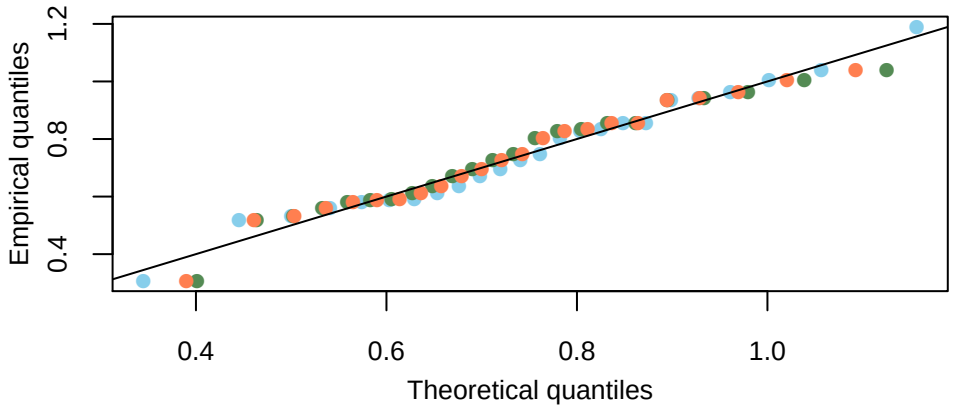
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **47**

Media:
White Perch Fillet
Exposure Unit:
Reference Sites
Chemical (mg/kg):
PCBs (Total Congeners)

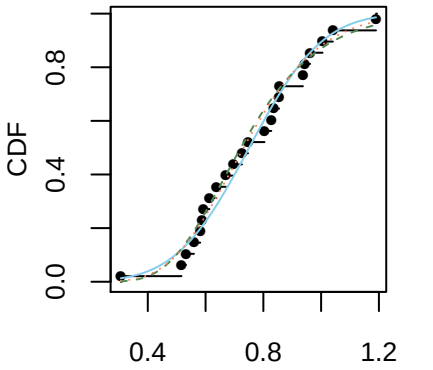
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

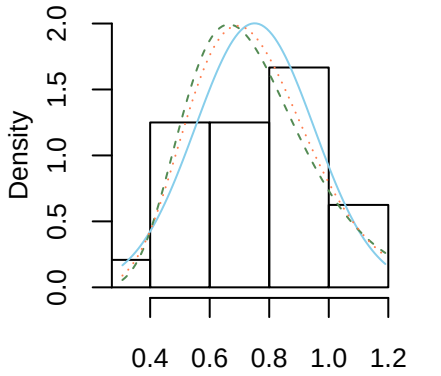


ECDF, Histogram & Q−Q (Detects Only)

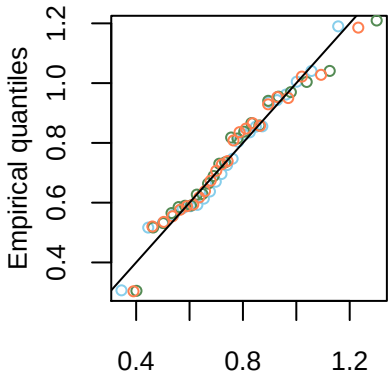
ECDF



Histogram



Q−Q



N = 24	FOD = 100%	Min (detect) = 0.31 J	Arithmetic Mean = 0.75
N (detect) = 24	SD (log detect) = 0.3	Max (detect) = 0.31 J	Arithmetic SD = 0.2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.94	0.92	–	–	–	–	−5.31085	−2.95474
Lognormal	0.23	0.77	–	–	–	–	−3.10423	−0.748125
Gamma	–	–	0.092	0.178	0.254	0.744	−4.52047	−2.16436

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

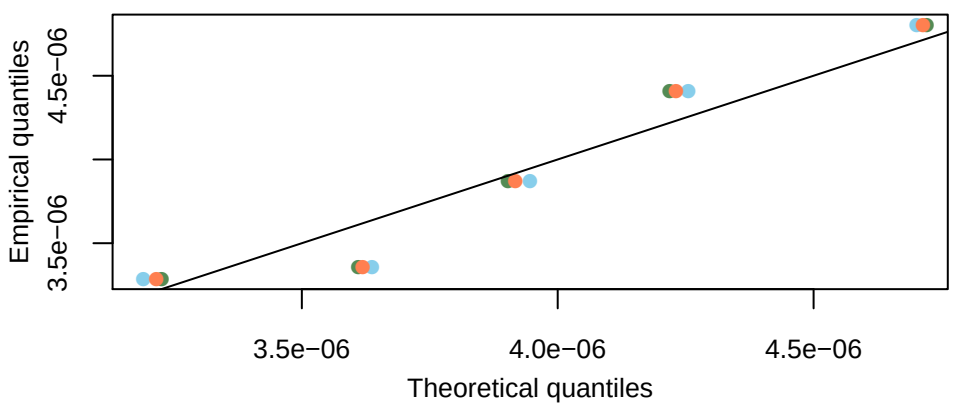
DRAFT

Distribution: White Perch Fillet in Reference Sites−PCBs (Total Congeners)

Media:
Blue Crab Muscle
Exposure Unit:
UBC
Chemical (mg/kg):
TEQdf (Mammals)

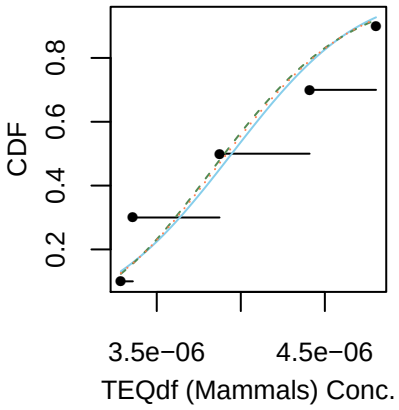
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

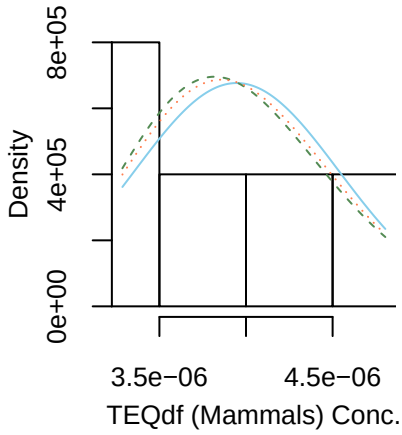


ECDF, Histogram & Q−Q (Detects Only)

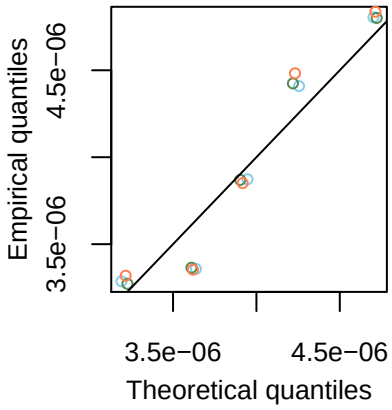
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 3.3e−06 J	Arithmetic Mean = 3.9e−06
N (detect) = 5	SD (log detect) = 0.17	Max (detect) = 3.3e−06 J	Arithmetic SD = 6.6e−07

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.51	N<5	–	–	–	–	−125.249	−126.03
Lognormal	0.51	N<5	–	–	–	–	−125.418	−126.199
Gamma	–	–	NA	NA	NA	NA	−125.379	−126.16

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

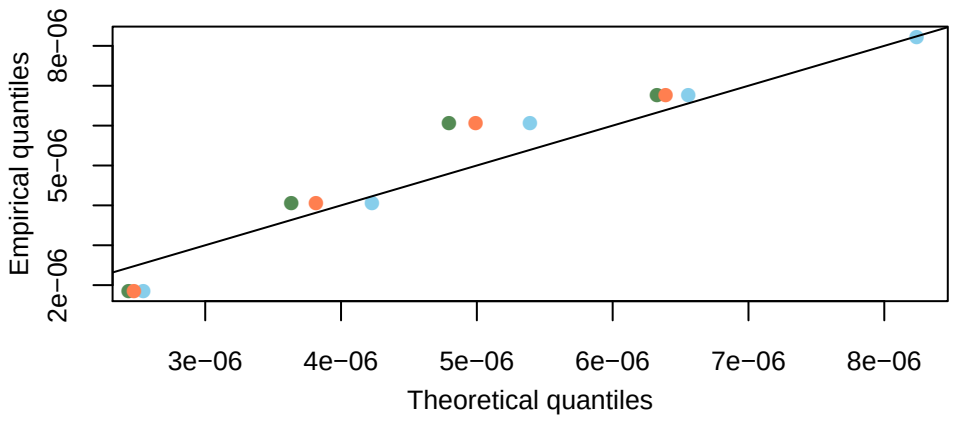
DRAFT

Distribution: Blue Crab Muscle in UBC−TEQdf (Mammals)

Media:
Blue Crab Muscle
Exposure Unit:
UBC
Chemical (mg/kg):
TEQp (Mammals)

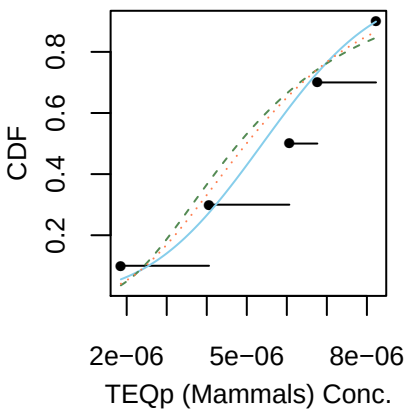
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

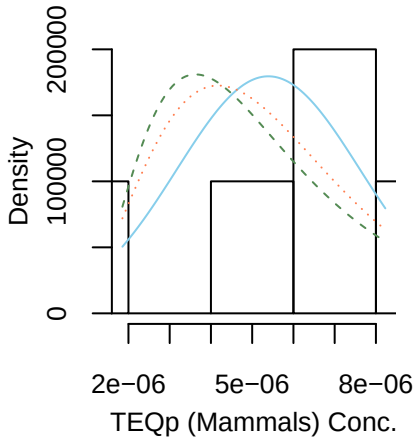


ECDF, Histogram & Q−Q (Detects Only)

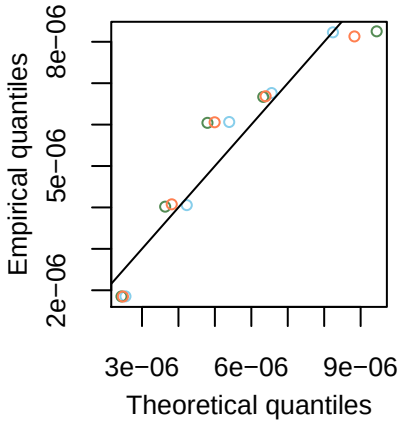
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 1.9e−06 J	Arithmetic Mean = 5.4e−06
N (detect) = 5	SD (log detect) = 0.59	Max (detect) = 1.9e−06 J	Arithmetic SD = 2.5e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.87	N<5	–	–	–	–	−111.983	−112.764
Lognormal	0.35	N<5	–	–	–	–	−110.666	−111.447
Gamma	–	–	NA	NA	NA	NA	−111.344	−112.125

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

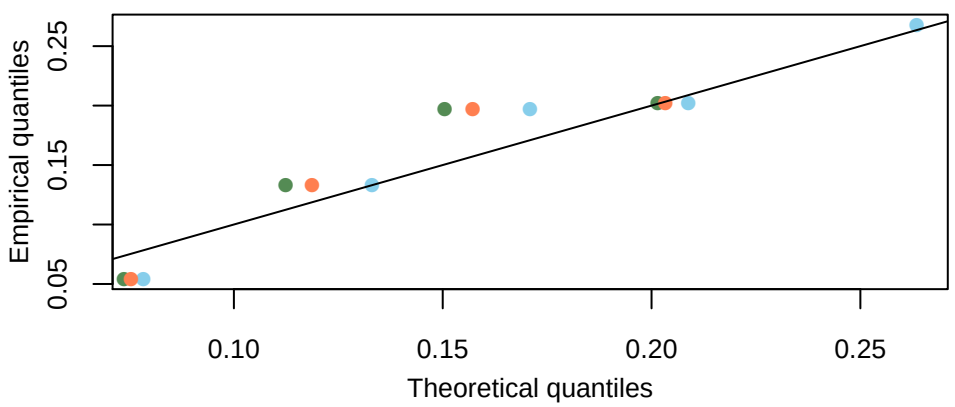
DRAFT

Distribution: Blue Crab Muscle in UBC−TEQp (Mammals)

Media:
Blue Crab Muscle
Exposure Unit:
UBC
Chemical (mg/kg):
PCBs (Total Congeners)

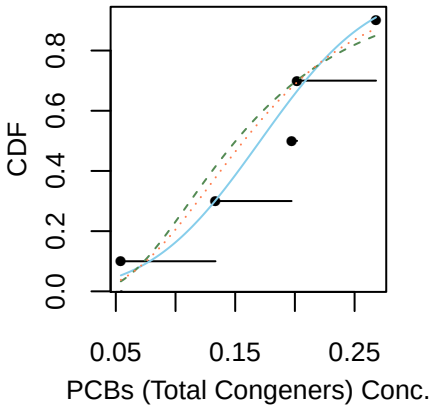
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

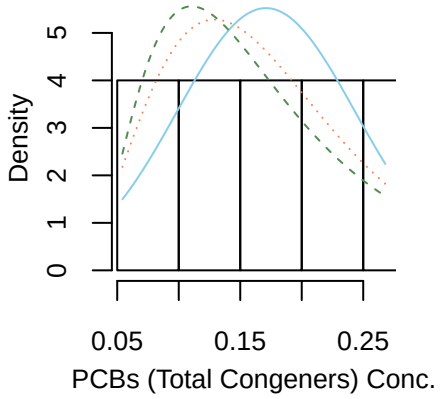


ECDF, Histogram & Q−Q (Detects Only)

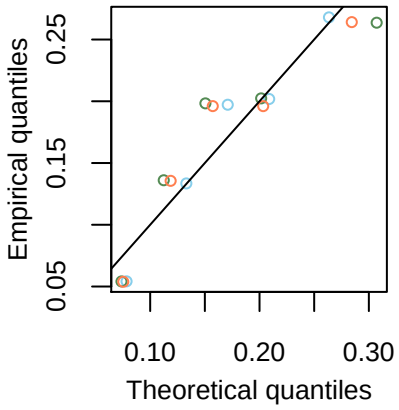
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.054 J	Arithmetic Mean = 0.17
N (detect) = 5	SD (log detect) = 0.62	Max (detect) = 0.054 J	Arithmetic SD = 0.081

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.83	N<5	–	–	–	–	−8.08824	−8.86936
Lognormal	0.27	N<5	–	–	–	–	−6.60623	−7.38735
Gamma	–	–	NA	NA	NA	NA	−7.37503	−8.15615

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in UBC−PCBs (Total Congeners)

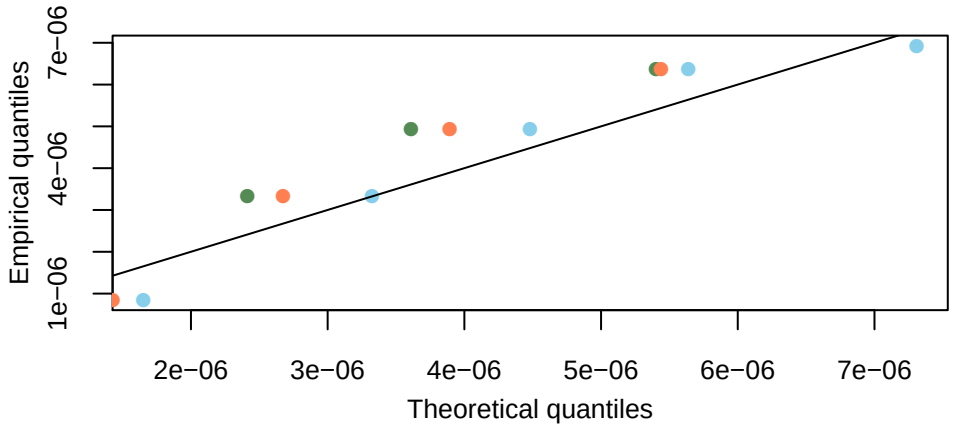
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **51**

Media:
Blue Crab Muscle
Exposure Unit:
MBC
Chemical (mg/kg):
TEQdf (Mammals)

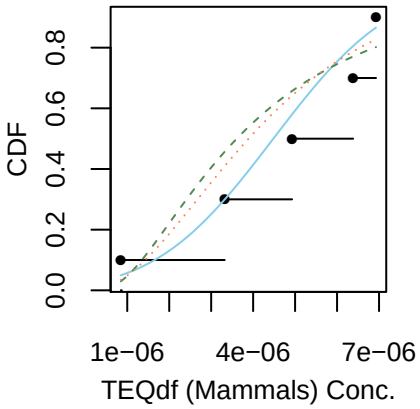
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

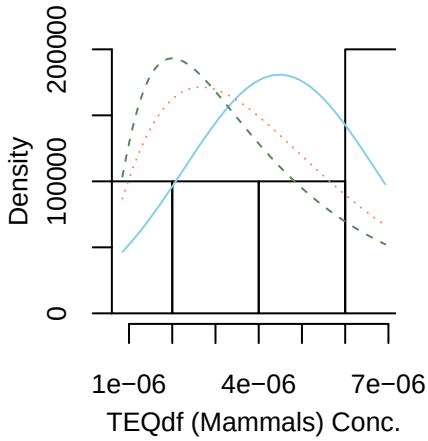


ECDF, Histogram & Q−Q (Detects Only)

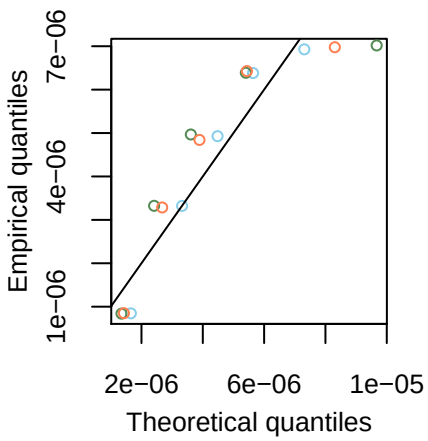
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 8.5e−07 J	Arithmetic Mean = 4.5e−06
N (detect) = 5	SD (log detect) = 0.86	Max (detect) = 8.5e−07 J	Arithmetic SD = 2.5e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.65	N<5	–	–	–	–	−112.049	−112.83
Lognormal	0.11	N<5	–	–	–	–	−109.757	−110.538
Gamma	–	–	NA	NA	NA	NA	−110.972	−111.753

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

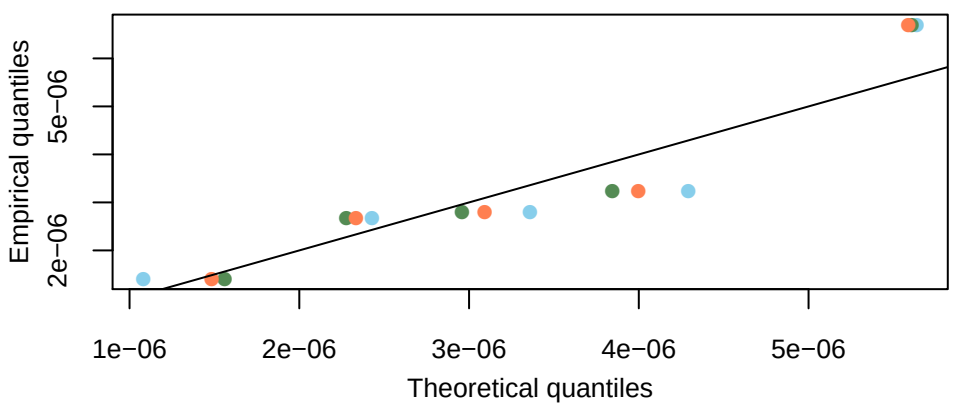
DRAFT

Distribution: Blue Crab Muscle in MBC−TEQdf (Mammals)

Media:
Blue Crab Muscle
Exposure Unit:
MBC
Chemical (mg/kg):
TEQp (Mammals)

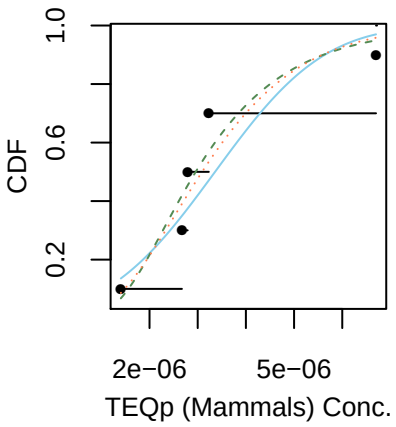
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

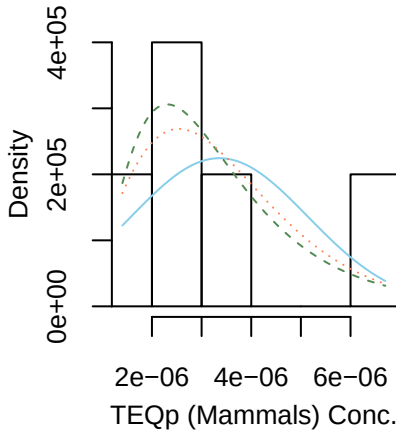


ECDF, Histogram & Q−Q (Detects Only)

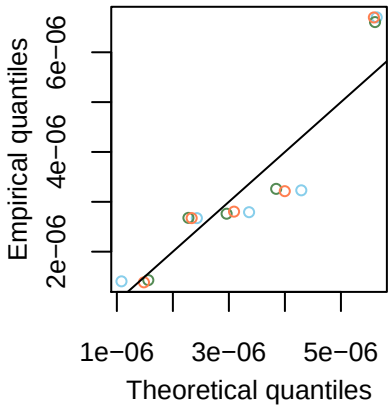
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 1.4e−06 J	Arithmetic Mean = 3.4e−06
N (detect) = 5	SD (log detect) = 0.56	Max (detect) = 1.4e−06 J	Arithmetic SD = 2e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.18	N<5	–	–	–	–	−114.214	−114.995
Lognormal	0.7	N<5	–	–	–	–	−116.07	−116.851
Gamma	–	–	NA	NA	NA	NA	−115.759	−116.54

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

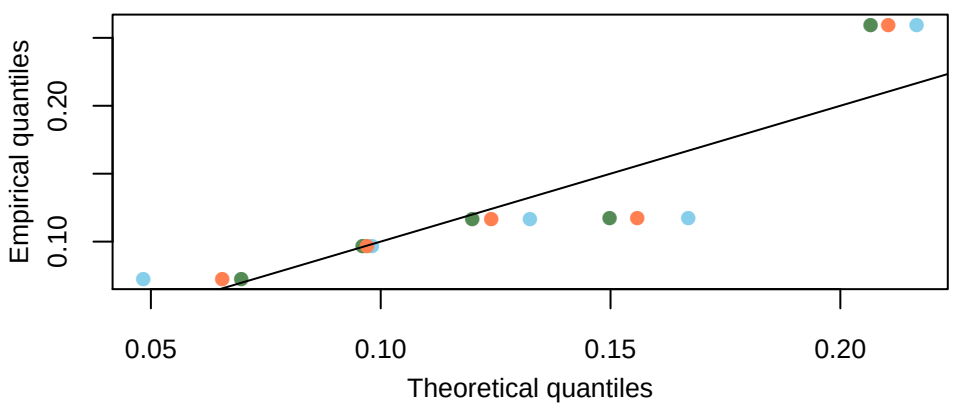
DRAFT

Distribution: Blue Crab Muscle in MBC−TEQp (Mammals)

Media:
Blue Crab Muscle
Exposure Unit:
MBC
Chemical (mg/kg):
PCBs (Total Congeners)

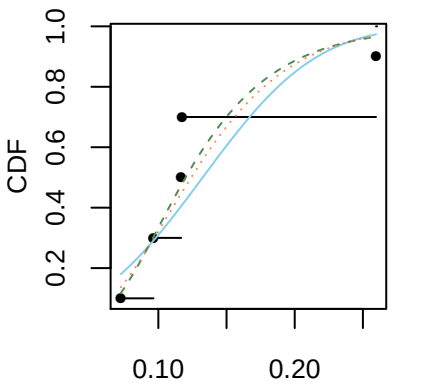
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

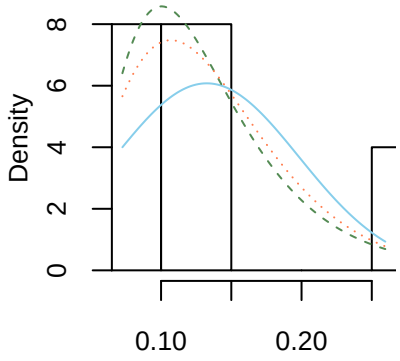


ECDF, Histogram & Q−Q (Detects Only)

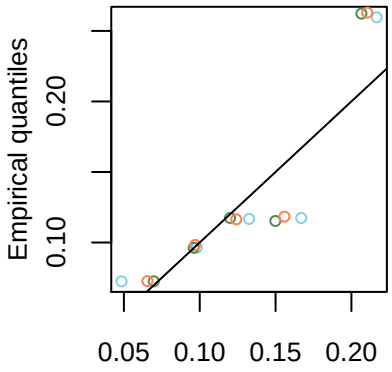
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.072 J	Arithmetic Mean = 0.13
N (detect) = 5	SD (log detect) = 0.47	Max (detect) = 0.072 J	Arithmetic SD = 0.073

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.053	N<5	–	–	–	–	−9.04594	−9.82706
Lognormal	0.37	N<5	–	–	–	–	−11.595	−12.3762
Gamma	–	–	NA	NA	NA	NA	−10.9252	−11.7063

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in MBC−PCBs (Total Congeners)

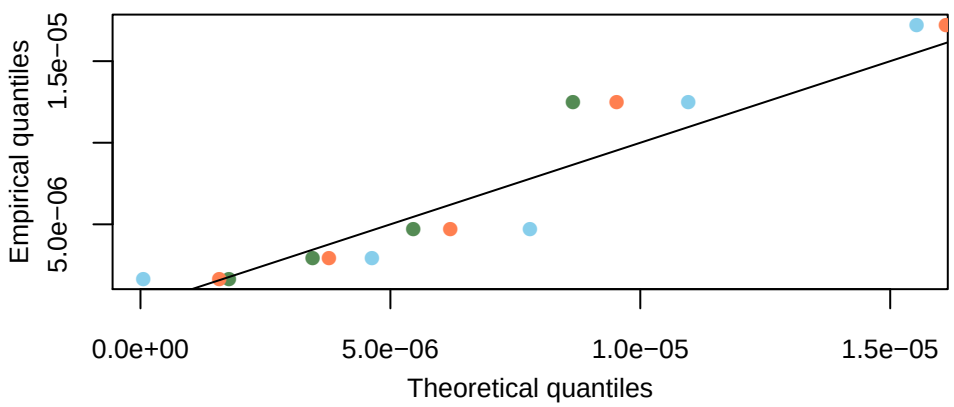
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **54**

Media:
Blue Crab Muscle
Exposure Unit:
BCC
Chemical (mg/kg):
TEQdf (Mammals)

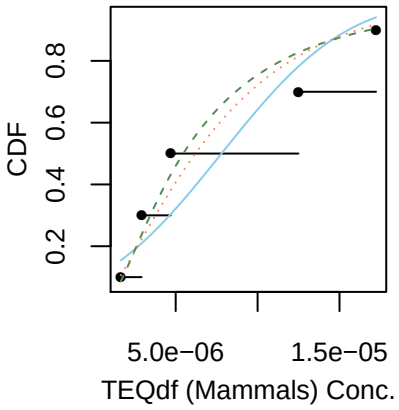
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

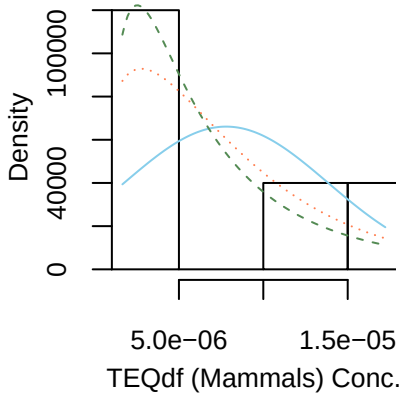


ECDF, Histogram & Q−Q (Detects Only)

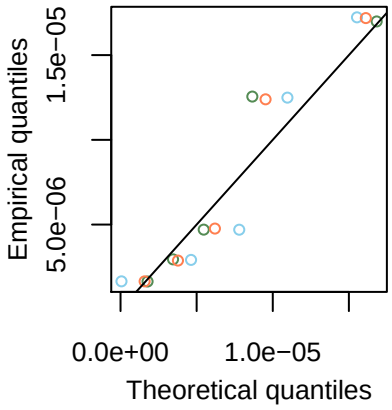
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 1.7e−06 J	Arithmetic Mean = 7.8e−06
N (detect) = 5	SD (log detect) = 0.98	Max (detect) = 1.7e−06 J	Arithmetic SD = 6.7e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.31	N<5	–	–	–	–	−101.987	−102.768
Lognormal	0.72	N<5	–	–	–	–	−104.289	−105.07
Gamma	–	–	NA	NA	NA	NA	−104.132	−104.913

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

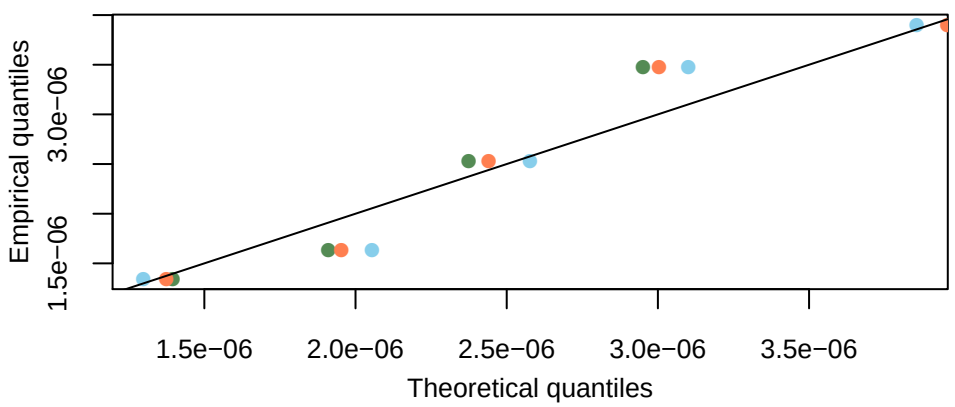
DRAFT

Distribution: Blue Crab Muscle in BCC−TEQdf (Mammals)

Media:
Blue Crab Muscle
Exposure Unit:
BCC
Chemical (mg/kg):
TEQp (Mammals)

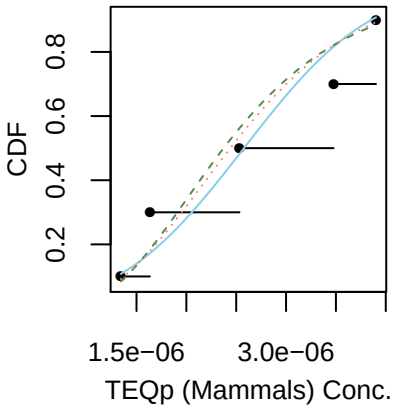
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

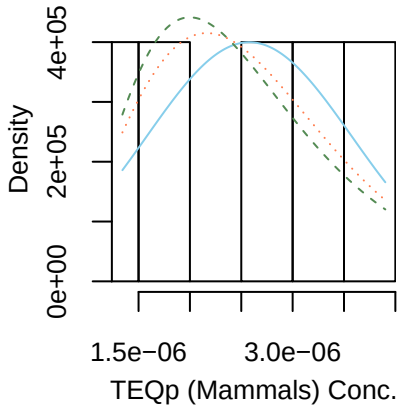


ECDF, Histogram & Q−Q (Detects Only)

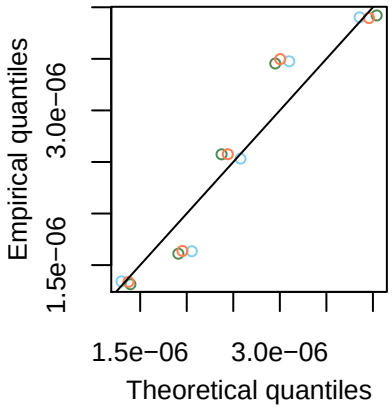
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 1.3e−06 J	Arithmetic Mean = 2.6e−06
N (detect) = 5	SD (log detect) = 0.46	Max (detect) = 1.3e−06 J	Arithmetic SD = 1.1e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.56	N<5	–	–	–	–	−119.987	−120.768
Lognormal	0.55	N<5	–	–	–	–	−120.117	−120.899
Gamma	–	–	NA	NA	NA	NA	−120.204	−120.986

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

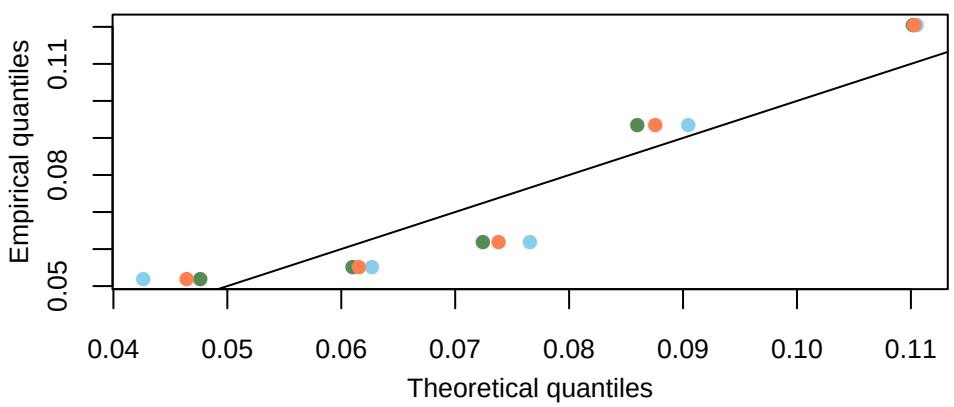
DRAFT

Distribution: Blue Crab Muscle in BCC−TEQp (Mammals)

Media:
Blue Crab Muscle
Exposure Unit:
BCC
Chemical (mg/kg):
PCBs (Total Congeners)

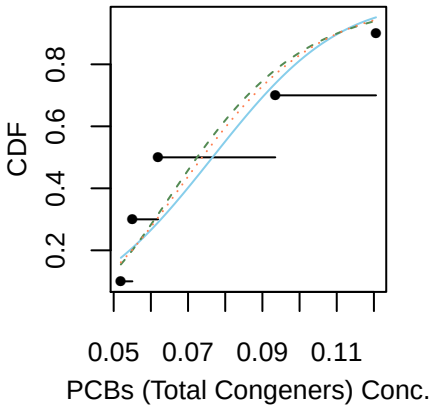
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

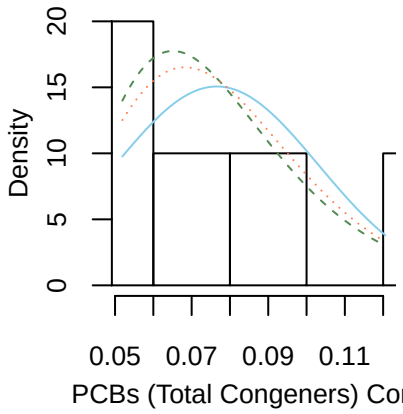


ECDF, Histogram & Q−Q (Detects Only)

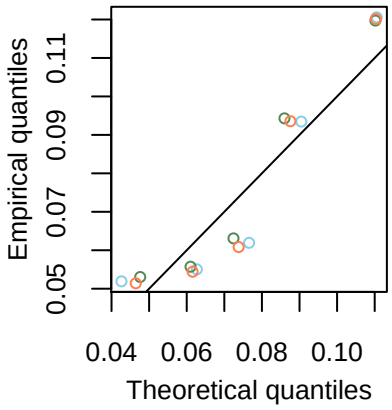
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.052 J	Arithmetic Mean = 0.077
N (detect) = 5	SD (log detect) = 0.37	Max (detect) = 0.052 J	Arithmetic SD = 0.03

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.23	N<5	–	–	–	–	−18.123	−18.9042
Lognormal	0.33	N<5	–	–	–	–	−19.2313	−20.0125
Gamma	–	–	NA	NA	NA	NA	−18.9437	−19.7248

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in BCC−PCBs (Total Congeners)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

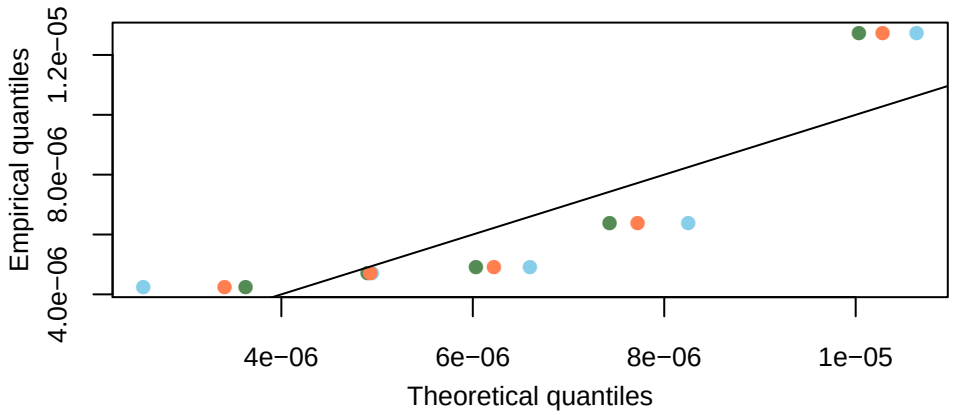
Figure **57**

Media:
Blue Crab Muscle
Exposure Unit:
LBC
Chemical (mg/kg):
TEQdf (Mammals)

Legend

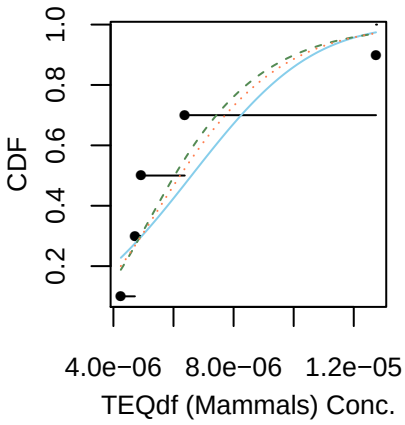
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

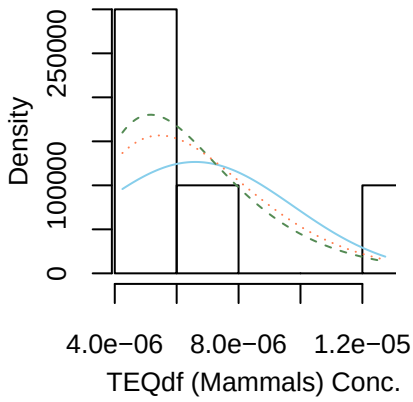


ECDF, Histogram & Q−Q (Detects Only)

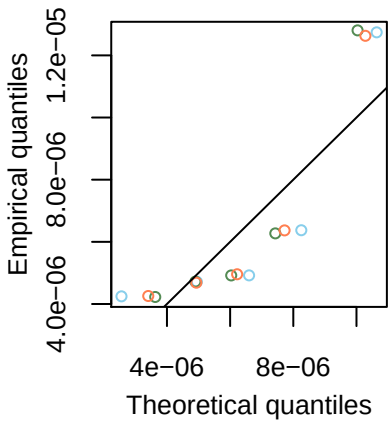
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 4.2e−06 J	Arithmetic Mean = 6.6e−06
N (detect) = 5	SD (log detect) = 0.44	Max (detect) = 4.2e−06 J	Arithmetic SD = 3.5e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.022	N<5	–	–	–	–	−108.485	−109.266
Lognormal	0.11	N<5	–	–	–	–	−111.232	−112.014
Gamma	–	–	NA	NA	NA	NA	−110.445	−111.226

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

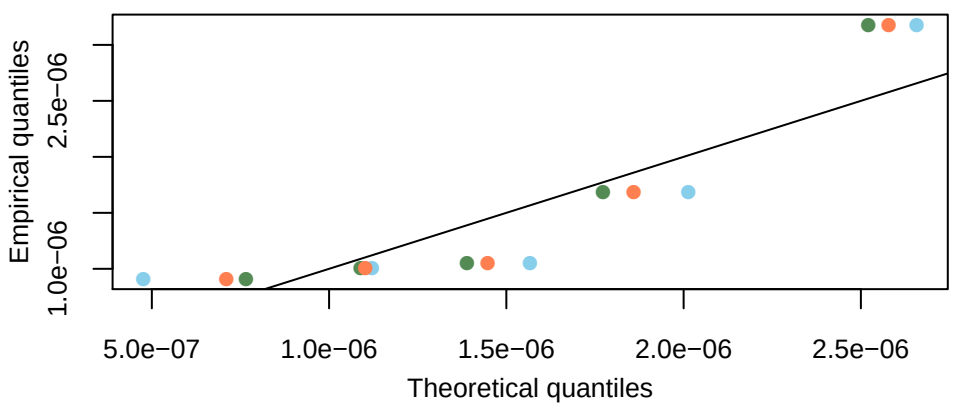
DRAFT

Distribution: Blue Crab Muscle in LBC−TEQdf (Mammals)

Media:
Blue Crab Muscle
Exposure Unit:
LBC
Chemical (mg/kg):
TEQp (Mammals)

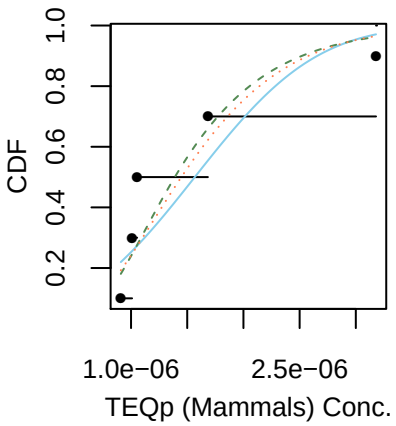
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

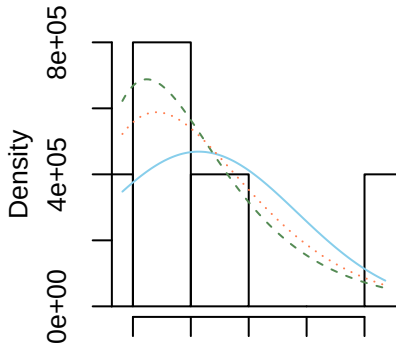


ECDF, Histogram & Q−Q (Detects Only)

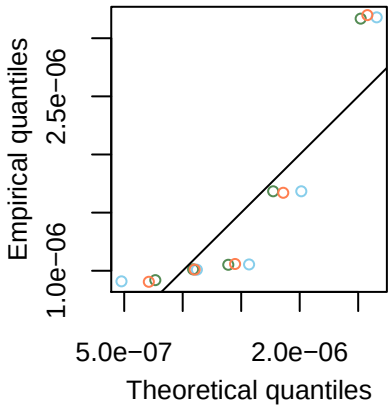
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 9.1e−07 J	Arithmetic Mean = 1.6e−06
N (detect) = 5	SD (log detect) = 0.52	Max (detect) = 9.1e−07 J	Arithmetic SD = 9.5e−07

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.047	N<5	–	–	–	–	−121.579	−122.36
Lognormal	0.18	N<5	–	–	–	–	−124.336	−125.117
Gamma	–	–	NA	NA	NA	NA	−123.6	−124.381

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

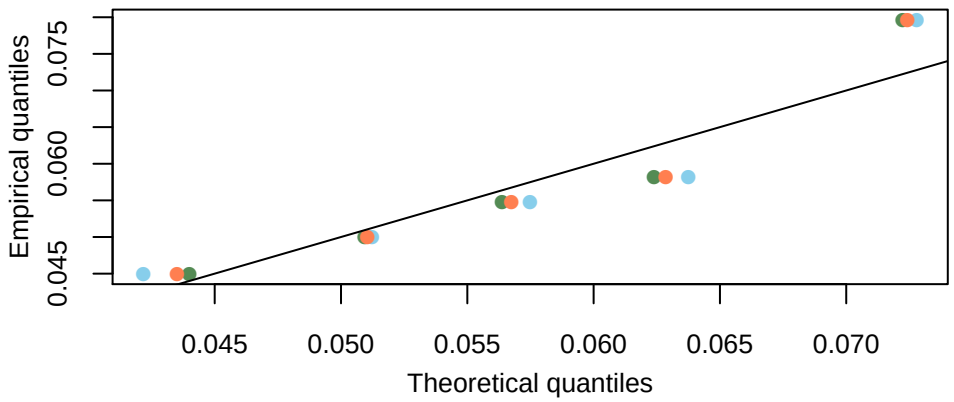
DRAFT

Distribution: Blue Crab Muscle in LBC−TEQp (Mammals)

Media:
Blue Crab Muscle
Exposure Unit:
LBC
Chemical (mg/kg):
PCBs (Total Congeners)

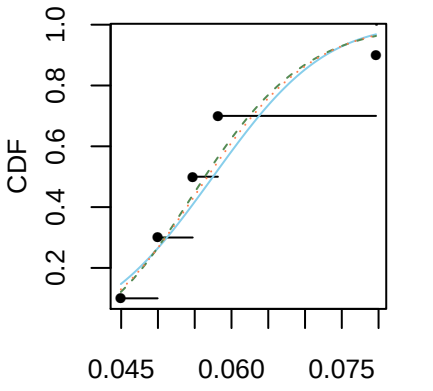
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

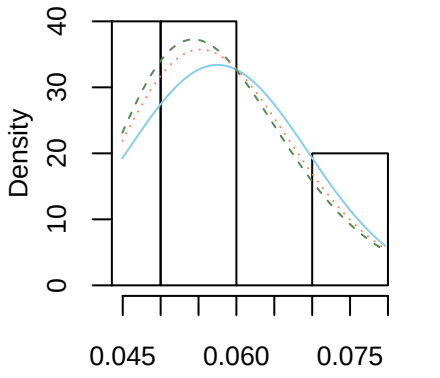


ECDF, Histogram & Q−Q (Detects Only)

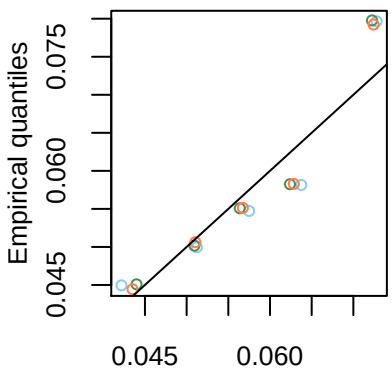
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.045 J	Arithmetic Mean = 0.057
N (detect) = 5	SD (log detect) = 0.22	Max (detect) = 0.045 J	Arithmetic SD = 0.013

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.31	N<5	–	–	–	–	−26.0861	−26.8672
Lognormal	0.59	N<5	–	–	–	–	−26.9932	−27.7743
Gamma	–	–	NA	NA	NA	NA	−26.7287	−27.5098

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle in LBC−PCBs (Total Congeners)

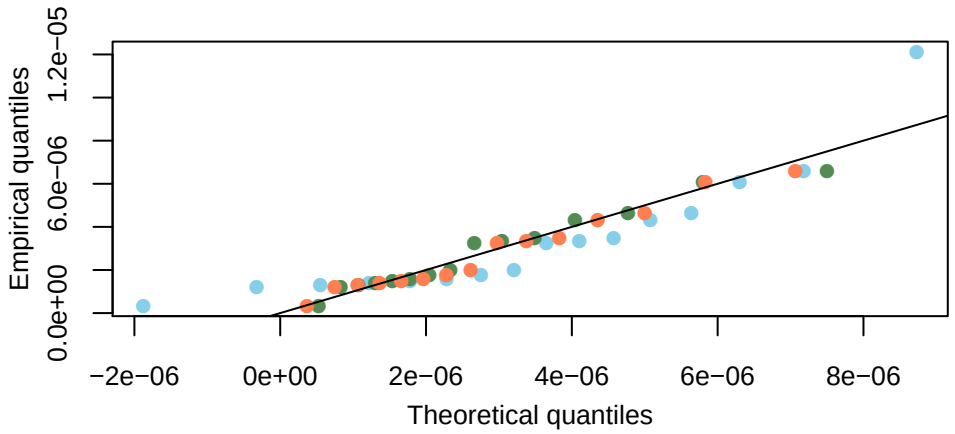
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **60**

Media:
Blue Crab Muscle
Exposure Unit:
Reference Sites
Chemical (mg/kg):
TEQdf (Mammals)

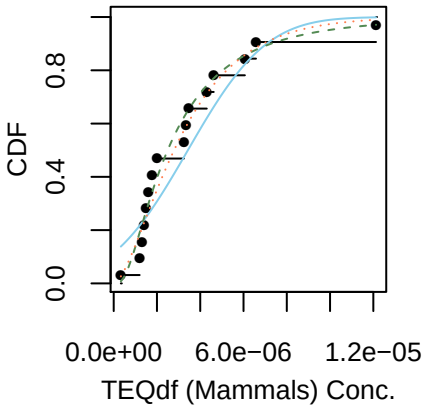
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

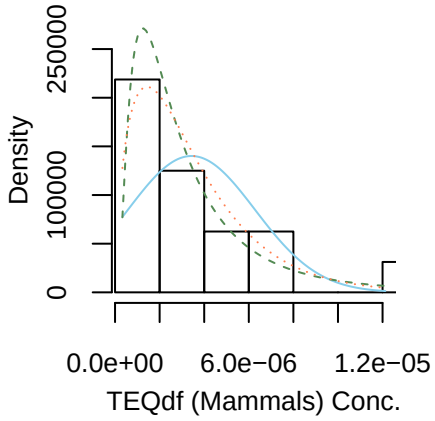


ECDF, Histogram & Q−Q (Detects Only)

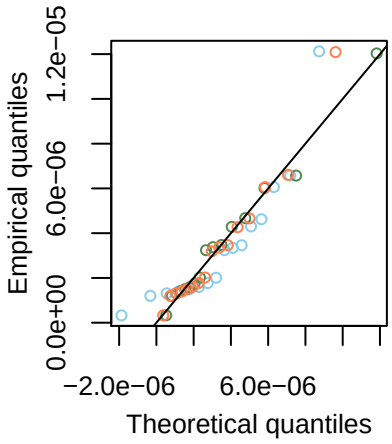
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 3.3e−07 J	Arithmetic Mean = 3.4e−06
N (detect) = 16	SD (log detect) = 0.86	Max (detect) = 3.3e−07 J	Arithmetic SD = 2.9e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.004	0.15	–	–	–	–	−359.208	−357.663
Lognormal	0.69	0.6	–	–	–	–	−369.199	−367.654
Gamma	–	–	0.1467	0.221	0.3312	0.763	−369.067	−367.522

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

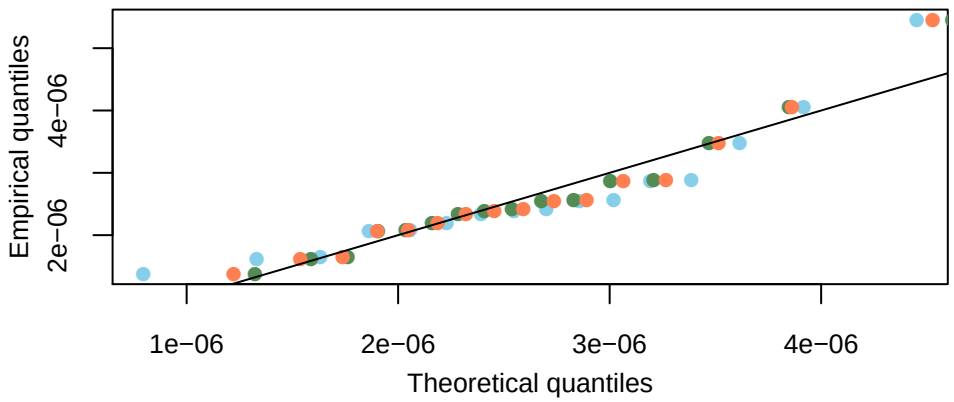
DRAFT

Distribution: Blue Crab Muscle in Reference Sites−TEQdf (Mammals)

Media:
Blue Crab Muscle
Exposure Unit:
Reference Sites
Chemical (mg/kg):
TEQp (Mammals)

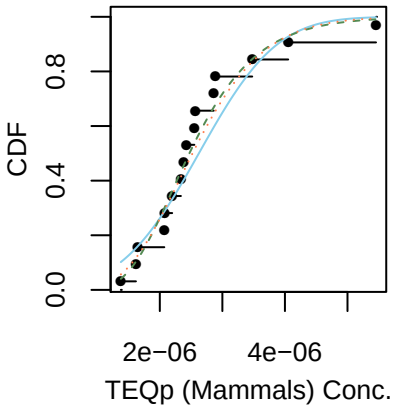
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

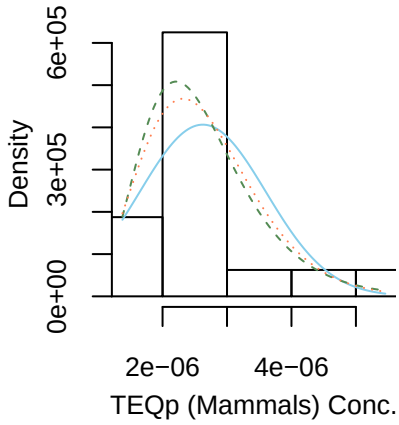


ECDF, Histogram & Q−Q (Detects Only)

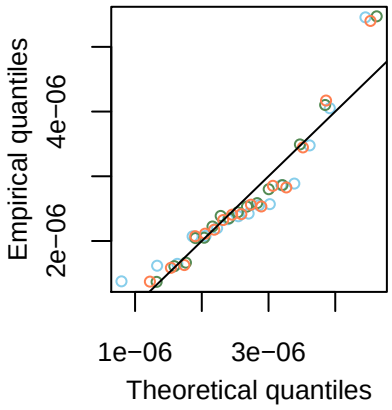
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 1.4e−06 J	Arithmetic Mean = 2.6e−06
N (detect) = 16	SD (log detect) = 0.35	Max (detect) = 1.4e−06 J	Arithmetic SD = 1e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.021	0.057	–	–	–	–	−393.29	−391.745
Lognormal	0.74	0.51	–	–	–	–	−398.653	−397.108
Gamma	–	–	0.1664	0.216	0.4062	0.741	−397.449	−395.904

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

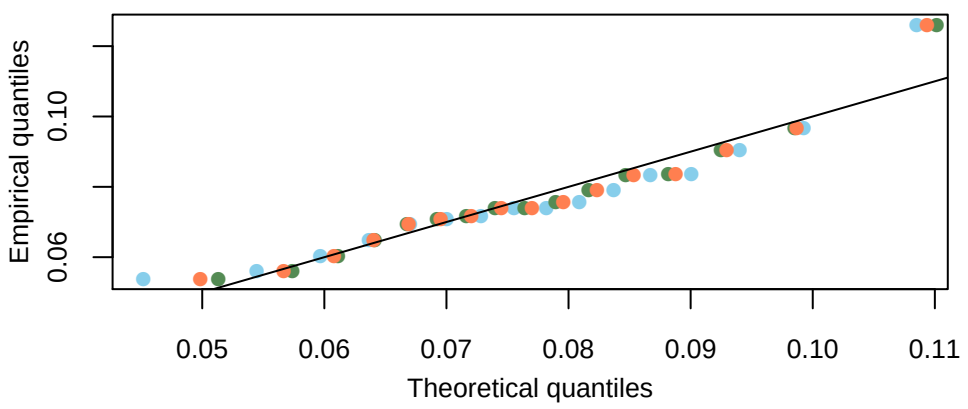
DRAFT

Distribution: Blue Crab Muscle in Reference Sites−TEQp (Mammals)

Media:
Blue Crab Muscle
Exposure Unit:
Reference Sites
Chemical (mg/kg):
PCBs (Total Congeners)

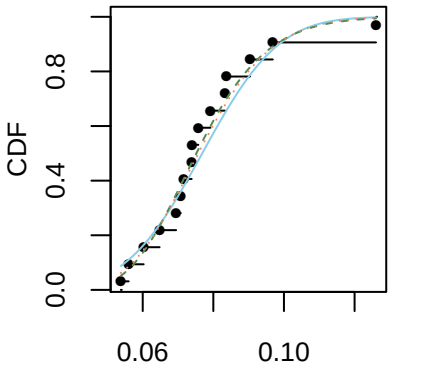
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

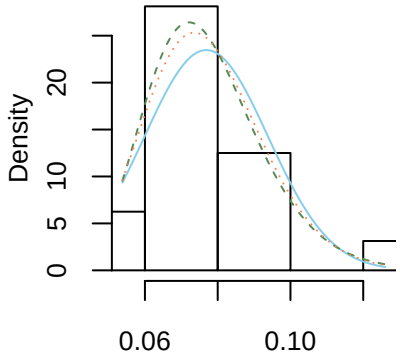


ECDF, Histogram & Q−Q (Detects Only)

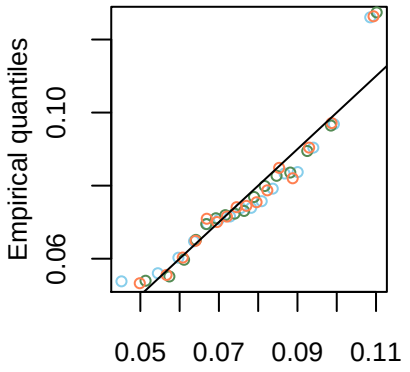
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 0.054 J	Arithmetic Mean = 0.077
N (detect) = 16	SD (log detect) = 0.21	Max (detect) = 0.054 J	Arithmetic SD = 0.018

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.067	0.33	–	–	–	–	−80.9785	−79.4333
Lognormal	0.66	0.79	–	–	–	–	−84.1074	−82.5623
Gamma	–	–	0.1265	0.215	0.3185	0.737	−83.3046	−81.7594

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

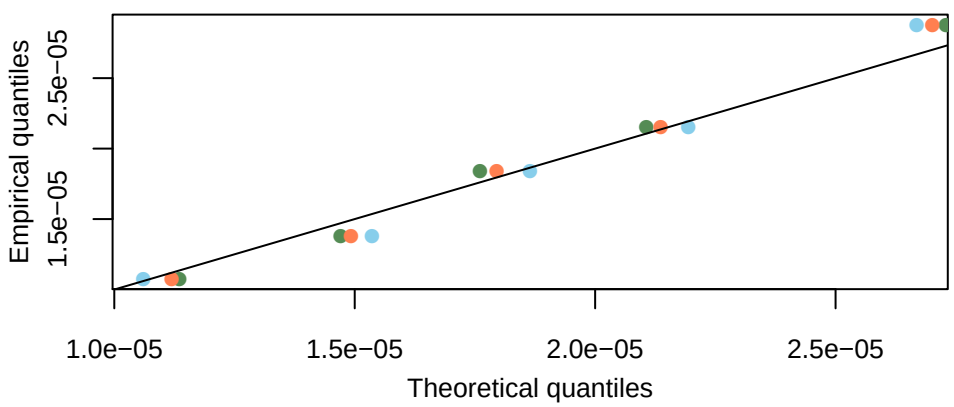
Distribution: Blue Crab Muscle in Reference Sites−PCBs (Total Congeners)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
UBC
Chemical (mg/kg):
TEQdf (Mammals)

Legend

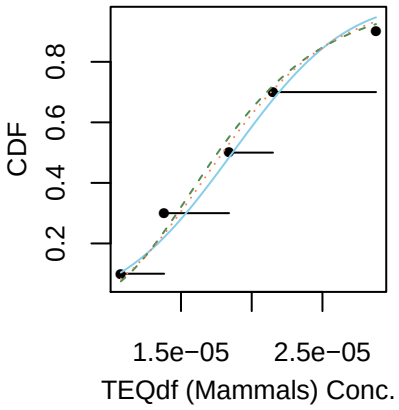
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

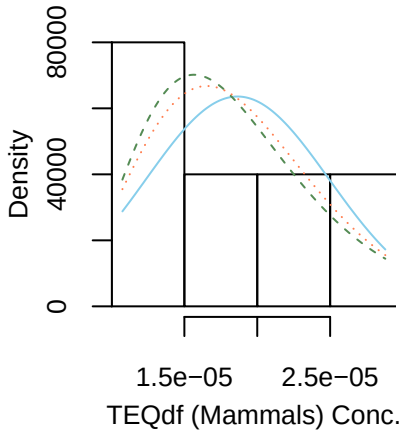


ECDF, Histogram & Q−Q (Detects Only)

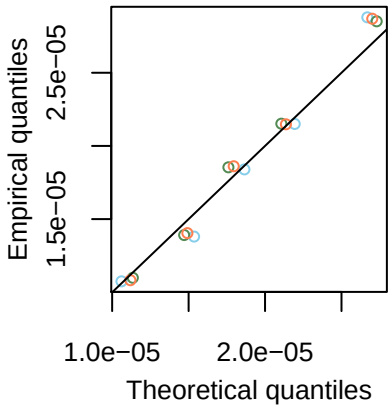
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 1.1e−05 J	Arithmetic Mean = 1.9e−05
N (detect) = 5	SD (log detect) = 0.38	Max (detect) = 1.1e−05 J	Arithmetic SD = 7e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.9	N<5	–	–	–	–	−101.601	−102.382
Lognormal	0.98	N<5	–	–	–	–	−102.002	−102.783
Gamma	–	–	NA	NA	NA	NA	−101.985	−102.766

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

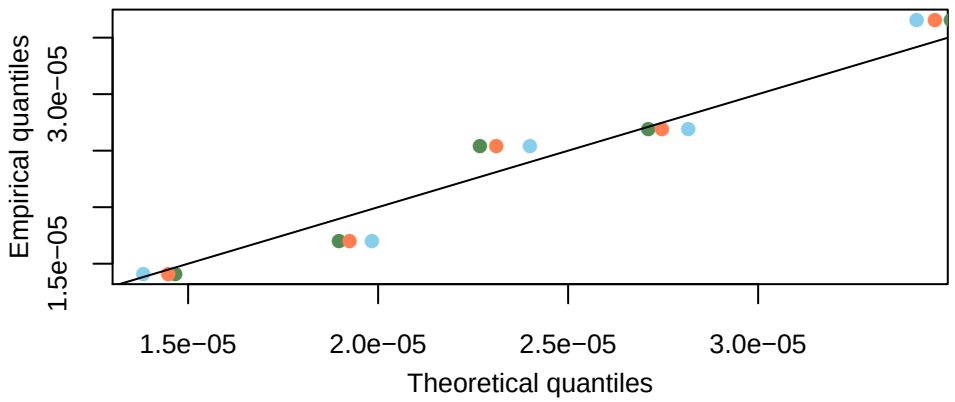
Distribution: Blue Crab Muscle & Hepatopancreas in UBC−TEQdf (Mammals)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
UBC
Chemical (mg/kg):
TEQp (Mammals)

Legend

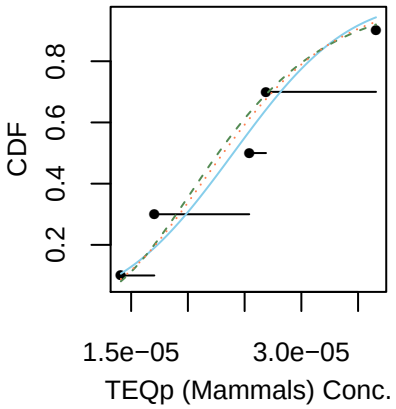
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

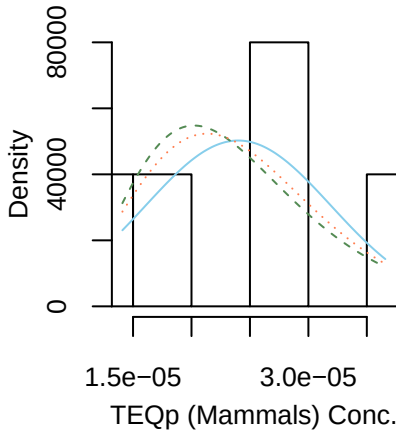


ECDF, Histogram & Q−Q (Detects Only)

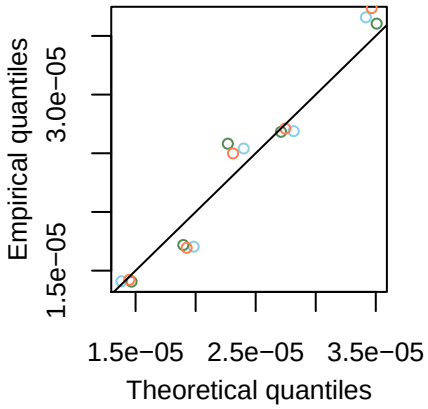
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 1.4e−05 J	Arithmetic Mean = 2.4e−05
N (detect) = 5	SD (log detect) = 0.38	Max (detect) = 1.4e−05 J	Arithmetic SD = 8.9e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.75	N<5	–	–	–	–	−99.247	−100.028
Lognormal	0.79	N<5	–	–	–	–	−99.534	−100.315
Gamma	–	–	NA	NA	NA	NA	−99.5472	−100.328

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

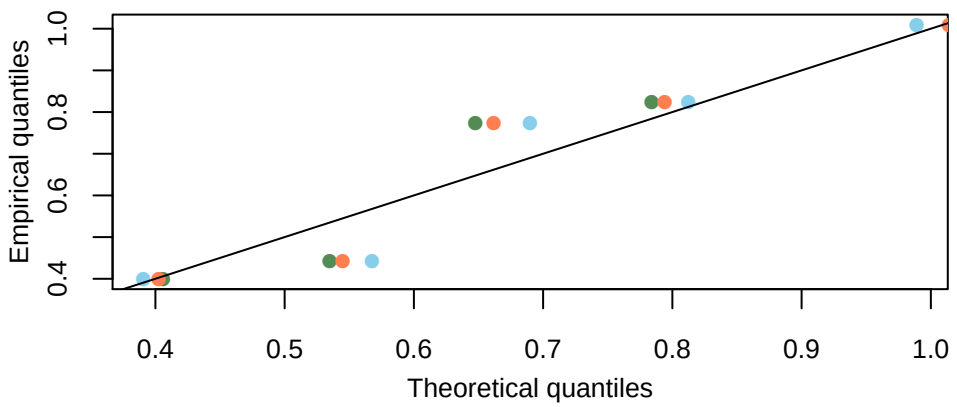
Distribution: Blue Crab Muscle & Hepatopancreas in UBC−TEQp (Mammals)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
UBC
Chemical (mg/kg):
PCBs (Total Congeners)

Legend

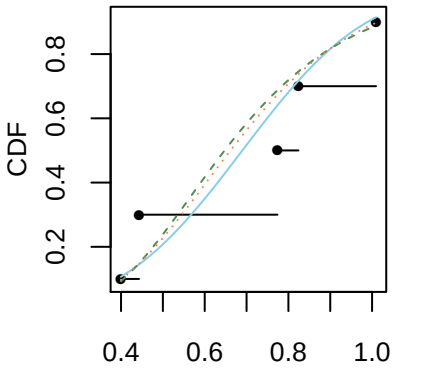
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

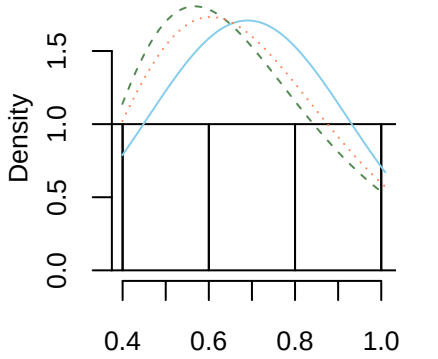


ECDF, Histogram & Q−Q (Detects Only)

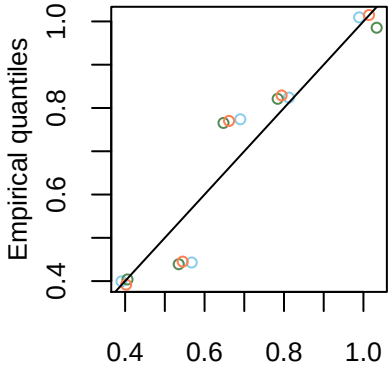
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.4 J	Arithmetic Mean = 0.69
N (detect) = 5	SD (log detect) = 0.41	Max (detect) = 0.4 J	Arithmetic SD = 0.26

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.46	N<5	–	–	–	–	3.64182	2.8607
Lognormal	0.32	N<5	–	–	–	–	3.75451	2.97339
Gamma	–	–	NA	NA	NA	NA	3.62013	2.83901

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

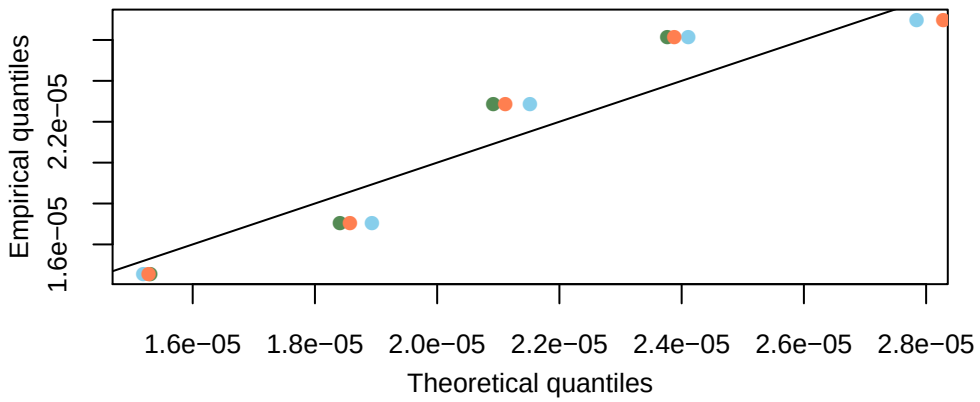
Distribution: Blue Crab Muscle & Hepatopancreas in UBC−PCBs (Total Congeners)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
MBC
Chemical (mg/kg):
TEQdf (Mammals)

Legend

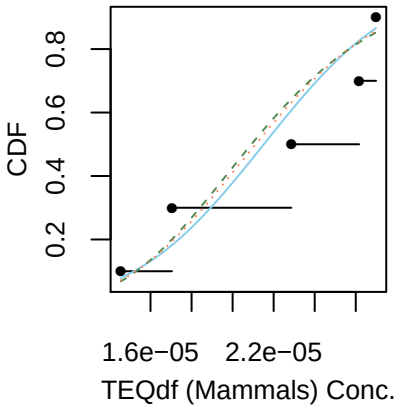
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

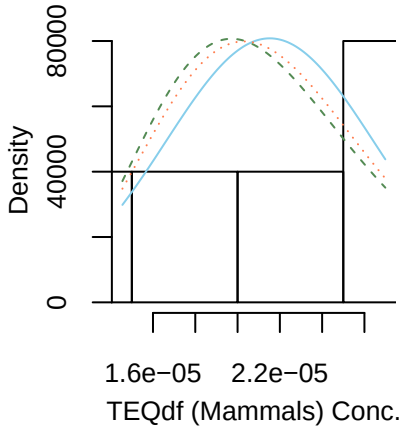


ECDF, Histogram & Q−Q (Detects Only)

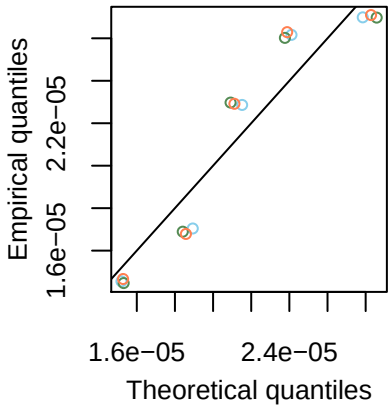
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 1.5e−05 J	Arithmetic Mean = 2.2e−05
N (detect) = 5	SD (log detect) = 0.27	Max (detect) = 1.5e−05 J	Arithmetic SD = 5.5e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.4	N<5	–	–	–	–	−104	−104.781
Lognormal	0.36	N<5	–	–	–	–	−103.686	−104.468
Gamma	–	–	NA	NA	NA	NA	−103.834	−104.615

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

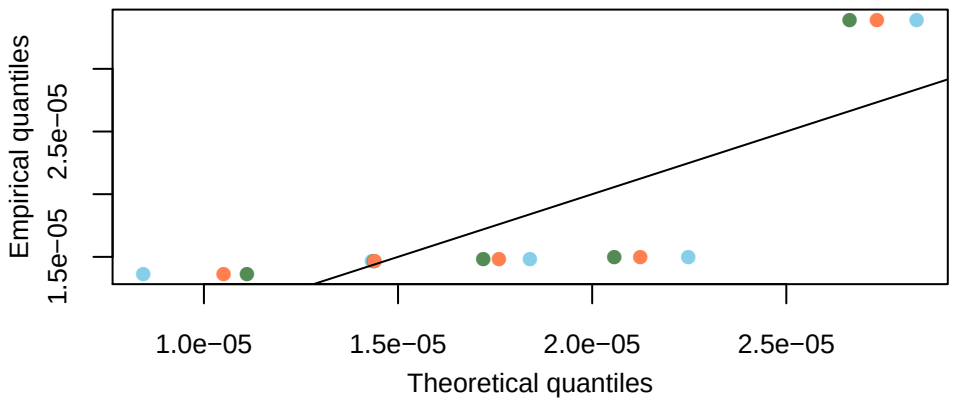
Distribution: Blue Crab Muscle & Hepatopancreas in MBC−TEQdf (Mammals)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
MBC
Chemical (mg/kg):
TEQp (Mammals)

Legend

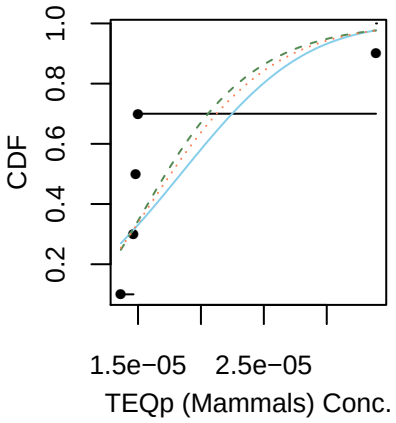
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

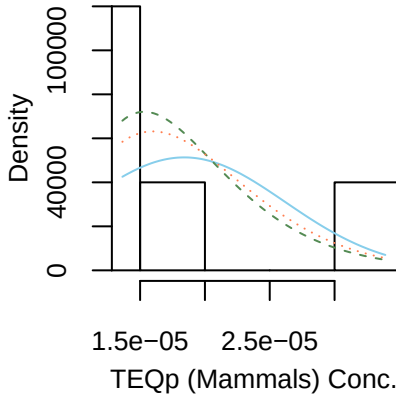


ECDF, Histogram & Q−Q (Detects Only)

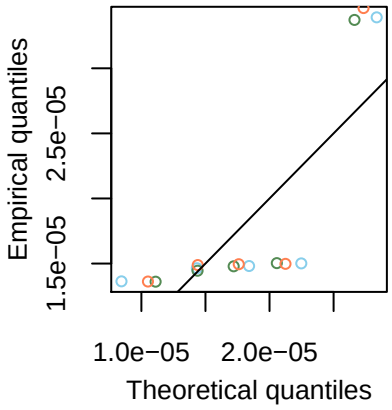
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 1.4e−05 J	Arithmetic Mean = 1.8e−05
N (detect) = 5	SD (log detect) = 0.38	Max (detect) = 1.4e−05 J	Arithmetic SD = 8.7e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00085	N<5	–	–	–	–	−99.4619	−100.243
Lognormal	0.0022	N<5	–	–	–	–	−102.272	−103.053
Gamma	–	–	NA	NA	NA	NA	−101.41	−102.191

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

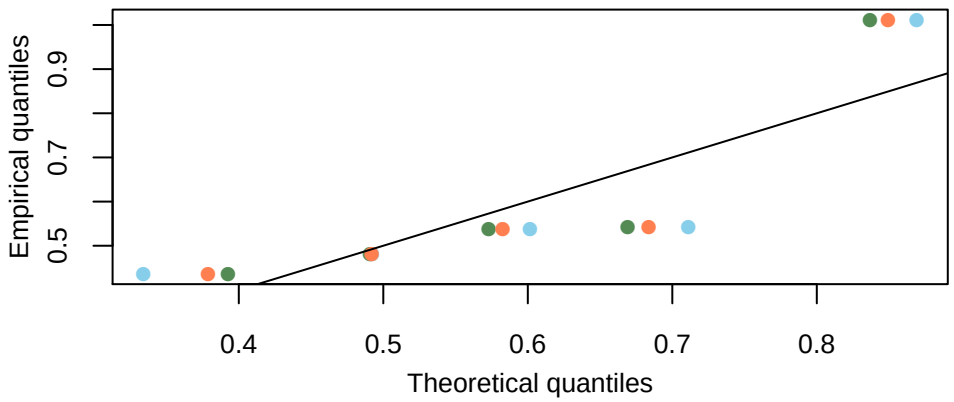
Distribution: Blue Crab Muscle & Hepatopancreas in MBC−TEQp (Mammals)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
MBC
Chemical (mg/kg):
PCBs (Total Congeners)

Legend

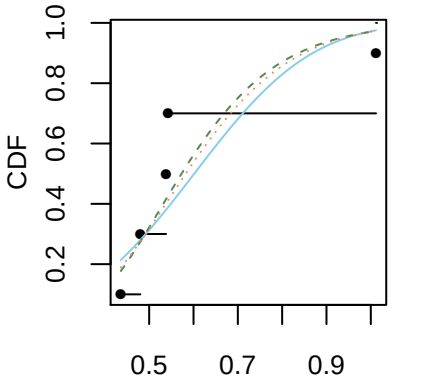
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

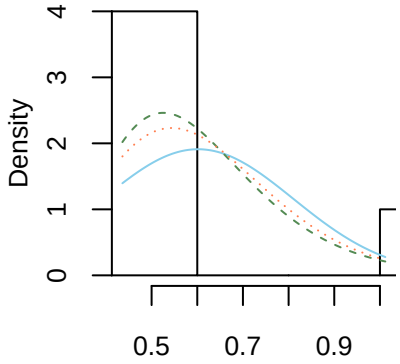


ECDF, Histogram & Q−Q (Detects Only)

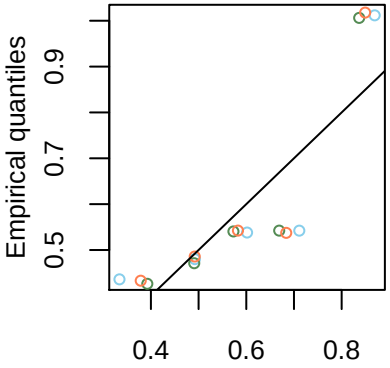
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.44 J	Arithmetic Mean = 0.6
N (detect) = 5	SD (log detect) = 0.33	Max (detect) = 0.44 J	Arithmetic SD = 0.23

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.017	N<5	–	–	–	–	2.52561	1.74448
Lognormal	0.074	N<5	–	–	–	–	0.426292	−0.354833
Gamma	–	–	NA	NA	NA	NA	1.05675	0.275625

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in MBC−PCBs (Total Congeners)

Media:
Blue Crab Muscle & Hepatopancreas

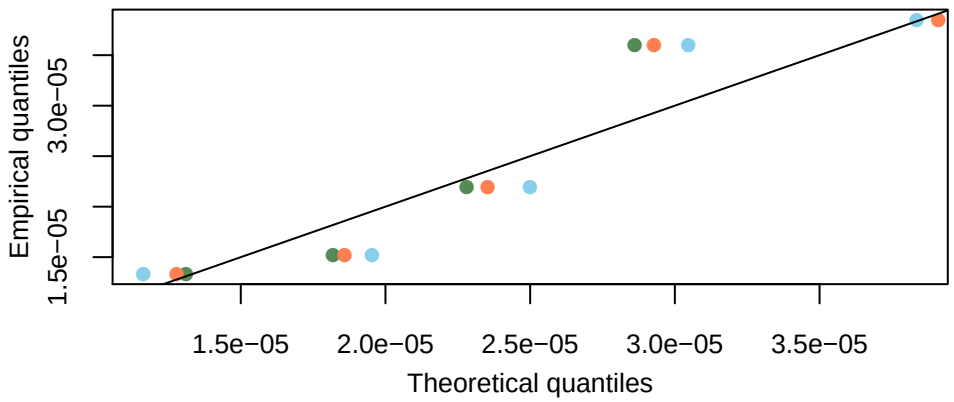
Exposure Unit:
BCC

Chemical (mg/kg):
TEQdf (Mammals)

Legend

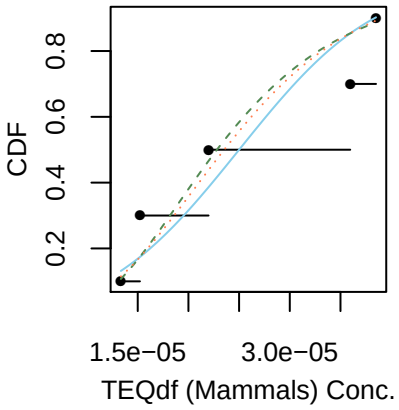
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

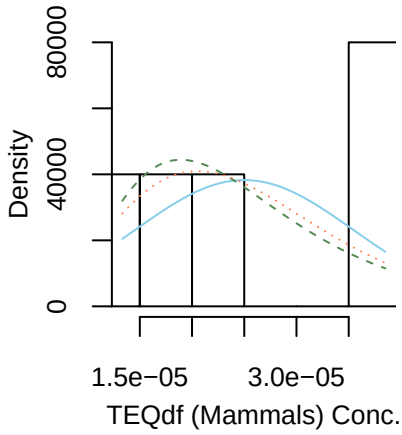


ECDF, Histogram & Q−Q (Detects Only)

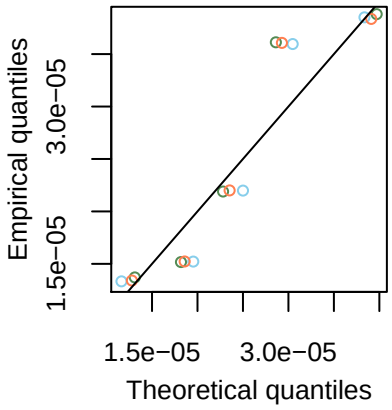
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 1.3e−05 J	Arithmetic Mean = 2.5e−05
N (detect) = 5	SD (log detect) = 0.48	Max (detect) = 1.3e−05 J	Arithmetic SD = 1.2e−05

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.26	N<5	–	–	–	–	−96.5231	−97.3043
Lognormal	0.36	N<5	–	–	–	–	−97.0766	−97.8578
Gamma	–	–	NA	NA	NA	NA	−97.0266	−97.8077

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in BCC−TEQdf (Mammals)

Media:
Blue Crab Muscle & Hepatopancreas

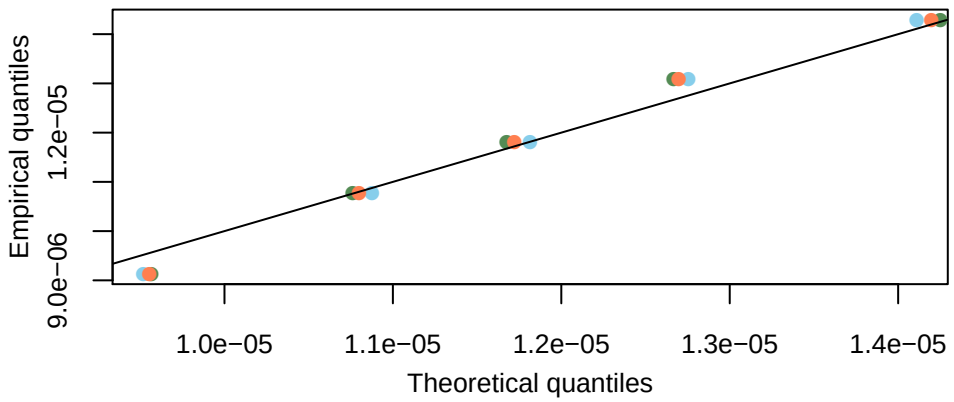
Exposure Unit:
BCC

Chemical (mg/kg):
TEQp (Mammals)

Legend

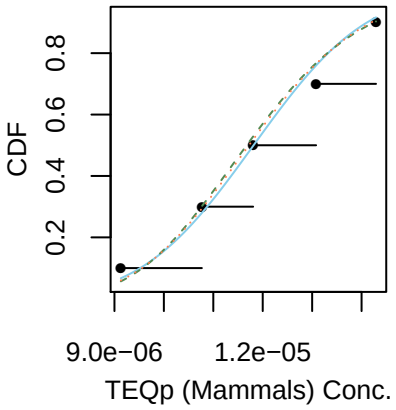
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

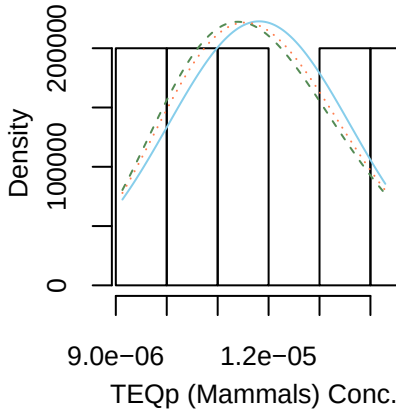


ECDF, Histogram & Q−Q (Detects Only)

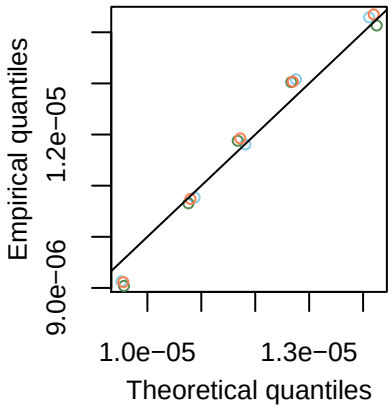
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 9.1e−06 J	Arithmetic Mean = 1.2e−05
N (detect) = 5	SD (log detect) = 0.17	Max (detect) = 9.1e−06 J	Arithmetic SD = 2e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.99	N<5	–	–	–	–	−114.135	−114.916
Lognormal	0.95	N<5	–	–	–	–	−113.998	−114.779
Gamma	–	–	NA	NA	NA	NA	−114.068	−114.849

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in BCC−TEQp (Mammals)

Media:
Blue Crab Muscle & Hepatopancreas

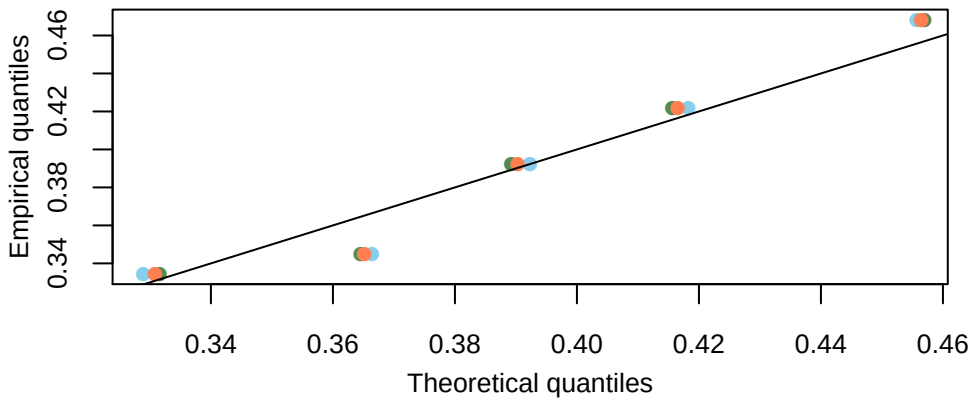
Exposure Unit:
BCC

Chemical (mg/kg):
PCBs (Total Congeners)

Legend

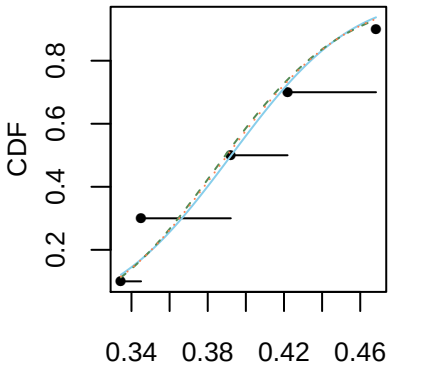
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

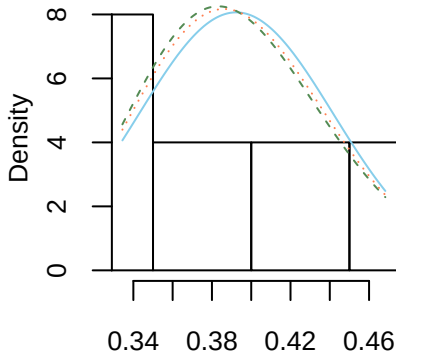


ECDF, Histogram & Q−Q (Detects Only)

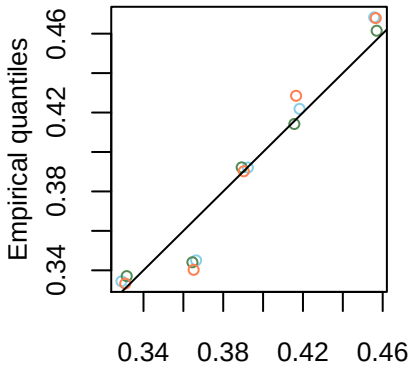
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.33 J	Arithmetic Mean = 0.39
N (detect) = 5	SD (log detect) = 0.14	Max (detect) = 0.33 J	Arithmetic SD = 0.055

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.7	N<5	–	–	–	–	−11.8764	−12.6575
Lognormal	0.72	N<5	–	–	–	–	−12.0295	−12.8106
Gamma	–	–	NA	NA	NA	NA	−11.9922	−12.7733

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

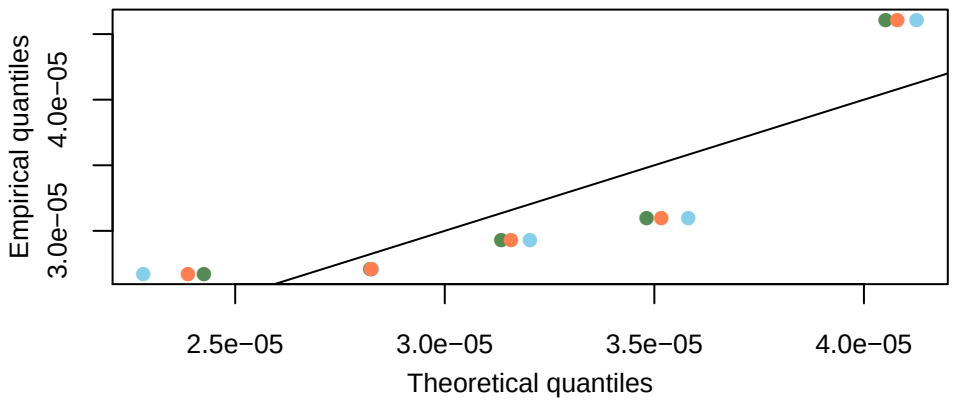
Distribution: Blue Crab Muscle & Hepatopancreas in BCC−PCBs (Total Congeners)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
LBC
Chemical (mg/kg):
TEQdf (Mammals)

Legend

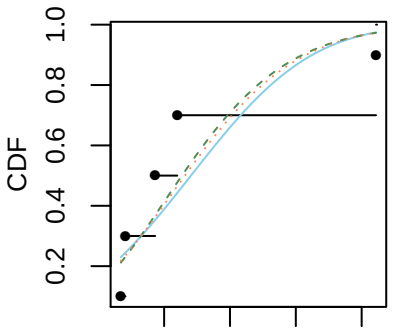
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

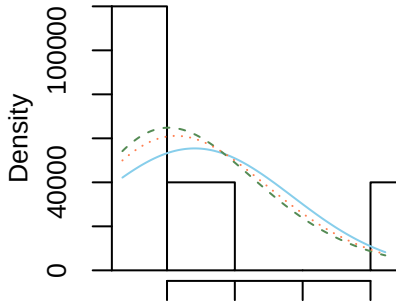


ECDF, Histogram & Q−Q (Detects Only)

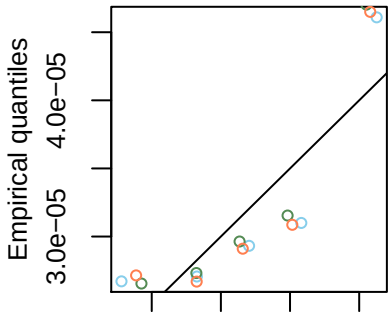
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 2.7e−05 J	Arithmetic Mean = 3.2e−05
N (detect) = 5	SD (log detect) = 0.22	Max (detect) = 2.7e−05 J	Arithmetic SD = 8e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.023	N<5	–	–	–	–	−100.227	−101.008
Lognormal	0.055	N<5	–	–	–	–	−101.598	−102.379
Gamma	–	–	NA	NA	NA	NA	−101.171	−101.953

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

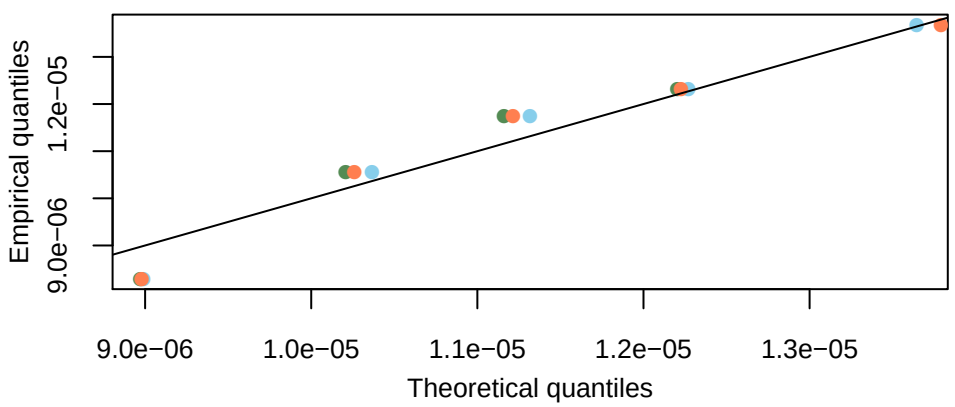
Distribution: Blue Crab Muscle & Hepatopancreas in LBC−TEQdf (Mammals)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
LBC
Chemical (mg/kg):
TEQp (Mammals)

Legend

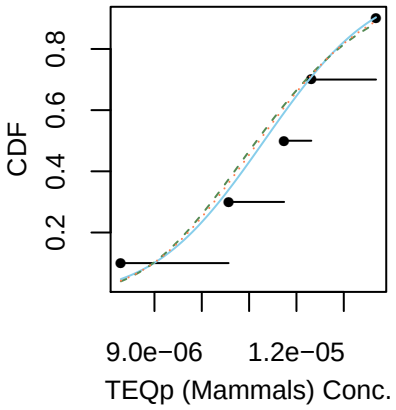
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

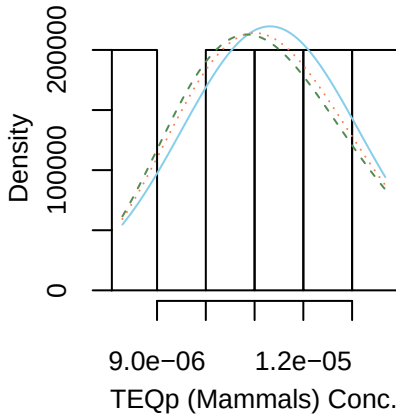


ECDF, Histogram & Q−Q (Detects Only)

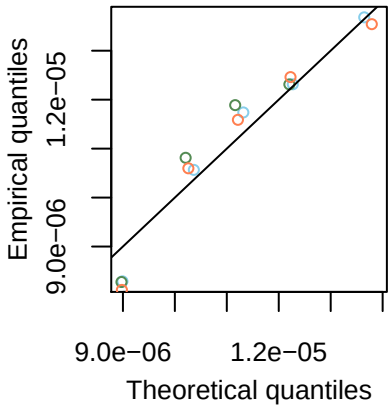
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 8.3e−06 J	Arithmetic Mean = 1.1e−05
N (detect) = 5	SD (log detect) = 0.19	Max (detect) = 8.3e−06 J	Arithmetic SD = 2e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.89	N<5	–	–	–	–	−113.998	−114.779
Lognormal	0.69	N<5	–	–	–	–	−113.538	−114.319
Gamma	–	–	NA	NA	NA	NA	−113.721	−114.502

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

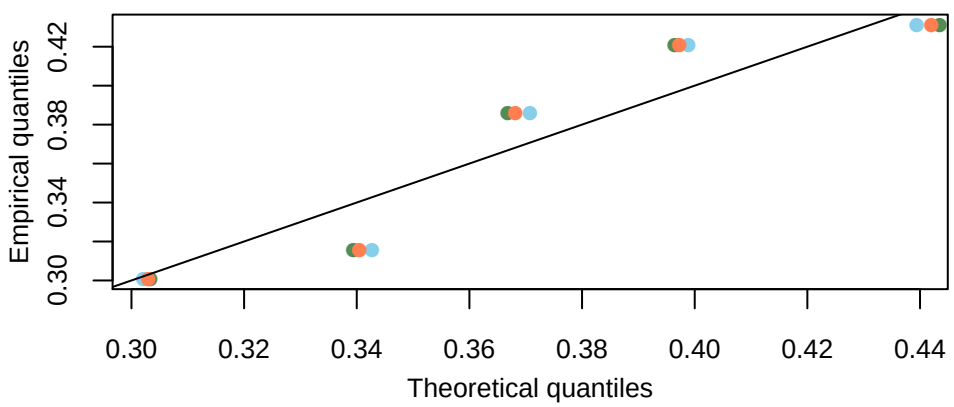
Distribution: Blue Crab Muscle & Hepatopancreas in LBC−TEQp (Mammals)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
LBC
Chemical (mg/kg):
PCBs (Total Congeners)

Legend

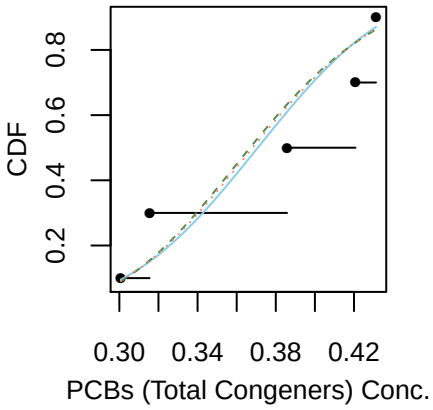
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

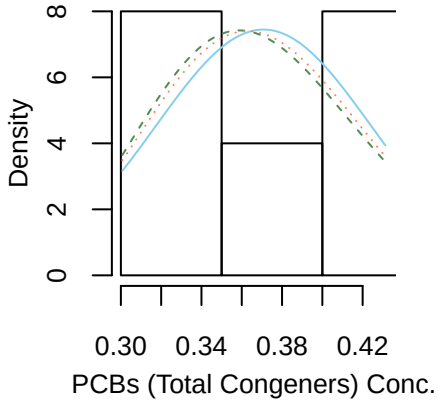


ECDF, Histogram & Q−Q (Detects Only)

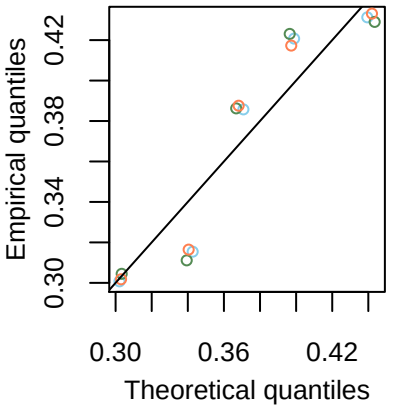
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.3 J	Arithmetic Mean = 0.37
N (detect) = 5	SD (log detect) = 0.17	Max (detect) = 0.3 J	Arithmetic SD = 0.06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.3	N<5	–	–	–	–	−11.0789	−11.86
Lognormal	0.27	N<5	–	–	–	–	−10.9343	−11.7154
Gamma	–	–	NA	NA	NA	NA	−10.9974	−11.7785

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

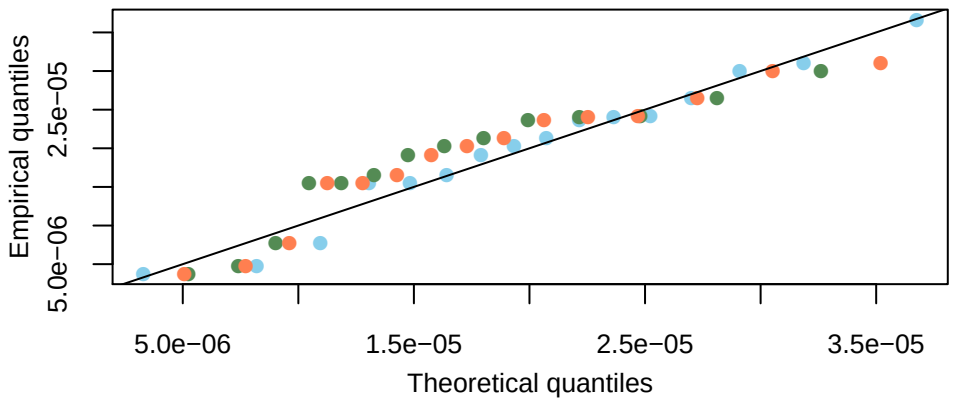
Distribution: Blue Crab Muscle & Hepatopancreas in LBC−PCBs (Total Congeners)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
Reference Sites
Chemical (mg/kg):
TEQdf (Mammals)

Legend

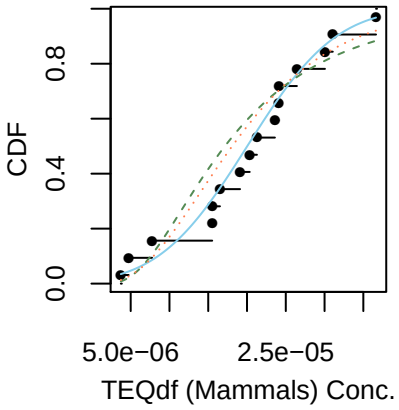
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

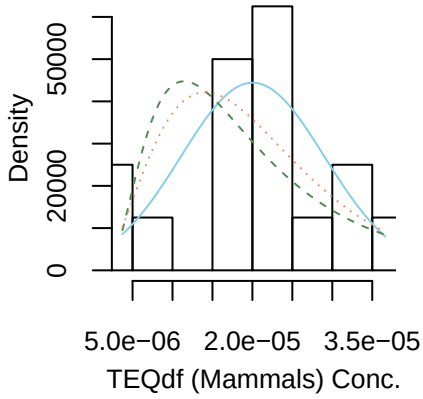


ECDF, Histogram & Q−Q (Detects Only)

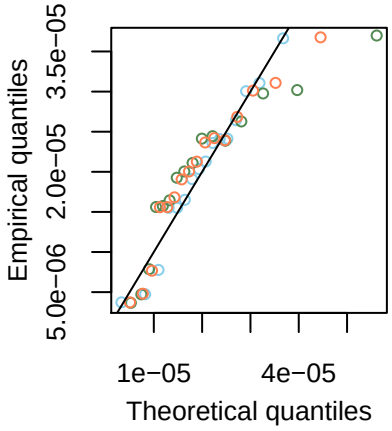
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 3.7e−06 J	Arithmetic Mean = 2e−05
N (detect) = 16	SD (log detect) = 0.66	Max (detect) = 3.7e−06 J	Arithmetic SD = 9.3e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.79	0.72	–	–	–	–	−322.448	−320.902
Lognormal	0.0097	0.0078	–	–	–	–	−316.203	−314.658
Gamma	–	–	0.2083	0.218	0.7277	0.75	−319.643	−318.098

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

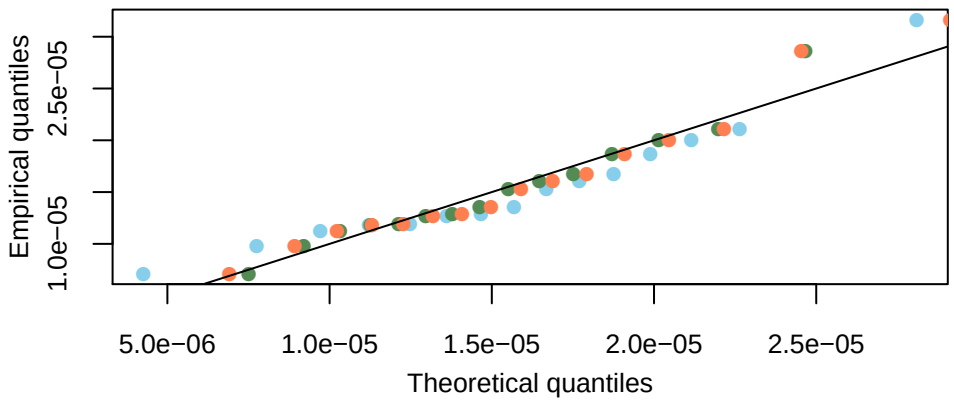
Distribution: Blue Crab Muscle & Hepatopancreas in Reference Sites−TEQdf (Mammals)

Media:
Blue Crab Muscle & Hepatopancreas
Exposure Unit:
Reference Sites
Chemical (mg/kg):
TEQp (Mammals)

Legend

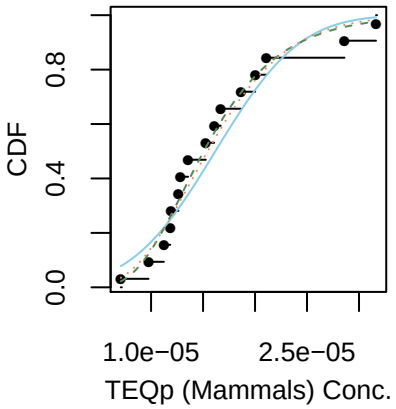
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

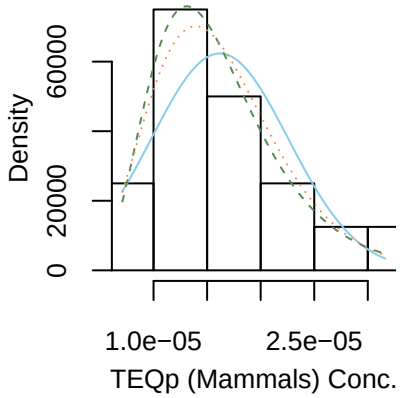


ECDF, Histogram & Q−Q (Detects Only)

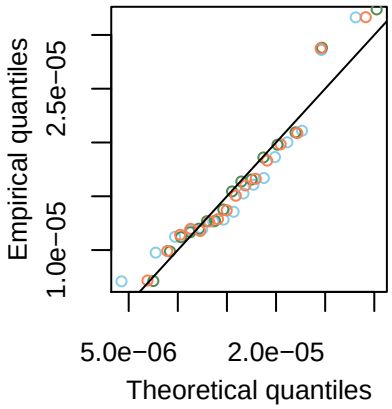
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 7.1e−06 J	Arithmetic Mean = 1.6e−05
N (detect) = 16	SD (log detect) = 0.39	Max (detect) = 7.1e−06 J	Arithmetic SD = 6.6e−06

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.082	0.37	–	–	–	–	−333.297	−331.752
Lognormal	0.94	0.89	–	–	–	–	−337.361	−335.816
Gamma	–	–	0.1304	0.216	0.3129	0.741	−336.644	−335.099

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in Reference Sites−TEQp (Mammals)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **77**

Media:
Blue Crab Muscle & Hepatopancreas

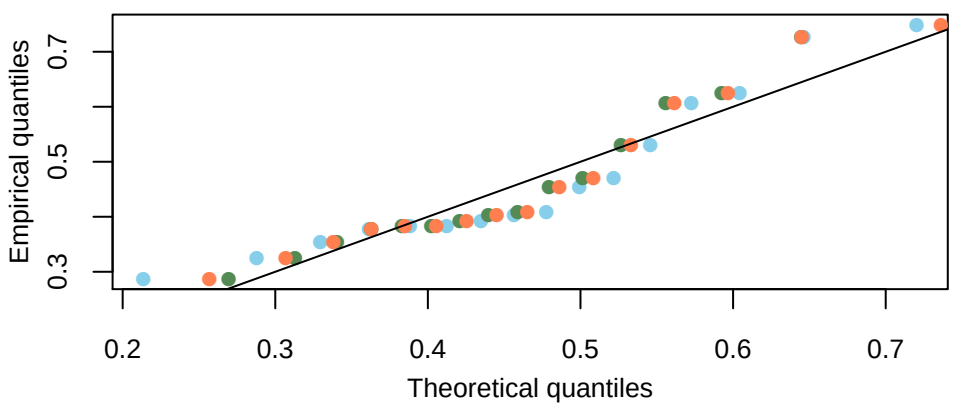
Exposure Unit:
Reference Sites

Chemical (mg/kg):
PCBs (Total Congeners)

Legend

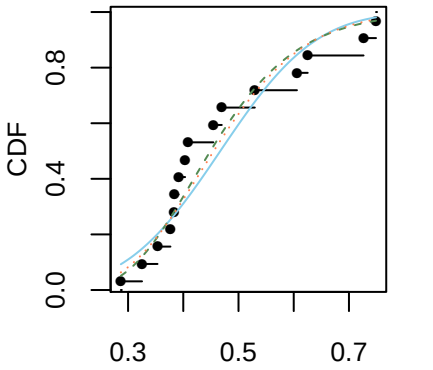
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

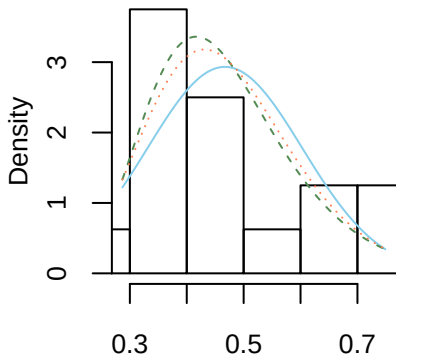


ECDF, Histogram & Q−Q (Detects Only)

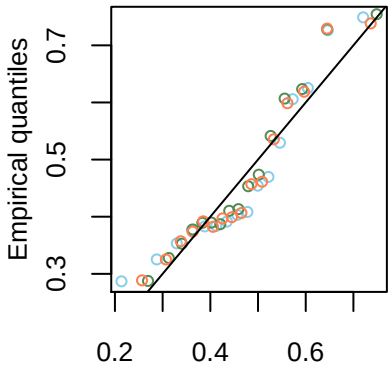
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 0.29 J	Arithmetic Mean = 0.47
N (detect) = 16	SD (log detect) = 0.28	Max (detect) = 0.29 J	Arithmetic SD = 0.14

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.049	0.03	–	–	–	–	−14.432	−12.8868
Lognormal	0.31	0.11	–	–	–	–	−17.5947	−16.0496
Gamma	–	–	0.2103	0.215	0.5975	0.739	−16.7995	−15.2543

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Blue Crab Muscle & Hepatopancreas in Reference Sites−PCBs (Total Congeners)

Media:
White Perch Whole Body
Exposure Unit:
UBC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in UBC−Antimony

Media:
White Perch Whole Body
Exposure Unit:
UBC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 2
N (detect) = 3	SD (log detect) = 0	Max (detect) = 4 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in UBC−Copper

Media:
White Perch Whole Body
Exposure Unit:
UBC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 9 J	Arithmetic Mean = 18
N (detect) = 3	SD (log detect) = 0	Max (detect) = 29 J	Arithmetic SD = 10

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in UBC−Iron

Media:
White Perch Whole Body
Exposure Unit:
UBC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 2
N (detect) = 3	SD (log detect) = 0	Max (detect) = 2 J	Arithmetic SD = 0.35

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

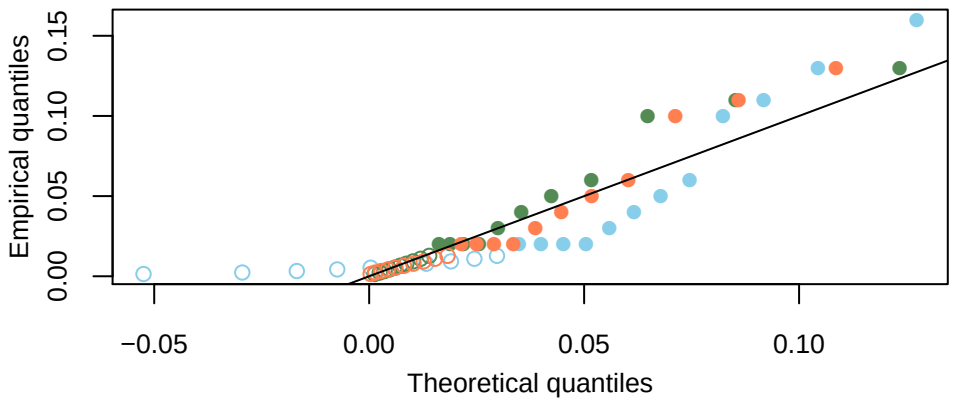
DRAFT

Distribution: White Perch Whole Body in UBC−Manganese

Media:
White Perch Whole Body
Exposure Unit:
UBC
Chemical (mg/kg):
Mercury (Inorganic)

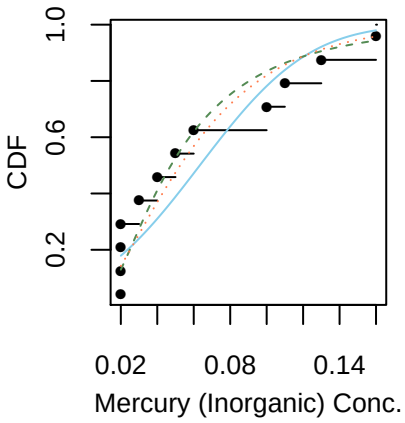
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

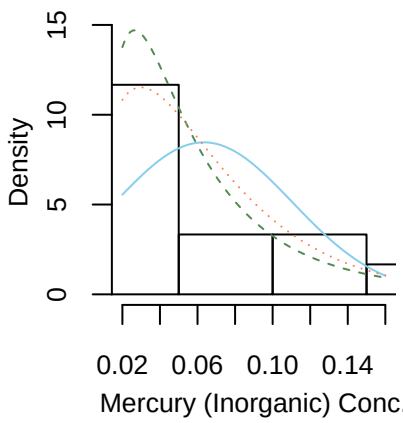


ECDF, Histogram & Q−Q (Detects Only)

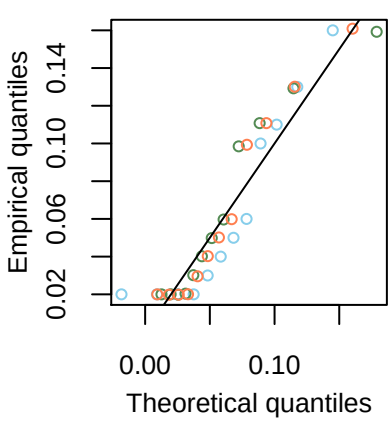
ECDF



Histogram



Q−Q



N = 22	FOD = 55%	Min (detect) = 0.02	Kaplan Meier Mean = 0.035
N (detect) = 12	SD (log detect) = 0.8	Max (detect) = 0.02	Kaplan Meier SD = 0.047

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−04	6.6e−05	–	–	–	–	−70.0526	−67.8705
Lognormal	0.79	0.86	–	–	–	–	−99.6519	−97.4699
Gamma	–	–	0.179	0.196	0.5104	0.804	−97.4872	−95.3051

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.032	0.24	–	–	–	–	−35.2564	−34.2866
Lognormal	0.085	0.25	–	–	–	–	−41.4779	−40.5081
Gamma	–	–	0.1908	0.274	0.6119	0.748	−40.613	−39.6431

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in UBC−Mercury (Inorganic)

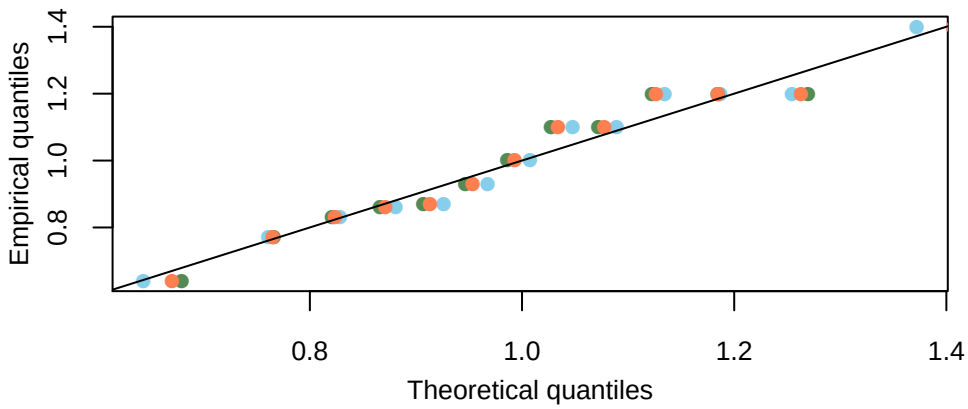
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **83**

Media:
White Perch Whole Body
Exposure Unit:
UBC
Chemical (mg/kg):
Selenium

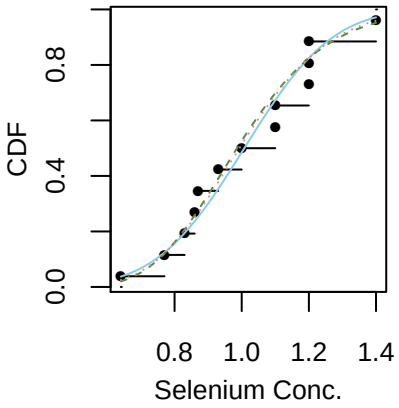
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

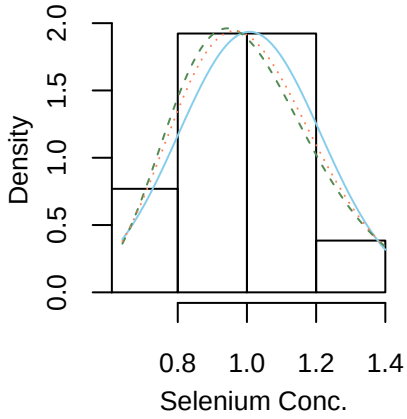


ECDF, Histogram & Q−Q (Detects Only)

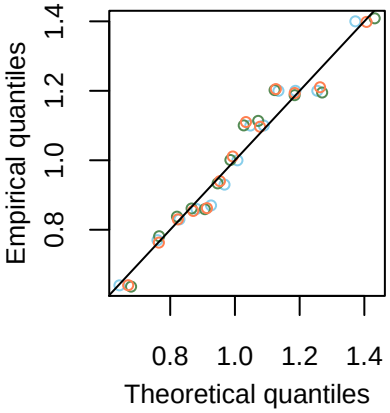
ECDF



Histogram



Q−Q



N = 13	FOD = 100%	Min (detect) = 0.64 J	Arithmetic Mean = 1
N (detect) = 13	SD (log detect) = 0.22	Max (detect) = 0.64	Arithmetic SD = 0.21

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.9	0.81	–	–	–	–	−0.175909	0.95399
Lognormal	0.85	0.56	–	–	–	–	0.0599429	1.18984
Gamma	–	–	0.152	0.266	0.2583	0.725	−0.159404	0.970495

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

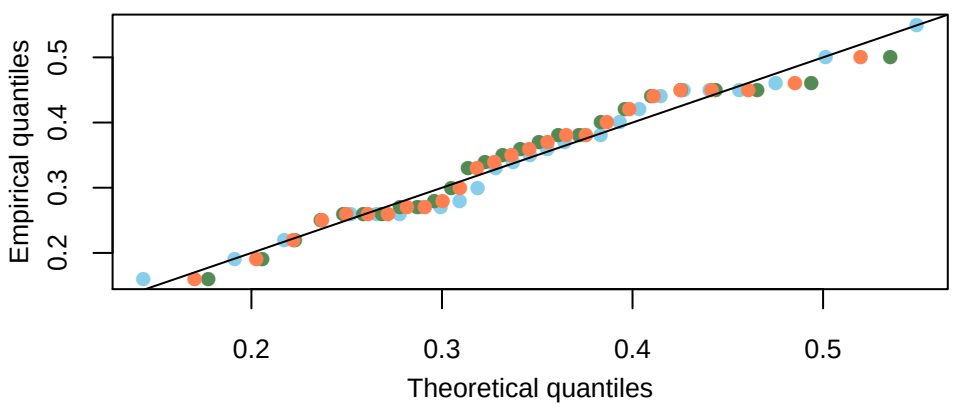
DRAFT

Distribution: White Perch Whole Body in UBC−Selenium

Media:
White Perch Whole Body
Exposure Unit:
UBC
Chemical (mg/kg):
Methyl Mercury

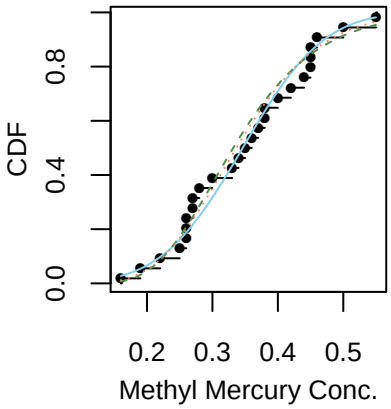
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

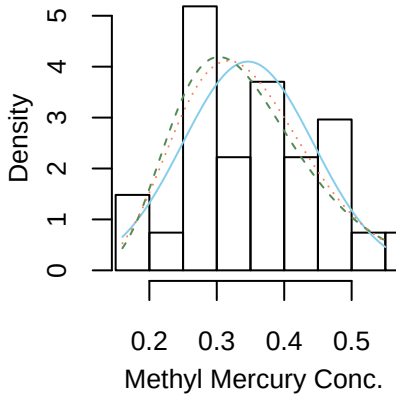


ECDF, Histogram & Q−Q (Detects Only)

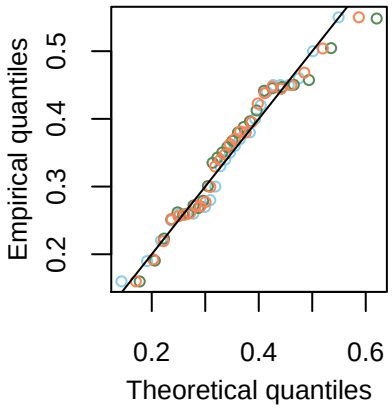
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 0.16 J	Arithmetic Mean = 0.35
N (detect) = 27	SD (log detect) = 0.31	Max (detect) = 0.16 J	Arithmetic SD = 0.099

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.76	0.43	–	–	–	–	−45.1936	−42.6019
Lognormal	0.41	0.86	–	–	–	–	−43.9442	−41.3526
Gamma	–	–	0.09886	0.175	0.3396	0.745	−44.9671	−42.3754

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

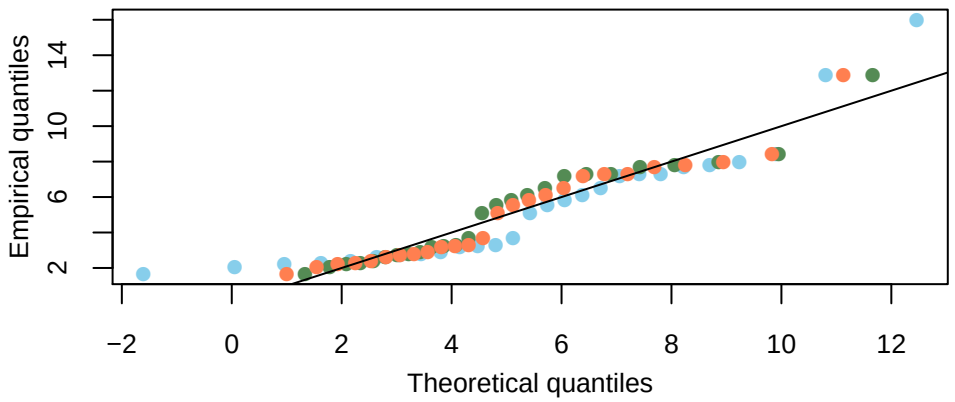
DRAFT

Distribution: White Perch Whole Body in UBC−Methyl Mercury

Media:
White Perch Whole Body
Exposure Unit:
UBC
Chemical (mg/kg):
PCBs (Total Aroclors)

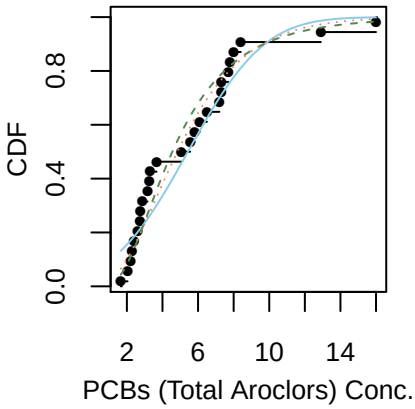
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

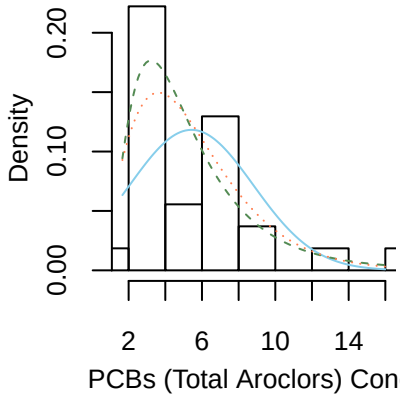


ECDF, Histogram & Q−Q (Detects Only)

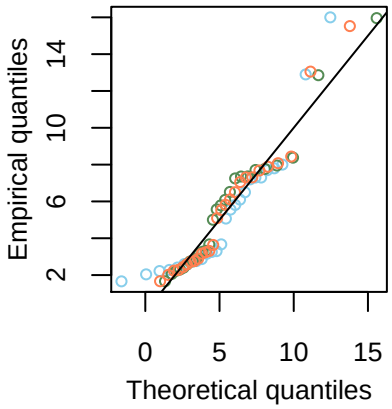
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 1	Arithmetic Mean = 5
N (detect) = 27	SD (log detect) = 0.6	Max (detect) = 16 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0013	0.029	–	–	–	–	146.283	148.875
Lognormal	0.19	0.13	–	–	–	–	134.003	136.595
Gamma	–	–	0.1689	0.177	0.7175	0.756	135.785	138.377

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in UBC−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **86**

Media:
White Perch Whole Body
Exposure Unit:
MBC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in MBC−Antimony

Media:
White Perch Whole Body
Exposure Unit:
MBC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 3 J	Arithmetic Mean = 4
N (detect) = 3	SD (log detect) = 0	Max (detect) = 5 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in MBC−Copper

Media:
White Perch Whole Body
Exposure Unit:
MBC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 11 J	Arithmetic Mean = 12
N (detect) = 3	SD (log detect) = 0	Max (detect) = 14 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in MBC−Iron

Media:
White Perch Whole Body
Exposure Unit:
MBC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 2
N (detect) = 3	SD (log detect) = 0	Max (detect) = 3 J	Arithmetic SD = 0.93

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

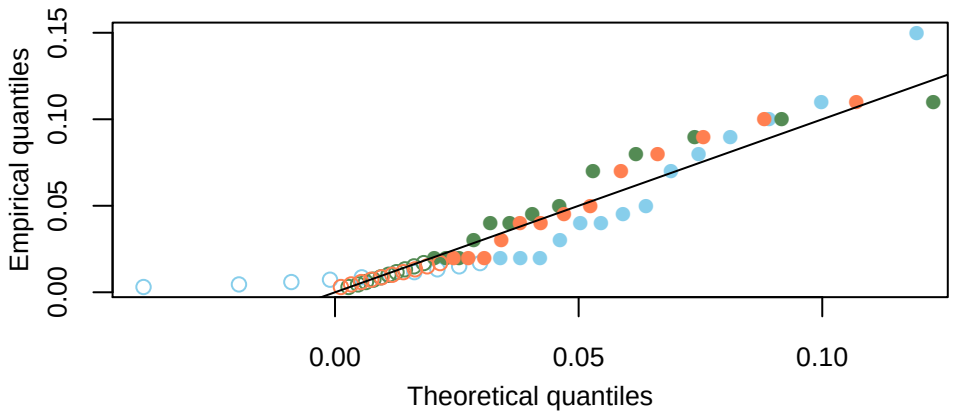
DRAFT

Distribution: White Perch Whole Body in MBC−Manganese

Media:
White Perch Whole Body
Exposure Unit:
MBC
Chemical (mg/kg):
Mercury (Inorganic)

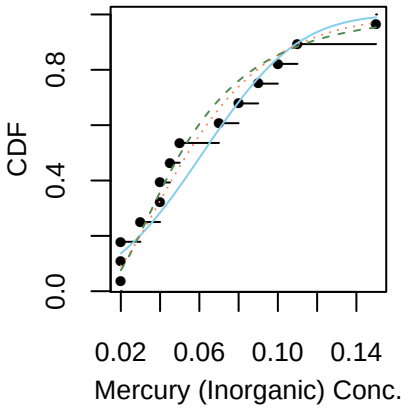
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

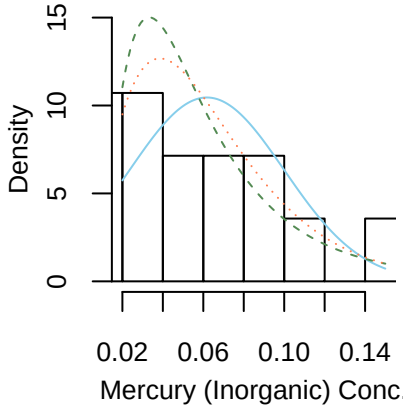


ECDF, Histogram & Q−Q (Detects Only)

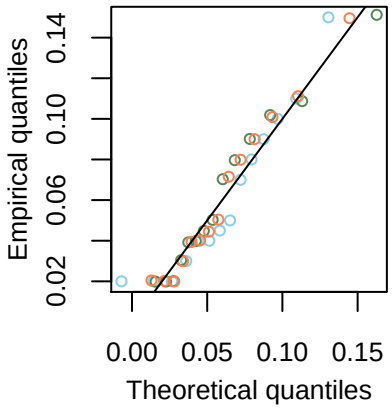
ECDF



Histogram



Q−Q



N = 24	FOD = 58%	Min (detect) = 0.02	Kaplan Meier Mean = 0.036
N (detect) = 14	SD (log detect) = 0.67	Max (detect) = 0.02	Kaplan Meier SD = 0.042

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00093	0.0014	–	–	–	–	−83.6622	−81.3061
Lognormal	0.74	0.64	–	–	–	–	−103.839	−101.483
Gamma	–	–	0.1702	0.183	0.417	0.772	−102.63	−100.273

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.14	0.19	–	–	–	–	−47.7211	−46.443
Lognormal	0.38	0.75	–	–	–	–	−51.9757	−50.6976
Gamma	–	–	0.1223	0.27	0.3229	0.736	−51.7516	−50.4735

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in MBC−Mercury (Inorganic)

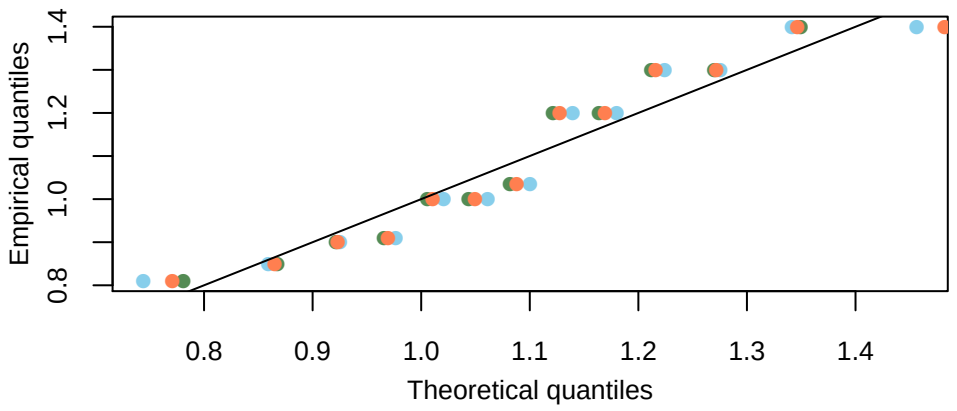
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **91**

Media:
White Perch Whole Body
Exposure Unit:
MBC
Chemical (mg/kg):
Selenium

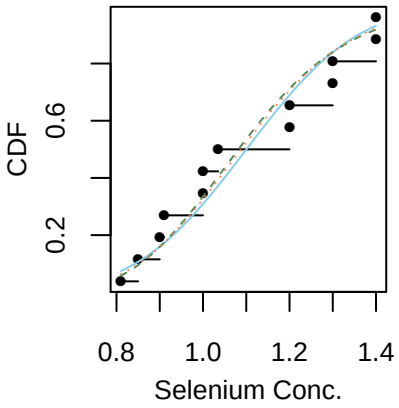
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

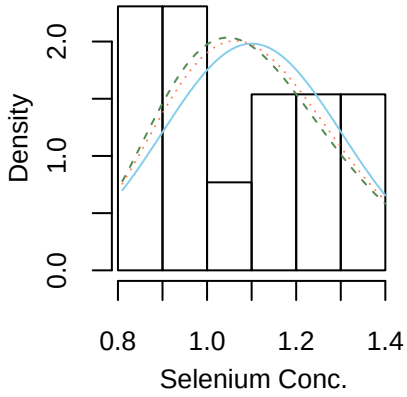


ECDF, Histogram & Q−Q (Detects Only)

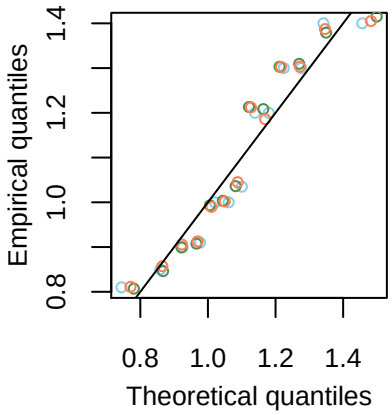
ECDF



Histogram



Q−Q



N = 13	FOD = 100%	Min (detect) = 0.81 J	Arithmetic Mean = 1
N (detect) = 13	SD (log detect) = 0.19	Max (detect) = 0.81	Arithmetic SD = 0.21

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.22	0.47	–	–	–	–	−0.781049	0.34885
Lognormal	0.27	0.41	–	–	–	–	−1.01974	0.110158
Gamma	–	–	0.167	0.266	0.4465	0.725	−1.01759	0.112312

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

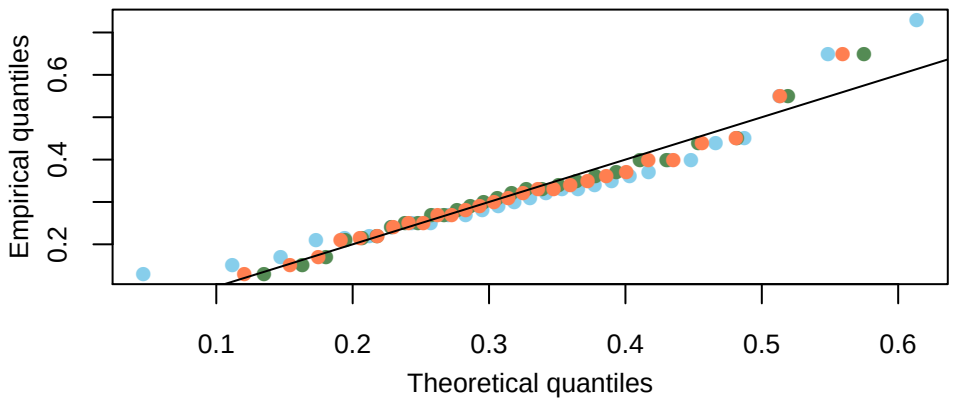
DRAFT

Distribution: White Perch Whole Body in MBC−Selenium

Media:
White Perch Whole Body
Exposure Unit:
MBC
Chemical (mg/kg):
Methyl Mercury

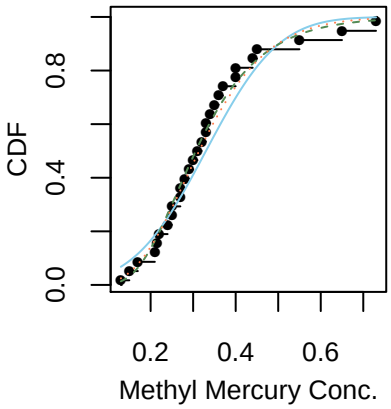
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

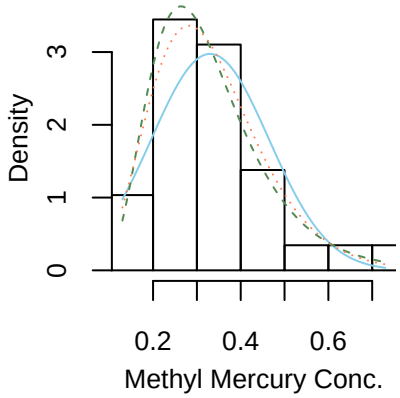


ECDF, Histogram & Q−Q (Detects Only)

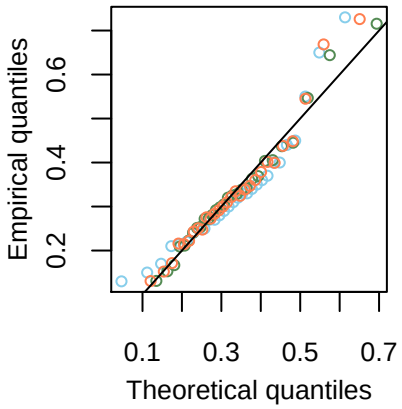
ECDF



Histogram



Q−Q



N = 29	FOD = 100%	Min (detect) = 0.13 J	Arithmetic Mean = 0.33
N (detect) = 29	SD (log detect) = 0.39	Max (detect) = 0.13 J	Arithmetic SD = 0.14

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.012	0.13	–	–	–	–	−30.2377	−27.5031
Lognormal	0.94	0.94	–	–	–	–	−37.4179	−34.6833
Gamma	–	–	0.09236	0.175	0.2906	0.747	−36.4944	−33.7599

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

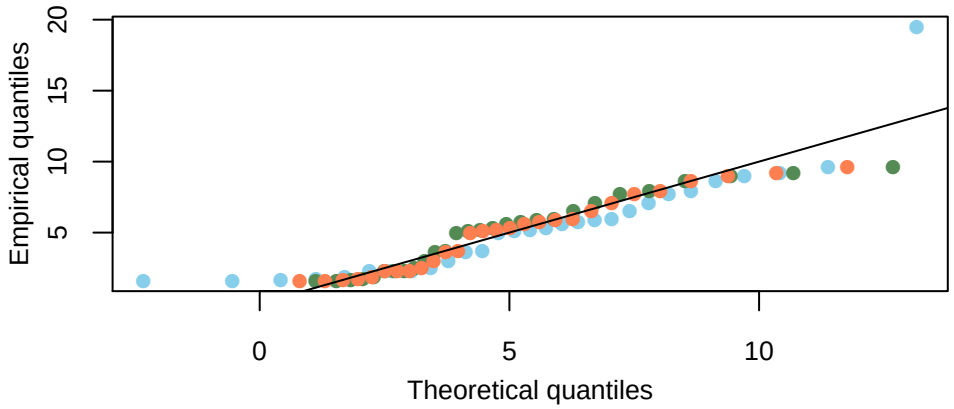
DRAFT

Distribution: White Perch Whole Body in MBC−Methyl Mercury

Media:
White Perch Whole Body
Exposure Unit:
MBC
Chemical (mg/kg):
PCBs (Total Aroclors)

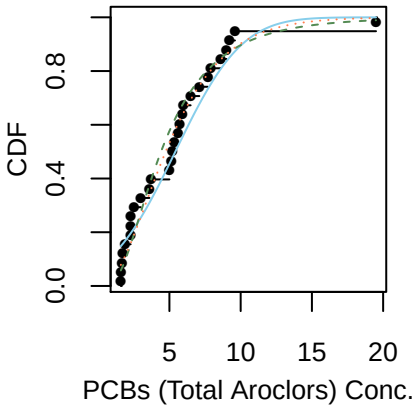
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

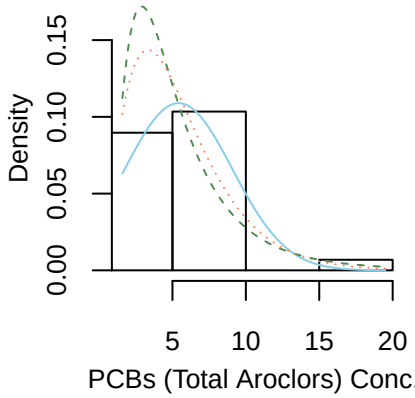


ECDF, Histogram & Q−Q (Detects Only)

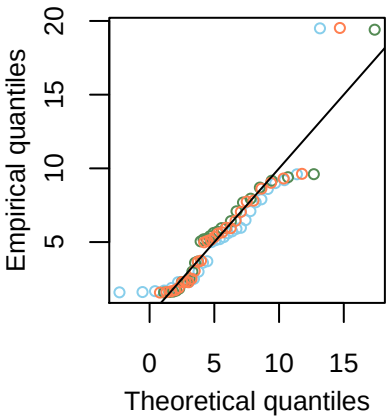
ECDF



Histogram



Q−Q



N = 29	FOD = 100%	Min (detect) = 1	Arithmetic Mean = 5
N (detect) = 29	SD (log detect) = 0.66	Max (detect) = 20 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−04	0.084	–	–	–	–	161.582	164.317
Lognormal	0.11	0.052	–	–	–	–	147.272	150.006
Gamma	–	–	0.1213	0.177	0.5418	0.756	148.467	151.201

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in MBC−PCBs (Total Aroclors)

Media:
White Perch Whole Body
Exposure Unit:
BCC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in BCC−Antimony

Media:
White Perch Whole Body
Exposure Unit:
BCC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 67%	Min (detect) = 2 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 5 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in BCC−Copper

Media:
White Perch Whole Body
Exposure Unit:
BCC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 12 J	Arithmetic Mean = 20
N (detect) = 3	SD (log detect) = 0	Max (detect) = 25 J	Arithmetic SD = 7

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in BCC−Iron

Media:
White Perch Whole Body
Exposure Unit:
BCC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 1
N (detect) = 3	SD (log detect) = 0	Max (detect) = 2 J	Arithmetic SD = 0.95

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

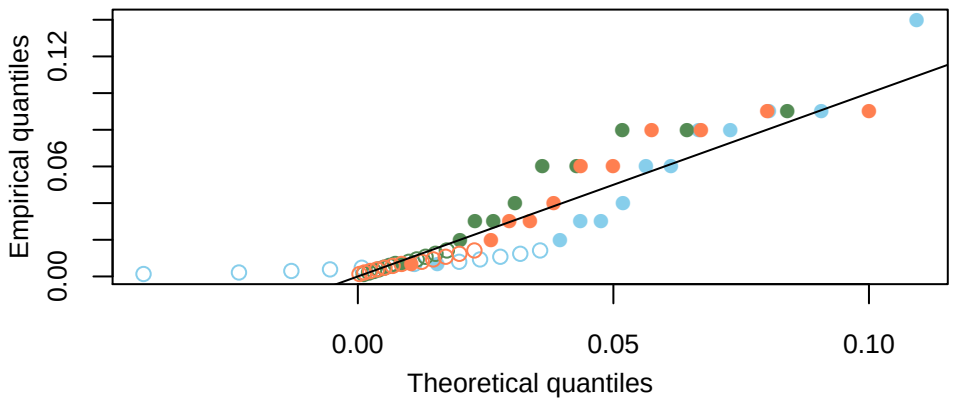
DRAFT

Distribution: White Perch Whole Body in BCC−Manganese

Media:
White Perch Whole Body
Exposure Unit:
BCC
Chemical (mg/kg):
Mercury (Inorganic)

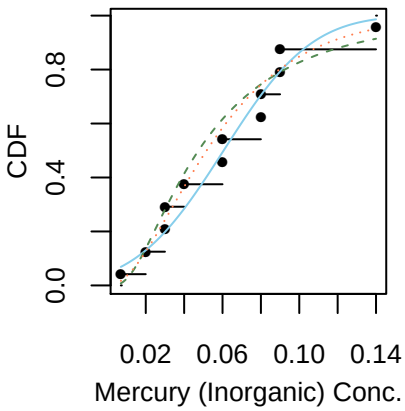
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

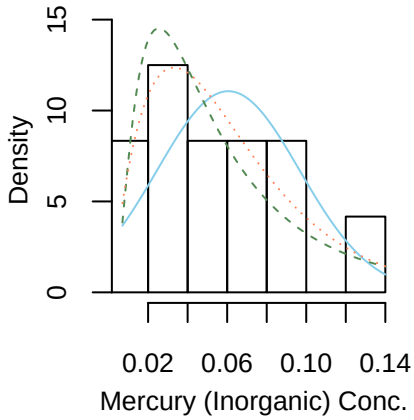


ECDF, Histogram & Q−Q (Detects Only)

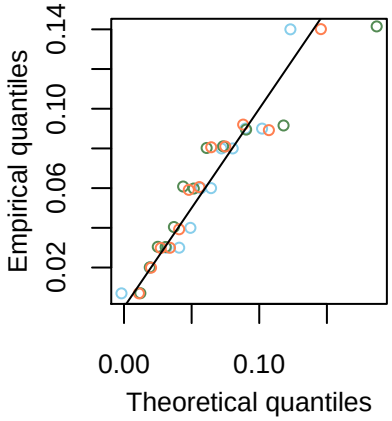
ECDF



Histogram



Q−Q



N = 24	FOD = 50%	Min (detect) = 0.007	Kaplan Meier Mean = 0.03
N (detect) = 12	SD (log detect) = 0.83	Max (detect) = 0.007 J	Kaplan Meier SD = 0.04

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00031	0.0011	–	–	–	–	−85.9558	−83.5997
Lognormal	0.38	0.39	–	–	–	–	−112.799	−110.443
Gamma	–	–	0.1558	0.188	0.6451	0.806	−111.435	−109.079

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.65	0.8	–	–	–	–	−41.6864	−40.7166
Lognormal	0.23	0.24	–	–	–	–	−40.7106	−39.7408
Gamma	–	–	0.1674	0.27	0.2971	0.736	−42.7824	−41.8125

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in BCC−Mercury (Inorganic)

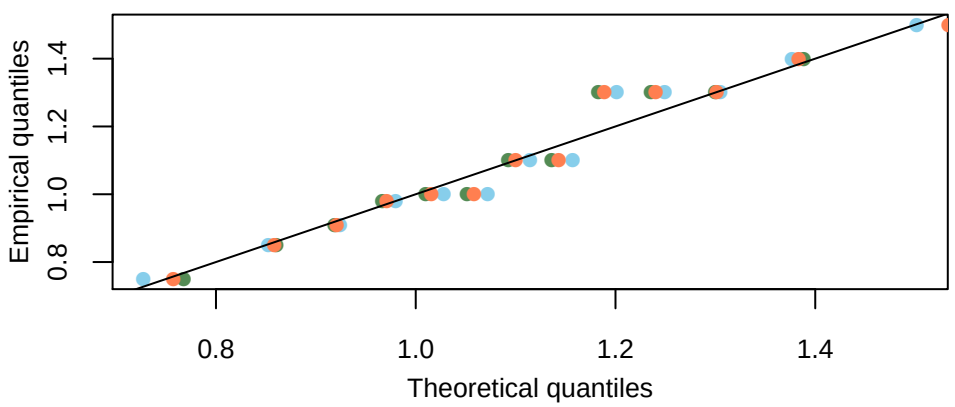
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **99**

Media:
White Perch Whole Body
Exposure Unit:
BCC
Chemical (mg/kg):
Selenium

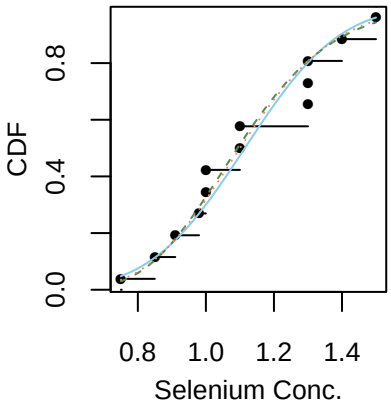
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

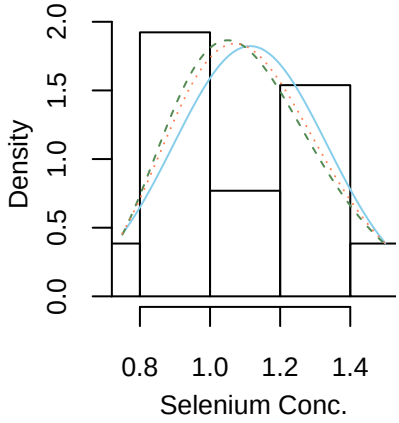


ECDF, Histogram & Q−Q (Detects Only)

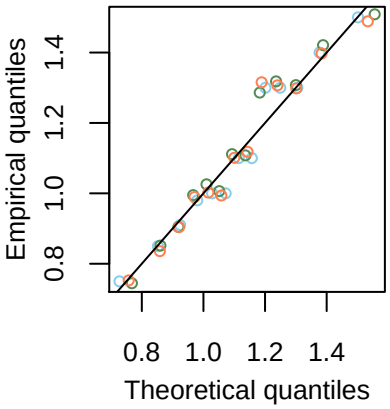
ECDF



Histogram



Q−Q



N = 13	FOD = 100%	Min (detect) = 0.75 J	Arithmetic Mean = 1
N (detect) = 13	SD (log detect) = 0.21	Max (detect) = 0.75	Arithmetic SD = 0.23

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.7	0.32	–	–	–	–	1.39057	2.52047
Lognormal	0.77	0.28	–	–	–	–	1.31077	2.44067
Gamma	–	–	0.1908	0.266	0.3073	0.725	1.22433	2.35423

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

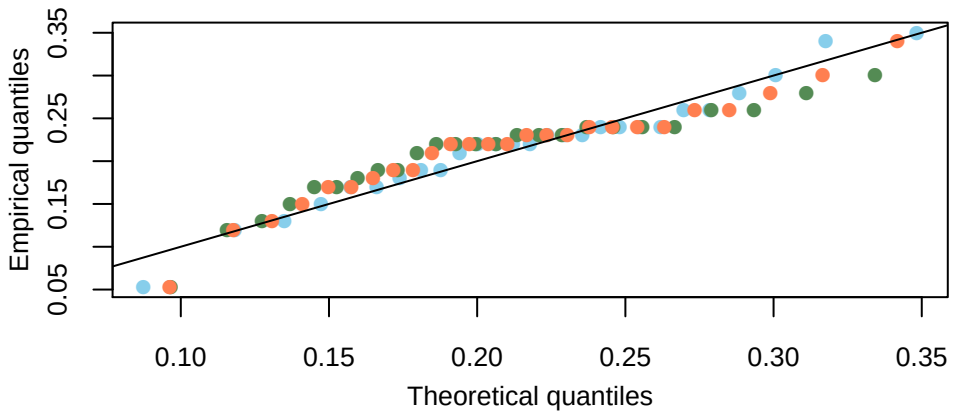
DRAFT

Distribution: White Perch Whole Body in BCC−Selenium

Media:
White Perch Whole Body
Exposure Unit:
BCC
Chemical (mg/kg):
Methyl Mercury

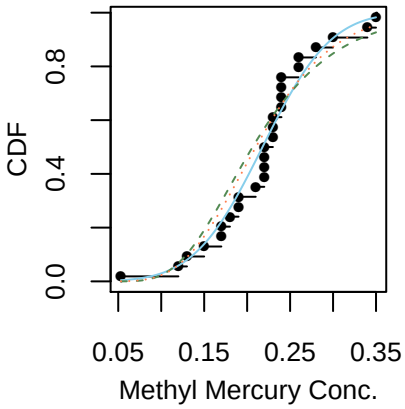
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

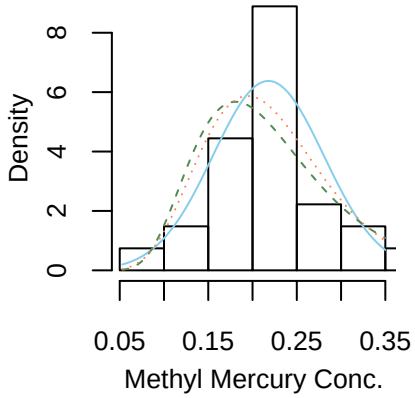


ECDF, Histogram & Q−Q (Detects Only)

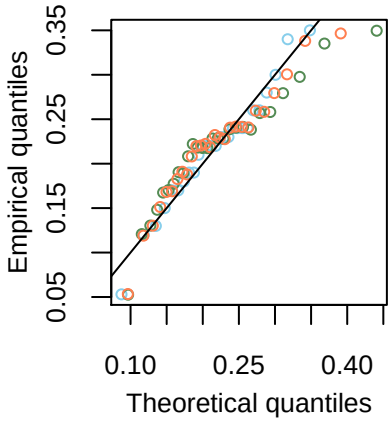
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 0.053 J	Arithmetic Mean = 0.22
N (detect) = 27	SD (log detect) = 0.37	Max (detect) = 0.053	Arithmetic SD = 0.064

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.48	0.17	–	–	–	–	−69.046	−66.4543
Lognormal	0.00058	0.008	–	–	–	–	−59.1798	−56.5881
Gamma	–	–	0.1848	0.175	0.8601	0.747	−64.0224	−61.4307

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

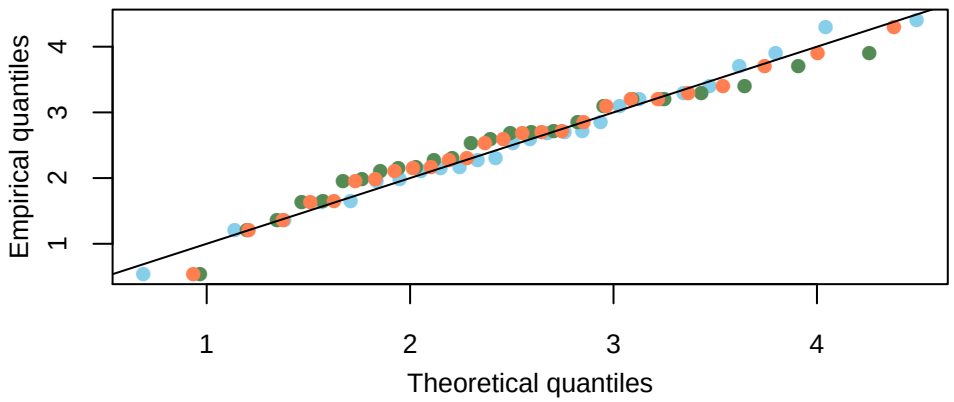
Distribution: White Perch Whole Body in BCC−Methyl Mercury

Media:
White Perch Whole Body
Exposure Unit:
BCC
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

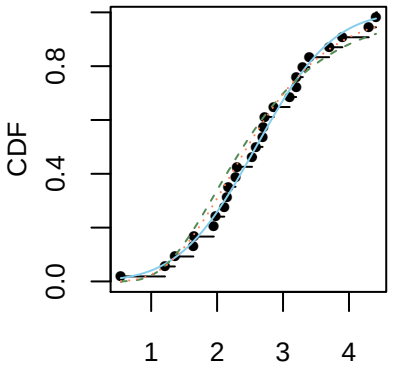
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

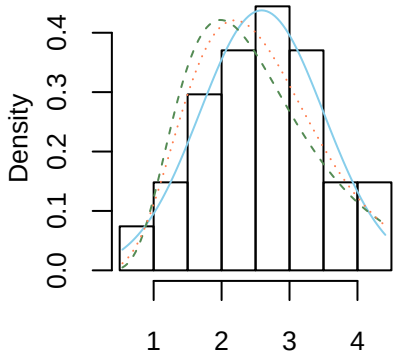


ECDF, Histogram & Q−Q (Detects Only)

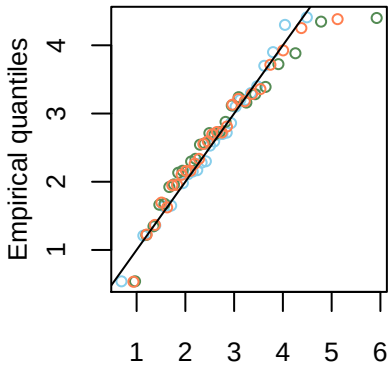
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 0.54 J	Arithmetic Mean = 2
N (detect) = 27	SD (log detect) = 0.44	Max (detect) = 0.54 J	Arithmetic SD = 0.93

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.99	0.97	–	–	–	–	75.6194	78.211
Lognormal	0.011	0.22	–	–	–	–	82.7413	85.3329
Gamma	–	–	0.1032	0.175	0.3182	0.747	78.5481	81.1398

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in BCC−PCBs (Total Aroclors)

Media:
White Perch Whole Body
Exposure Unit:
LBC
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in LBC−Antimony

Media:
White Perch Whole Body
Exposure Unit:
LBC
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 3 J	Arithmetic Mean = 4
N (detect) = 3	SD (log detect) = 0	Max (detect) = 5 J	Arithmetic SD = 0.78

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in LBC−Copper

Media:
White Perch Whole Body
Exposure Unit:
LBC
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 9 J	Arithmetic Mean = 18
N (detect) = 3	SD (log detect) = 0	Max (detect) = 35 J	Arithmetic SD = 14

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in LBC−Iron

Media:
White Perch Whole Body
Exposure Unit:
LBC
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 1
N (detect) = 3	SD (log detect) = 0	Max (detect) = 2 J	Arithmetic SD = 0.25

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

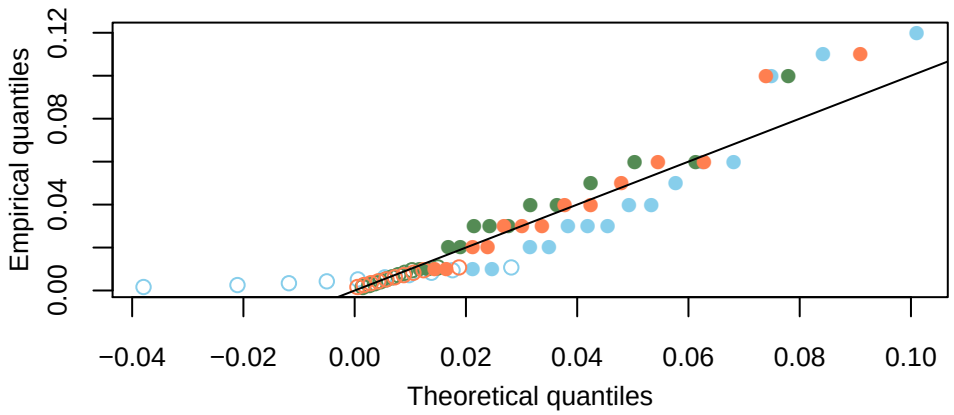
DRAFT

Distribution: White Perch Whole Body in LBC−Manganese

Media:
White Perch Whole Body
Exposure Unit:
LBC
Chemical (mg/kg):
Mercury (Inorganic)

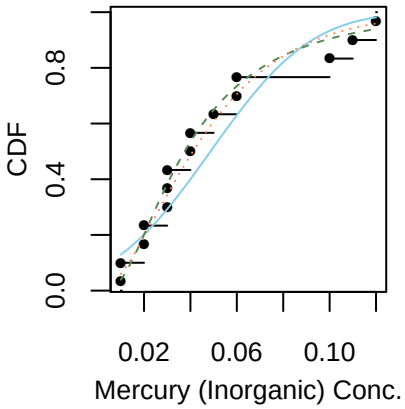
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

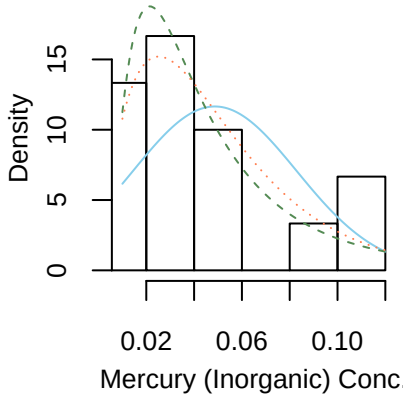


ECDF, Histogram & Q−Q (Detects Only)

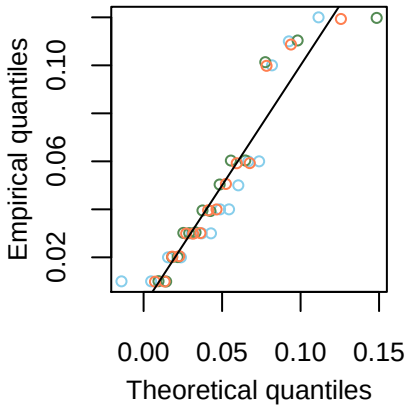
ECDF



Histogram



Q−Q



N = 25	FOD = 60%	Min (detect) = 0.01	Kaplan Meier Mean = 0.029
N (detect) = 15	SD (log detect) = 0.78	Max (detect) = 0.01 J	Kaplan Meier SD = 0.036

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00016	0.0074	–	–	–	–	−94.3502	−91.9125
Lognormal	0.56	0.41	–	–	–	–	−120.267	−117.829
Gamma	–	–	0.1755	0.184	0.4752	0.807	−118.892	−116.454

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.03	0.12	–	–	–	–	−54.6732	−53.2571
Lognormal	0.53	0.81	–	–	–	–	−60.5474	−59.1313
Gamma	–	–	0.1233	0.224	0.3089	0.747	−60.4765	−59.0604

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

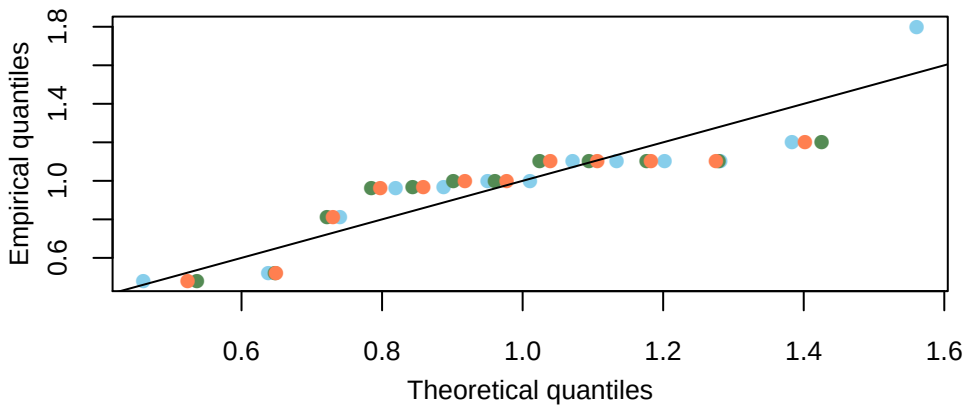
DRAFT

Distribution: White Perch Whole Body in LBC−Mercury (Inorganic)

Media:
White Perch Whole Body
Exposure Unit:
LBC
Chemical (mg/kg):
Selenium

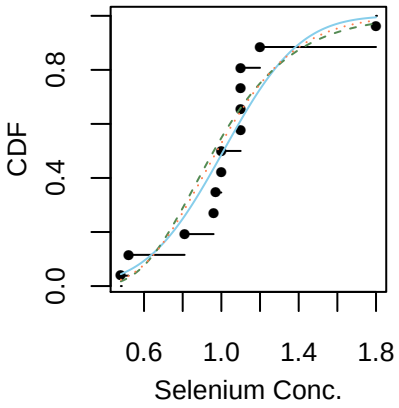
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

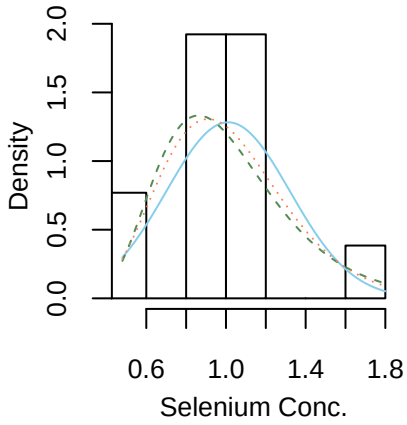


ECDF, Histogram & Q−Q (Detects Only)

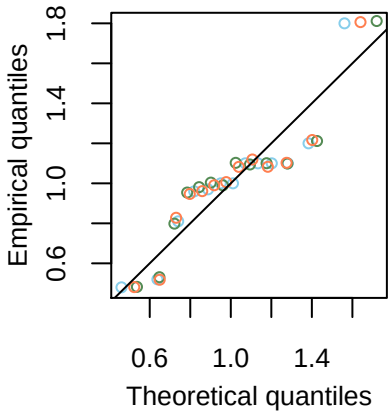
ECDF



Histogram



Q−Q



N = 13	FOD = 100%	Min (detect) = 0.48 J	Arithmetic Mean = 1
N (detect) = 13	SD (log detect) = 0.34	Max (detect) = 0.48	Arithmetic SD = 0.32

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.055	0.043	–	–	–	–	10.5307	11.6606
Lognormal	0.042	0.011	–	–	–	–	10.9565	12.0864
Gamma	–	–	0.2468	0.267	0.8604	0.725	10.2942	11.4241

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in LBC−Selenium

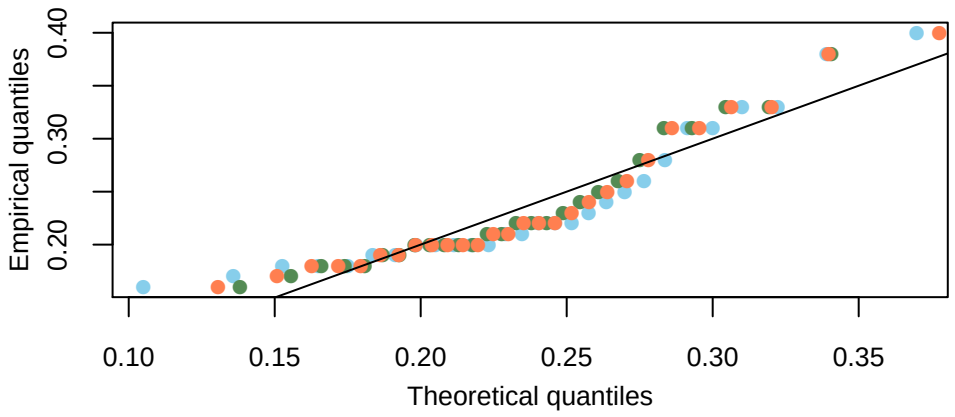
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **108**

Media:
White Perch Whole Body
Exposure Unit:
LBC
Chemical (mg/kg):
Methyl Mercury

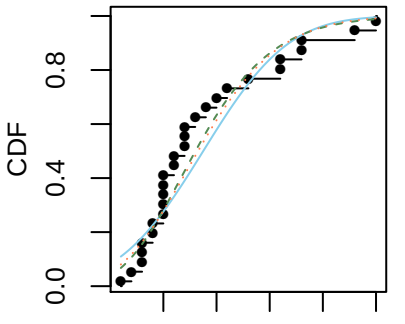
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

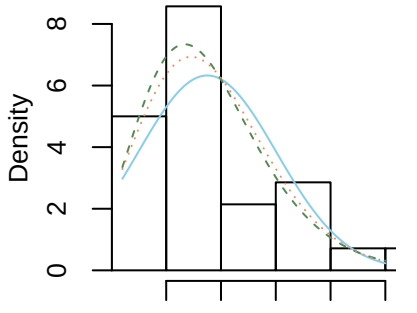


ECDF, Histogram & Q−Q (Detects Only)

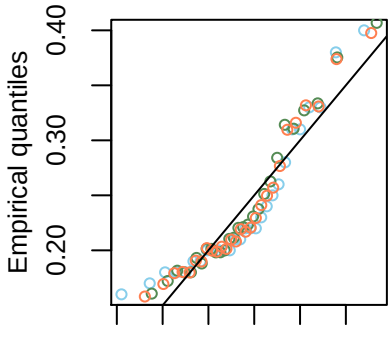
ECDF



Histogram



Q−Q



N = 28	FOD = 100%	Min (detect) = 0.16 J	Arithmetic Mean = 0.24
N (detect) = 28	SD (log detect) = 0.25	Max (detect) = 0.16 J	Arithmetic SD = 0.064

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.002	0.0019	–	–	–	–	−71.3096	−68.6452
Lognormal	0.034	0.021	–	–	–	–	−77.9714	−75.307
Gamma	–	–	0.1943	0.175	1.098	0.745	−76.1215	−73.4571

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

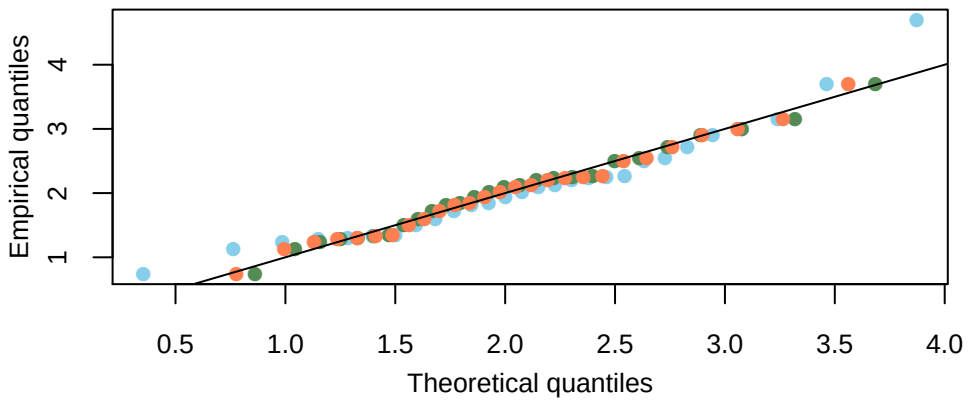
DRAFT

Distribution: White Perch Whole Body in LBC−Methyl Mercury

Media:
White Perch Whole Body
Exposure Unit:
LBC
Chemical (mg/kg):
PCBs (Total Aroclors)

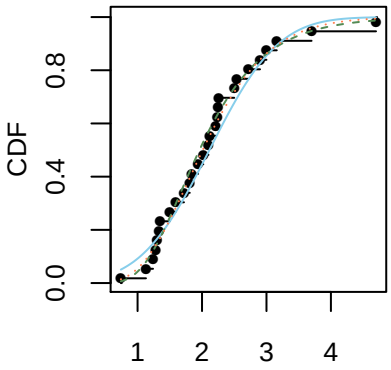
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

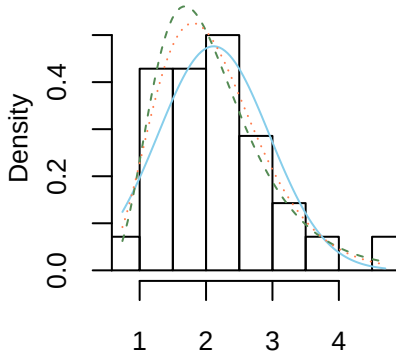


ECDF, Histogram & Q−Q (Detects Only)

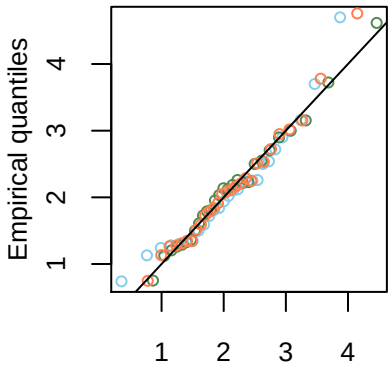
ECDF



Histogram



Q−Q



N = 28	FOD = 100%	Min (detect) = 0.74	Arithmetic Mean = 2
N (detect) = 28	SD (log detect) = 0.4	Max (detect) = 0.74 J	Arithmetic SD = 0.85

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.077	0.13	–	–	–	–	73.5485	76.2129
Lognormal	0.98	0.95	–	–	–	–	68.6504	71.3148
Gamma	–	–	0.09496	0.175	0.1872	0.747	68.8697	71.5342

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

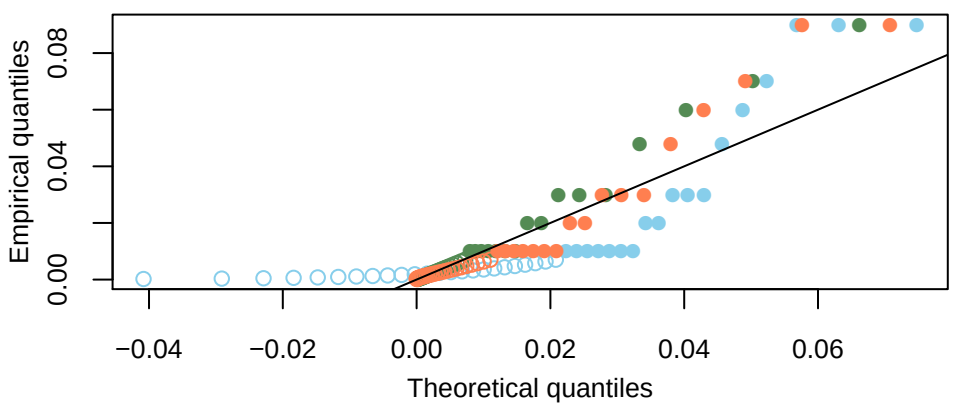
DRAFT

Distribution: White Perch Whole Body in LBC−PCBs (Total Aroclors)

Media:
White Perch Whole Body
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Mercury (Inorganic)

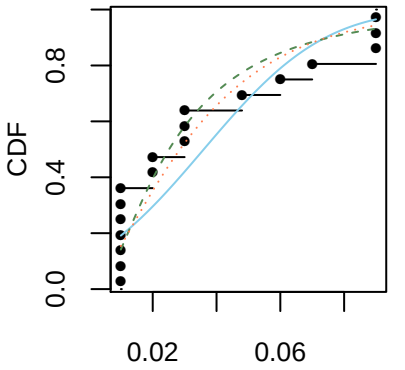
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

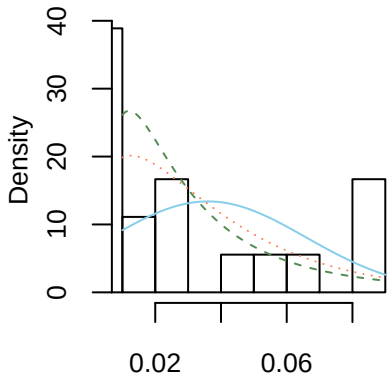


ECDF, Histogram & Q−Q (Detects Only)

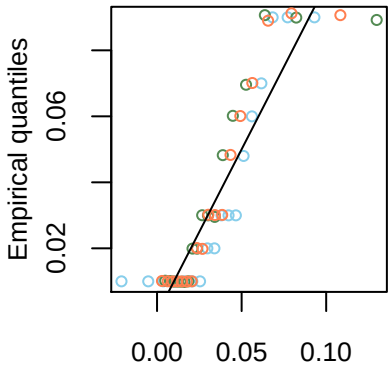
ECDF



Histogram



Q−Q



N = 42	FOD = 43%	Min (detect) = 0.01	Kaplan Meier Mean = 0.015
N (detect) = 18	SD (log detect) = 0.88	Max (detect) = 0.01 J	Kaplan Meier SD = 0.026

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.1e−14	–	–	–	–	−184.772	−181.297
Lognormal	0.54	0.34	–	–	–	–	−272.428	−268.953
Gamma	–	–	0.2029	0.148	1.249	0.813	−265.242	−261.766

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0012	0.0058	–	–	–	–	−71.4049	−69.6242
Lognormal	0.0057	0.0071	–	–	–	–	−83.0583	−81.2775
Gamma	–	–	0.2347	0.209	1.116	0.767	−81.4448	−79.664

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

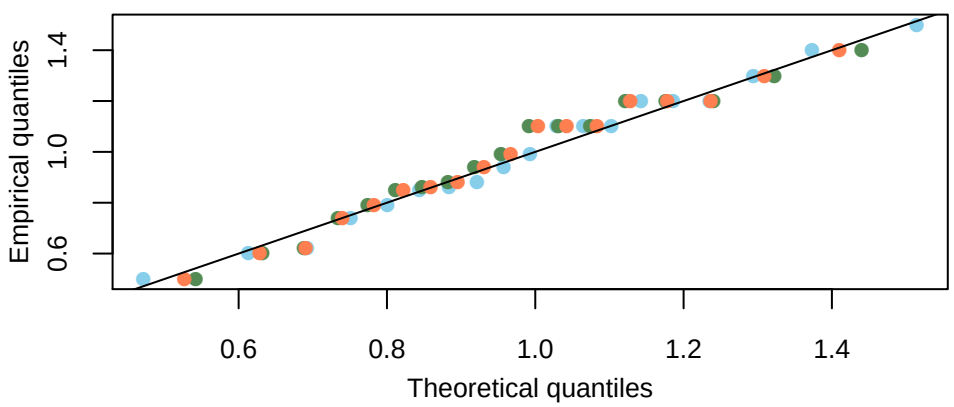
DRAFT

Distribution: White Perch Whole Body in Reference Sites−Mercury (Inorganic)

Media:
White Perch Whole Body
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Selenium

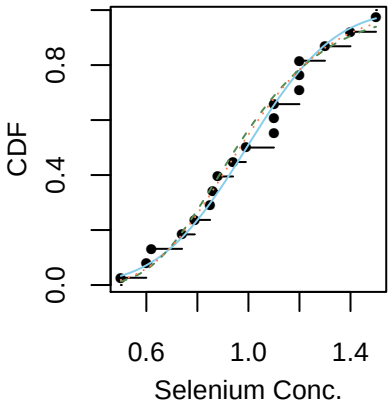
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

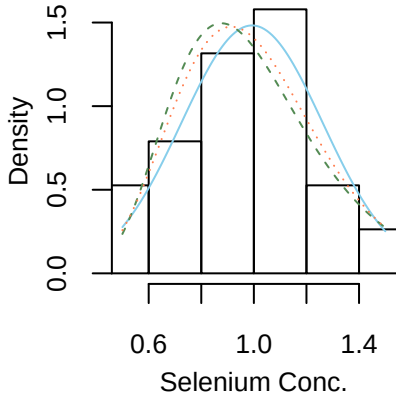


ECDF, Histogram & Q−Q (Detects Only)

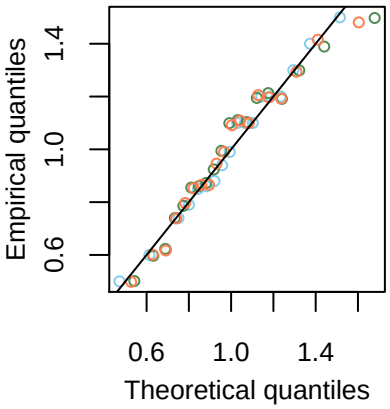
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 0.5 J	Arithmetic Mean = 0.99
N (detect) = 19	SD (log detect) = 0.3	Max (detect) = 0.5	Arithmetic SD = 0.28

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.93	0.62	–	–	–	–	8.03162	9.92049
Lognormal	0.54	0.26	–	–	–	–	9.31514	11.204
Gamma	–	–	0.1517	0.199	0.2559	0.741	8.50141	10.3903

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in Reference Sites−Selenium

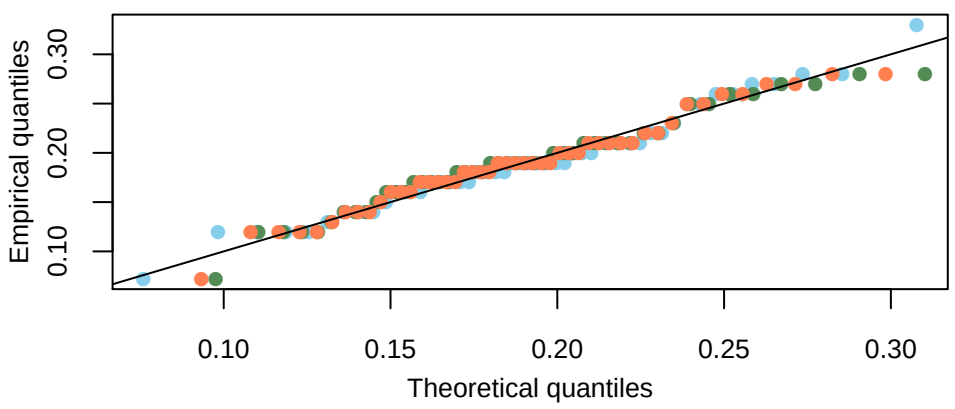
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **112**

Media:
White Perch Whole Body
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Methyl Mercury

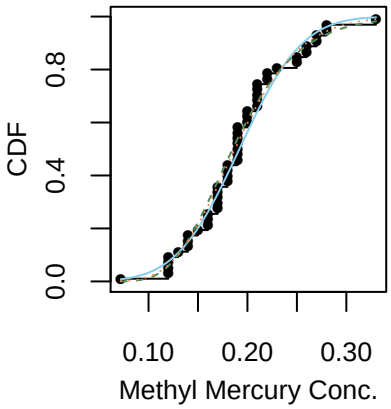
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

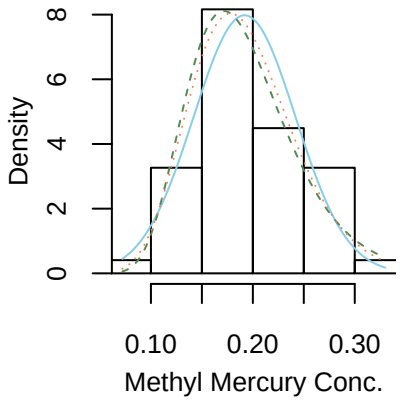


ECDF, Histogram & Q−Q (Detects Only)

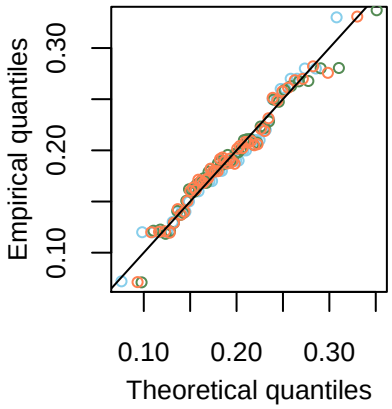
ECDF



Histogram



Q−Q



N = 49	FOD = 100%	Min (detect) = 0.072 J	Arithmetic Mean = 0.19
N (detect) = 49	SD (log detect) = 0.28	Max (detect) = 0.072	Arithmetic SD = 0.051

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.42	0.11	–	–	–	–	−150.545	−146.762
Lognormal	0.084	0.11	–	–	–	–	−148.434	−144.65
Gamma	–	–	0.09605	0.132	0.4162	0.748	−150.569	−146.785

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

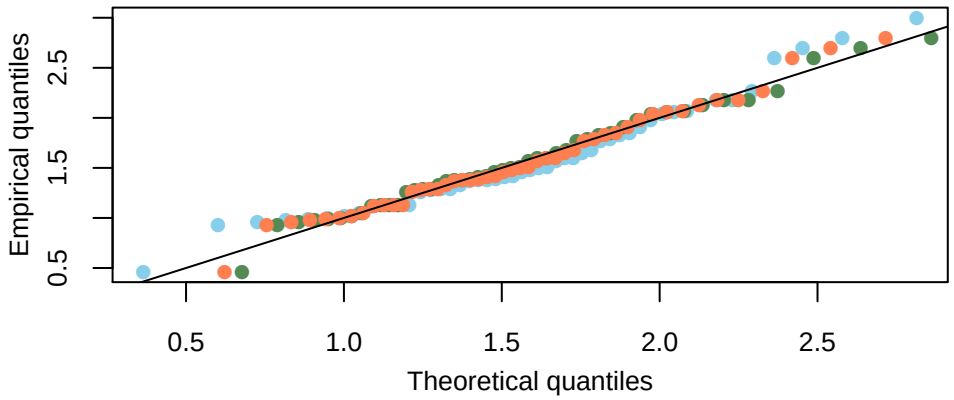
DRAFT

Distribution: White Perch Whole Body in Reference Sites−Methyl Mercury

Media:
White Perch Whole Body
Exposure Unit:
Reference Sites
Chemical (mg/kg):
PCBs (Total Aroclors)

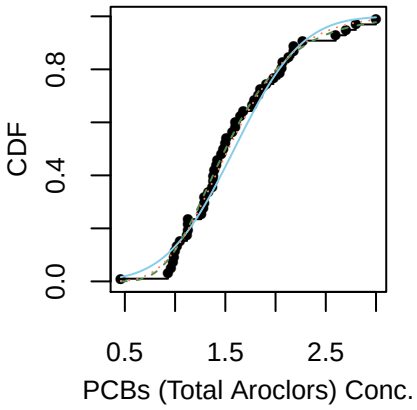
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

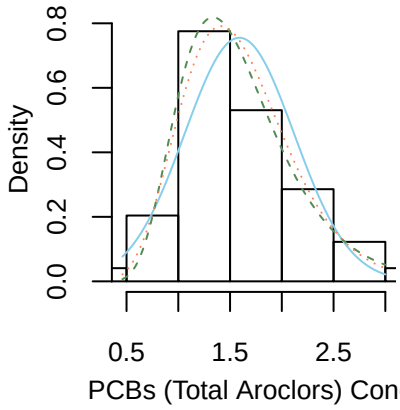


ECDF, Histogram & Q−Q (Detects Only)

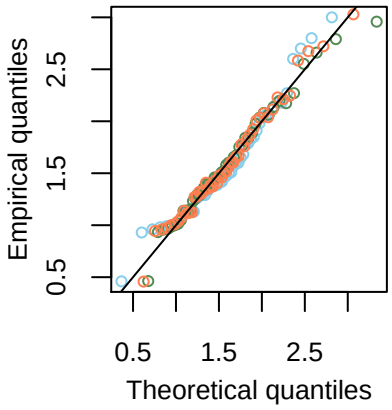
ECDF



Histogram



Q−Q



N = 49	FOD = 100%	Min (detect) = 0.46 J	Arithmetic Mean = 1
N (detect) = 49	SD (log detect) = 0.35	Max (detect) = 0.46 J	Arithmetic SD = 0.53

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.074	0.14	–	–	–	–	80.4967	84.2804
Lognormal	0.15	0.89	–	–	–	–	78.3877	82.1713
Gamma	–	–	0.06781	0.132	0.2972	0.753	76.9567	80.7403

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: White Perch Whole Body in Reference Sites−PCBs (Total Aroclors)

Media:
Surface Sediment (0−15 cm)

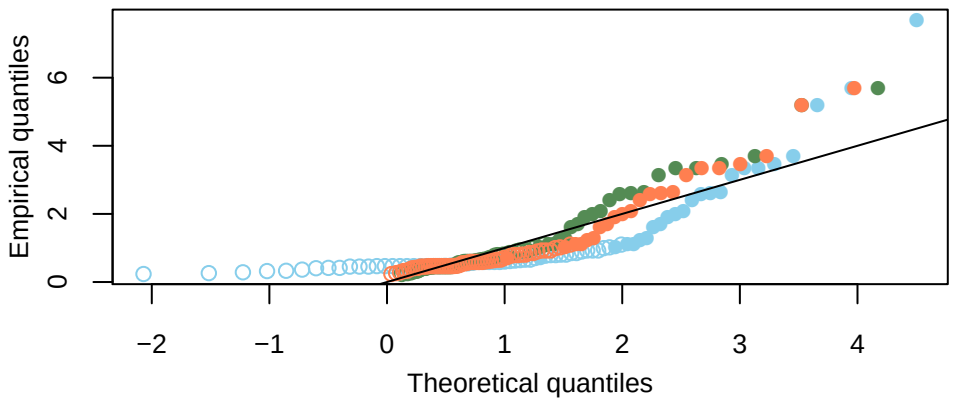
Exposure Unit:
UBC

Chemical (mg/kg):
Antimony

Legend

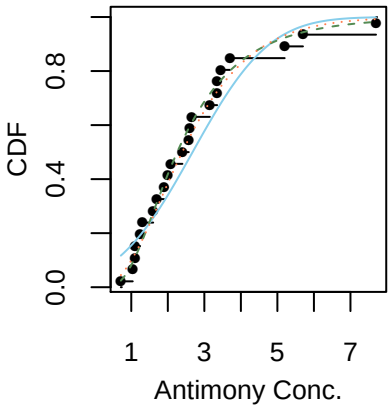
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

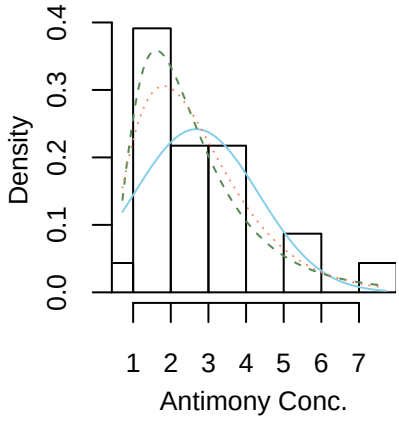


ECDF, Histogram & Q−Q (Detects Only)

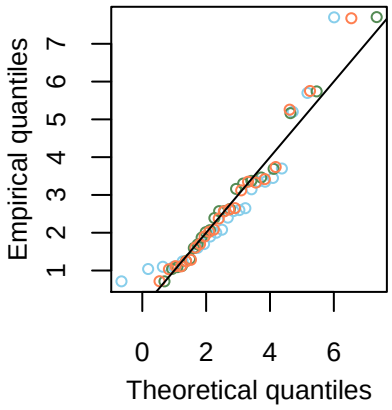
ECDF



Histogram



Q−Q



N = 78	FOD = 29%	Min (detect) = 0.71 J	Kaplan Meier Mean = 1
N (detect) = 23	SD (log detect) = 0.6	Max (detect) = 7 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−17	–	–	–	–	265.667	270.355
Lognormal	8e−05	0.0013	–	–	–	–	157.393	162.081
Gamma	–	–	0.194	0.11	4.571	0.78	180.655	185.343

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0059	0.14	–	–	–	–	92.2995	94.5705
Lognormal	0.97	0.95	–	–	–	–	81.9957	84.2667
Gamma	–	–	0.08557	0.184	0.2648	0.755	83.2855	85.5565

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Antimony

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **115**

Media:
Surface Sediment (0−15 cm)

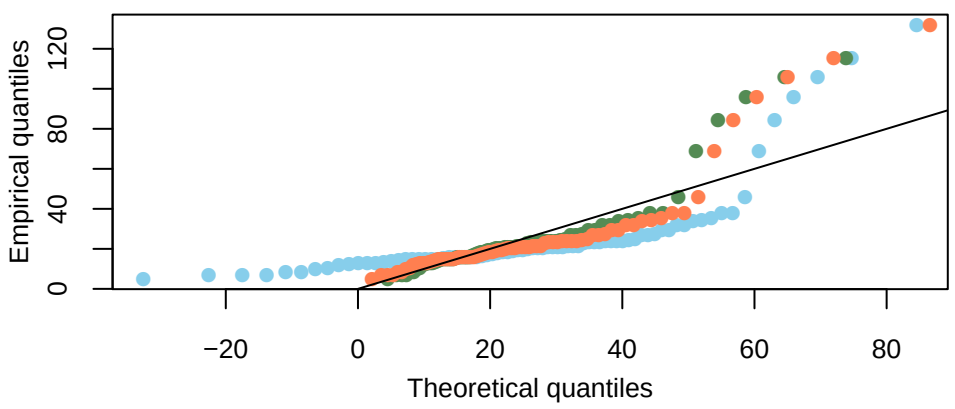
Exposure Unit:
UBC

Chemical (mg/kg):
Arsenic

Legend

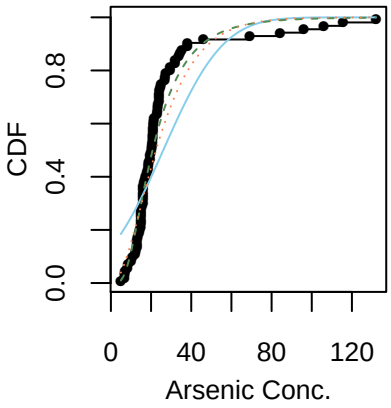
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

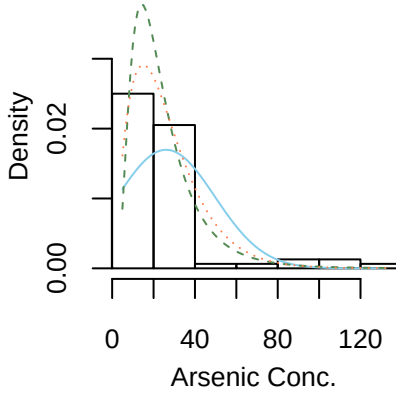


ECDF, Histogram & Q−Q (Detects Only)

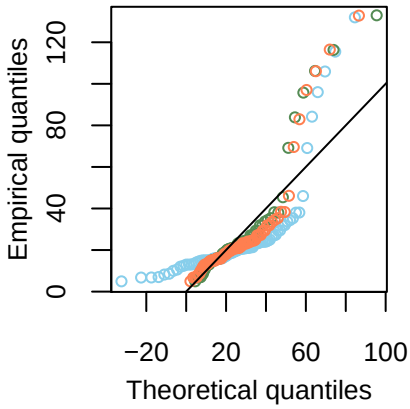
ECDF



Histogram



Q−Q



N = 78	FOD = 100%	Min (detect) = 4	Arithmetic Mean = 26
N (detect) = 78	SD (log detect) = 0.62	Max (detect) = 130 J	Arithmetic SD = 24

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5e−16	–	–	–	–	717.913	722.627
Lognormal	0.00019	0.00087	–	–	–	–	622.184	626.897
Gamma	–	–	0.194	0.108	4.206	0.763	642.833	647.547

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Arsenic

Media:
Surface Sediment (0−15 cm)

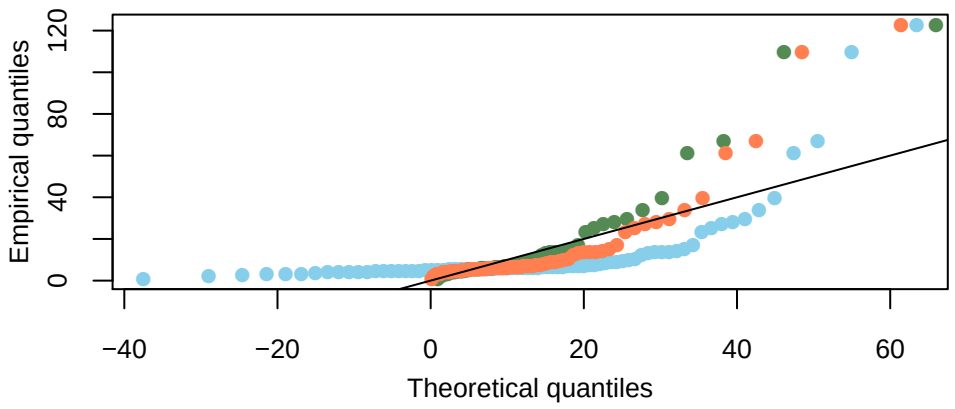
Exposure Unit:
UBC

Chemical (mg/kg):
Cadmium

Legend

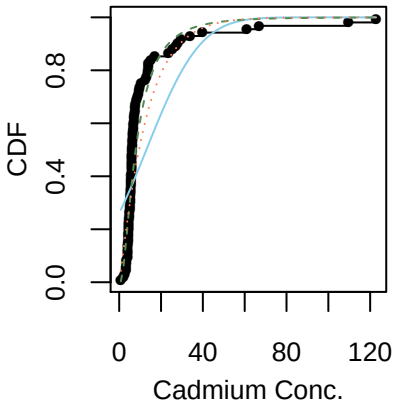
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

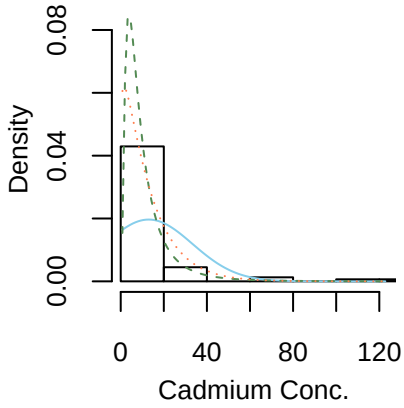


ECDF, Histogram & Q−Q (Detects Only)

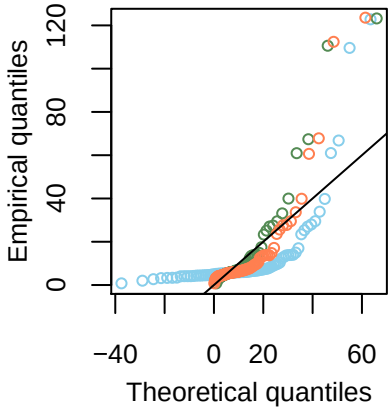
ECDF



Histogram



Q−Q



N = 78	FOD = 100%	Min (detect) = 0.78 J	Arithmetic Mean = 13
N (detect) = 78	SD (log detect) = 0.86	Max (detect) = 120 J	Arithmetic SD = 20

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.9e−21	–	–	–	–	694.905	699.618
Lognormal	0	2.7e−07	–	–	–	–	522.626	527.339
Gamma	–	–	0.2493	0.11	7.106	0.78	559.312	564.026

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Cadmium

Media:
Surface Sediment (0−15 cm)

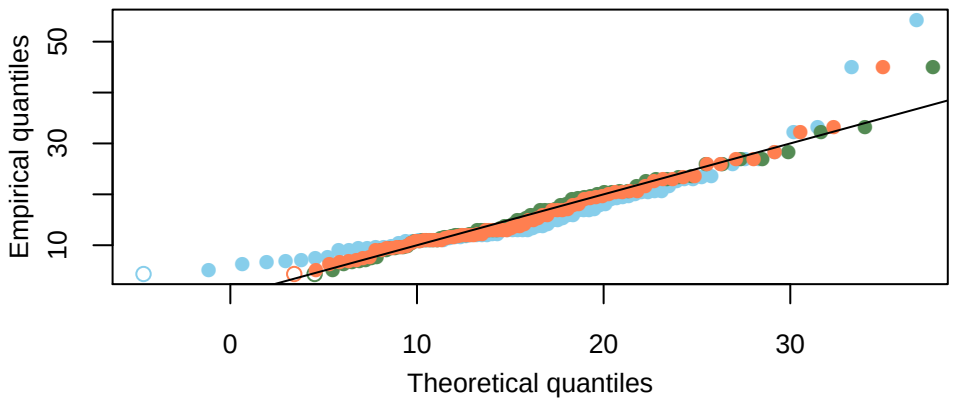
Exposure Unit:
UBC

Chemical (mg/kg):
Cobalt

Legend

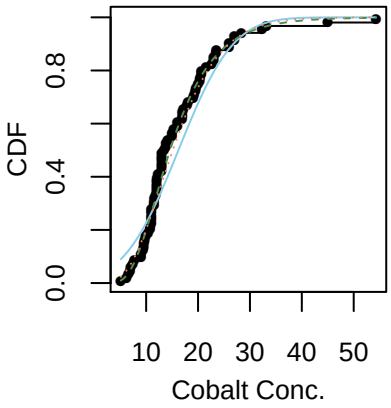
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

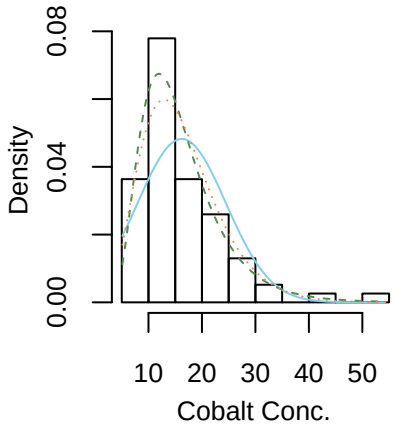


ECDF, Histogram & Q−Q (Detects Only)

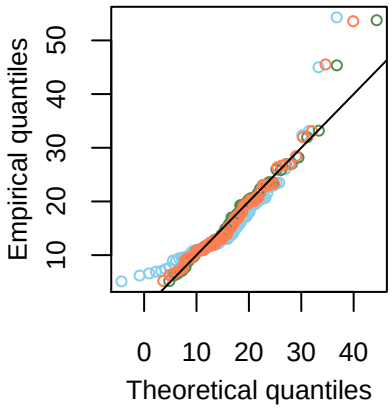
ECDF



Histogram



Q−Q



N = 78	FOD = 99%	Min (detect) = 5 J	Kaplan Meier Mean = 16
N (detect) = 77	SD (log detect) = 0.45	Max (detect) = 54 J	Kaplan Meier SD = 8

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00033	–	–	–	–	555.942	560.655
Lognormal	0.76	0.18	–	–	–	–	521.77	526.484
Gamma	–	–	0.1116	0.108	0.7357	0.763	526.842	531.555

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3e−04	–	–	–	–	547.852	552.539
Lognormal	0.57	0.083	–	–	–	–	511.614	516.302
Gamma	–	–	0.1186	0.108	0.8554	0.763	518.043	522.73

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Cobalt

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **118**

Media:
Surface Sediment (0−15 cm)

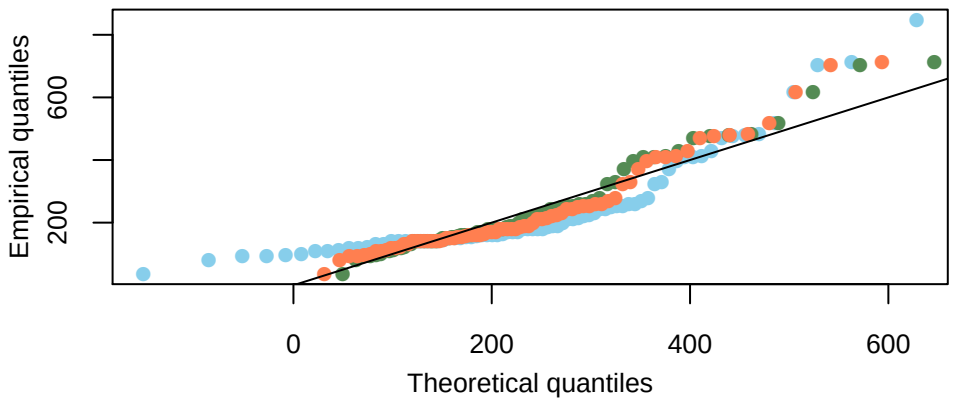
Exposure Unit:
UBC

Chemical (mg/kg):
Copper

Legend

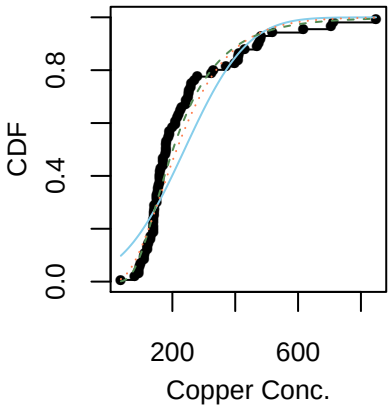
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

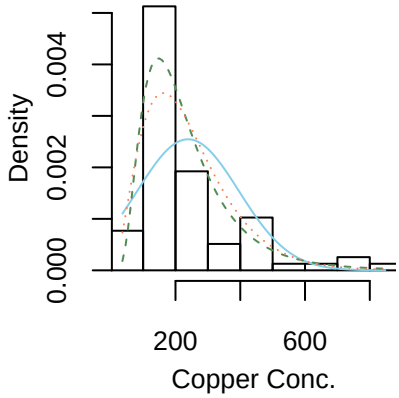


ECDF, Histogram & Q−Q (Detects Only)

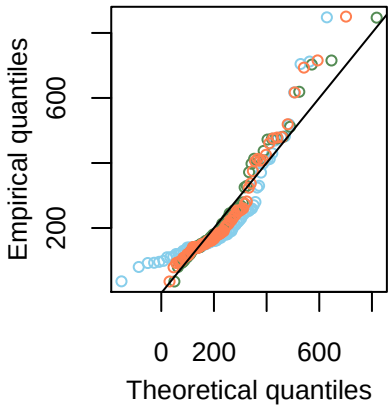
ECDF



Histogram



Q−Q



N = 78	FOD = 100%	Min (detect) = 36 J	Arithmetic Mean = 240
N (detect) = 78	SD (log detect) = 0.57	Max (detect) = 850 J	Arithmetic SD = 160

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.7e−08	–	–	–	–	1013.82	1018.53
Lognormal	0.012	0.0097	–	–	–	–	963.476	968.19
Gamma	–	–	0.1531	0.108	2.471	0.763	972.639	977.353

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Copper

Media:
Surface Sediment (0−15 cm)

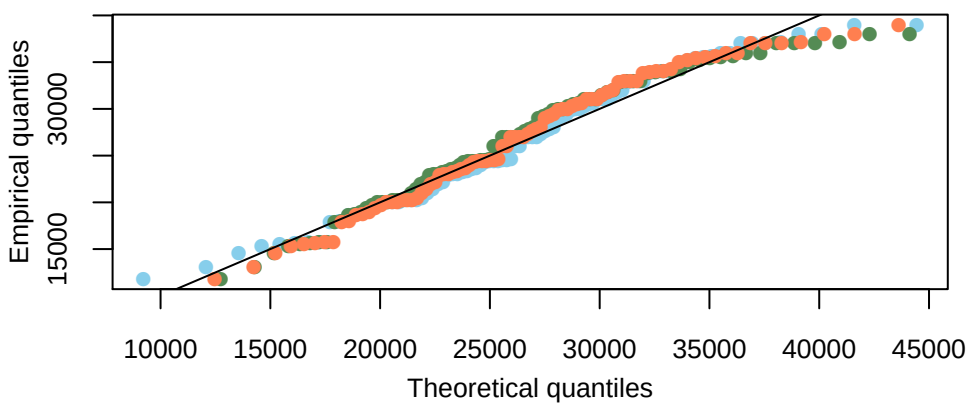
Exposure Unit:
UBC

Chemical (mg/kg):
Iron

Legend

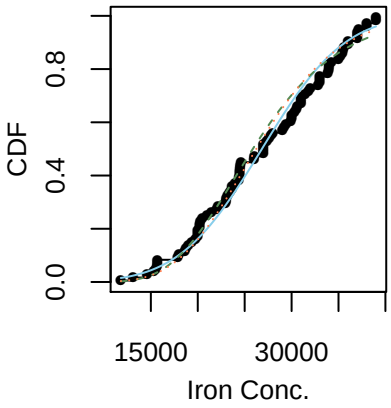
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

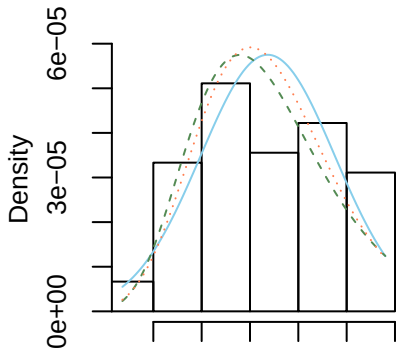


ECDF, Histogram & Q−Q (Detects Only)

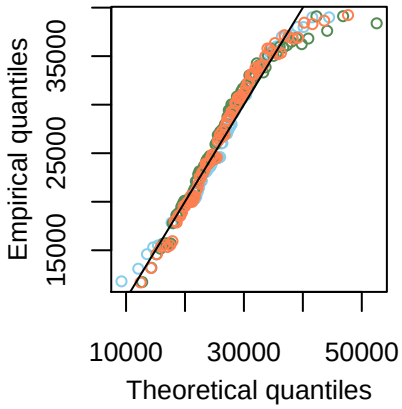
ECDF



Histogram



Q−Q



N = 90	FOD = 100%	Min (detect) = 12,000	Arithmetic Mean = 27,000
N (detect) = 90	SD (log detect) = 0.28	Max (detect) = 39,000 J	Arithmetic SD = 7,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.038	0.15	–	–	–	–	1851.41	1856.41
Lognormal	0.0027	0.035	–	–	–	–	1858.52	1863.52
Gamma	–	–	0.09551	0.094	1.07	0.752	1854.81	1859.81

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Iron

Media:
Surface Sediment (0−15 cm)

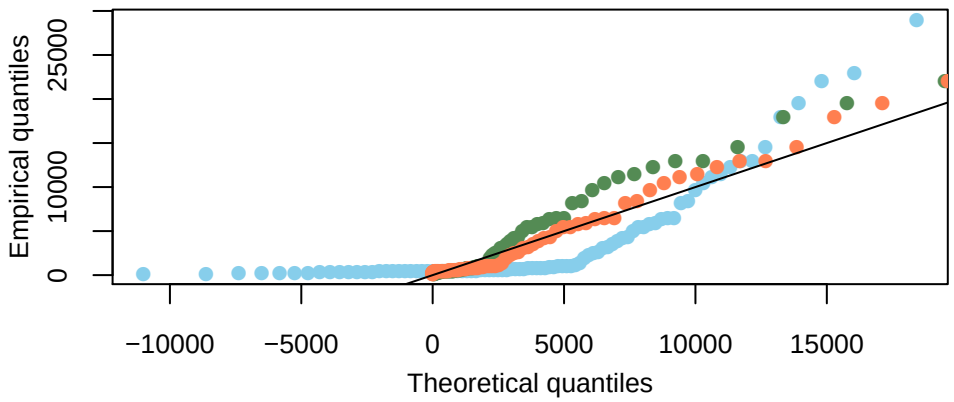
Exposure Unit:
UBC

Chemical (mg/kg):
Manganese

Legend

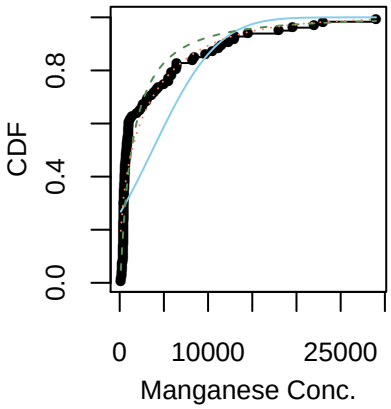
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

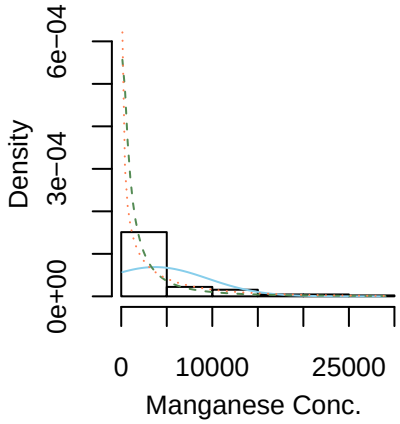


ECDF, Histogram & Q−Q (Detects Only)

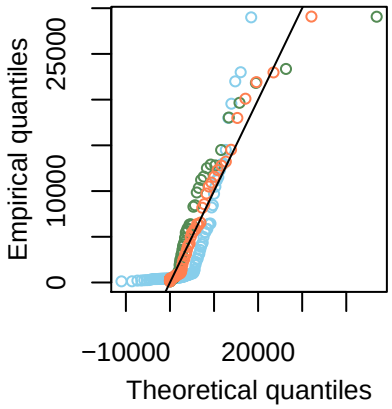
ECDF



Histogram



Q−Q



N = 90	FOD = 100%	Min (detect) = 130	Arithmetic Mean = 3,700
N (detect) = 90	SD (log detect) = 1.4	Max (detect) = 29,000 J	Arithmetic SD = 5,800

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.5e−21	–	–	–	–	1819.07	1824.07
Lognormal	0	5.5e−08	–	–	–	–	1614.49	1619.49
Gamma	–	–	0.2175	0.1043	5.44	0.9159	1652.4	1657.4

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Manganese

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **121**

Media:
Surface Sediment (0−15 cm)

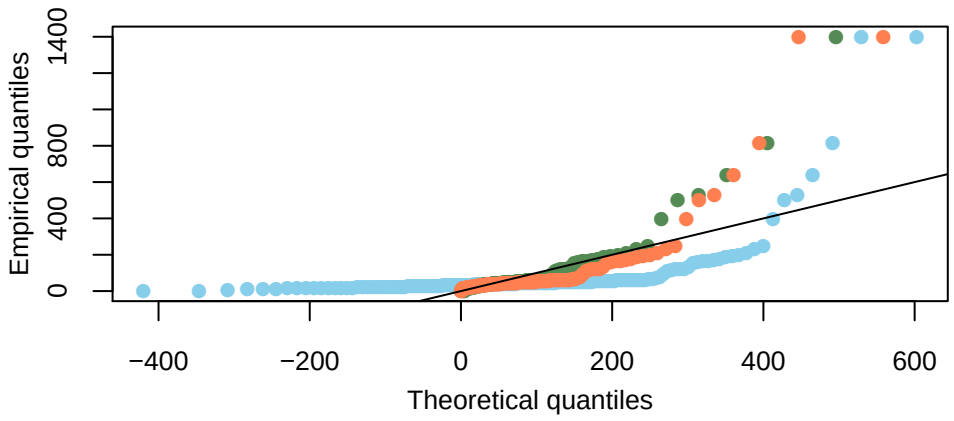
Exposure Unit:
UBC

Chemical (mg/kg):
Mercury

Legend

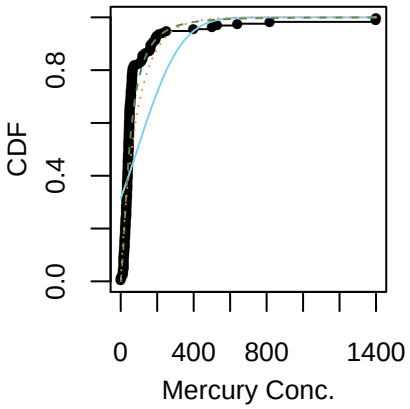
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

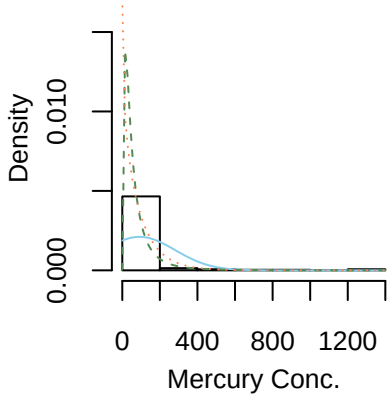


ECDF, Histogram & Q−Q (Detects Only)

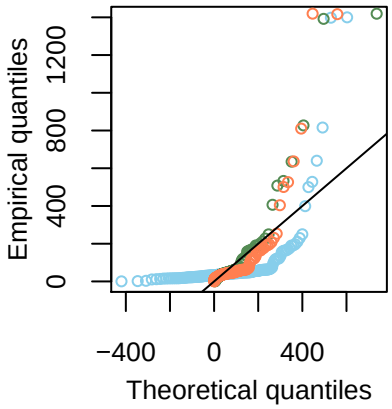
ECDF



Histogram



Q−Q



N = 145	FOD = 100%	Min (detect) = 0.53 J	Arithmetic Mean = 92
N (detect) = 145	SD (log detect) = 1	Max (detect) = 1,400 J	Arithmetic SD = 190

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.5e−53	–	–	–	–	1936.03	1941.98
Lognormal	0	1.5e−12	–	–	–	–	1537.47	1543.42
Gamma	–	–	0.2779	0.095	12.52	0.818	1602.32	1608.27

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Mercury

Media:
Surface Sediment (0−15 cm)

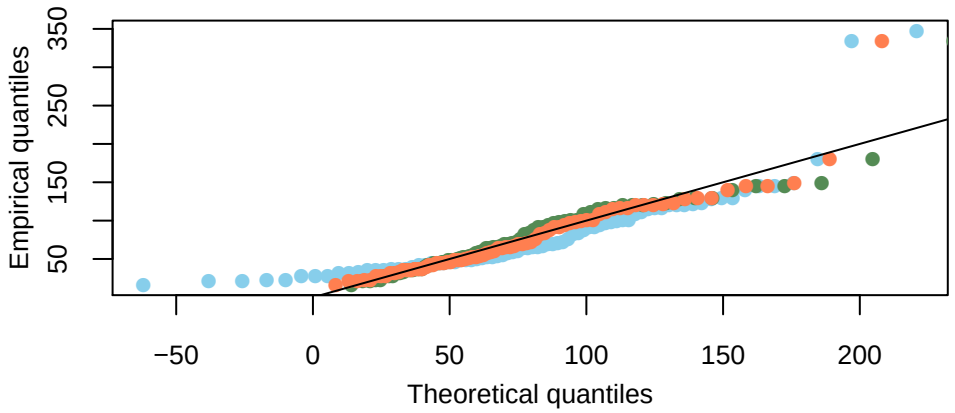
Exposure Unit:
UBC

Chemical (mg/kg):
Nickel

Legend

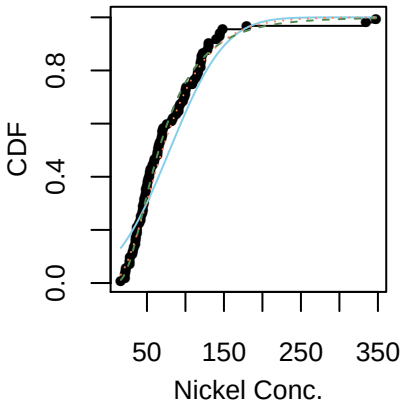
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

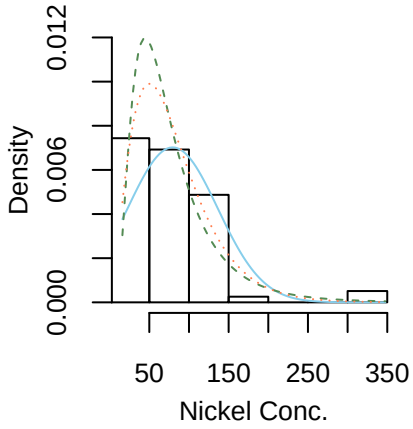


ECDF, Histogram & Q−Q (Detects Only)

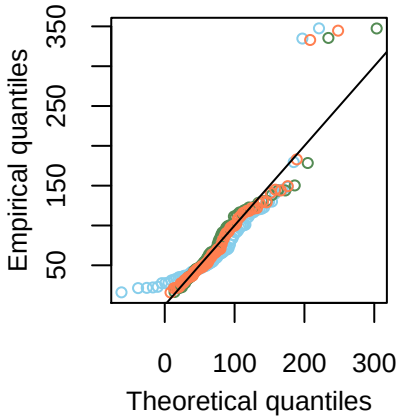
ECDF



Histogram



Q−Q



N = 78	FOD = 100%	Min (detect) = 16	Arithmetic Mean = 79
N (detect) = 78	SD (log detect) = 0.62	Max (detect) = 350 J	Arithmetic SD = 57

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00033	–	–	–	–	855.578	860.292
Lognormal	0.38	0.58	–	–	–	–	802.022	806.735
Gamma	–	–	0.07639	0.108	0.7346	0.763	809.213	813.926

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Nickel

Media:
Surface Sediment (0−15 cm)

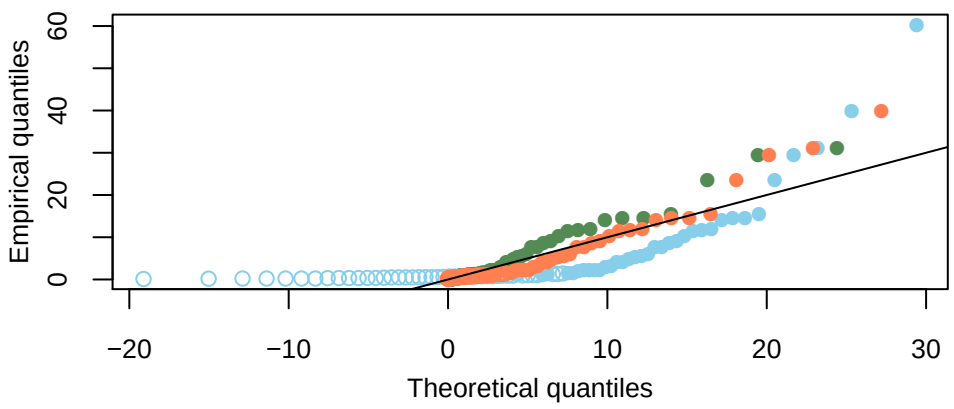
Exposure Unit:
UBC

Chemical (mg/kg):
Thallium

Legend

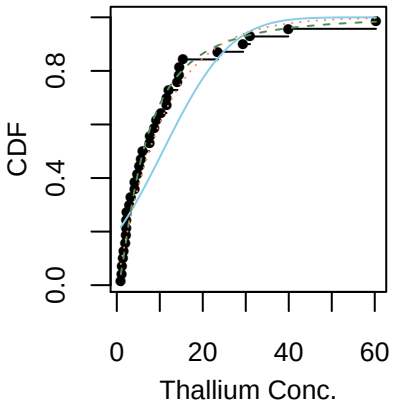
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

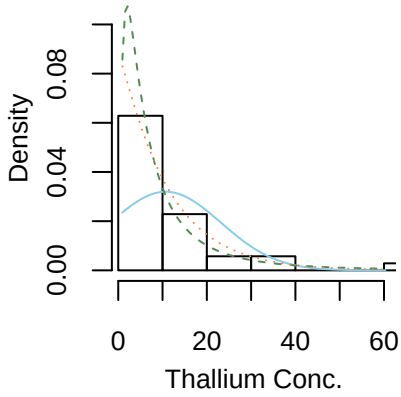


ECDF, Histogram & Q−Q (Detects Only)

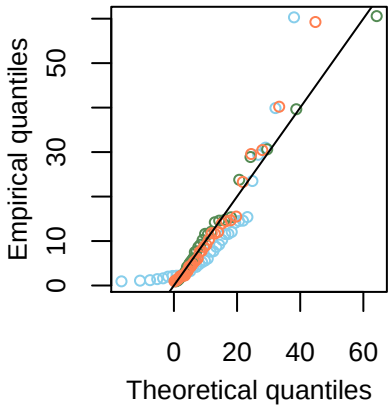
ECDF



Histogram



Q−Q



N = 78	FOD = 45%	Min (detect) = 0.94 J	Kaplan Meier Mean = 5
N (detect) = 35	SD (log detect) = 1.1	Max (detect) = 60 J	Kaplan Meier SD = 9

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.1e−20	–	–	–	–	580.604	585.317
Lognormal	0.002	0.00055	–	–	–	–	359.994	364.708
Gamma	–	–	0.2181	0.113	4.501	0.817	390.397	395.11

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00017	–	–	–	–	280.014	283.125
Lognormal	0.63	0.47	–	–	–	–	235.211	238.321
Gamma	–	–	0.09923	0.153	0.5829	0.776	239.961	243.071

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Thallium

Media:
Surface Sediment (0−15 cm)

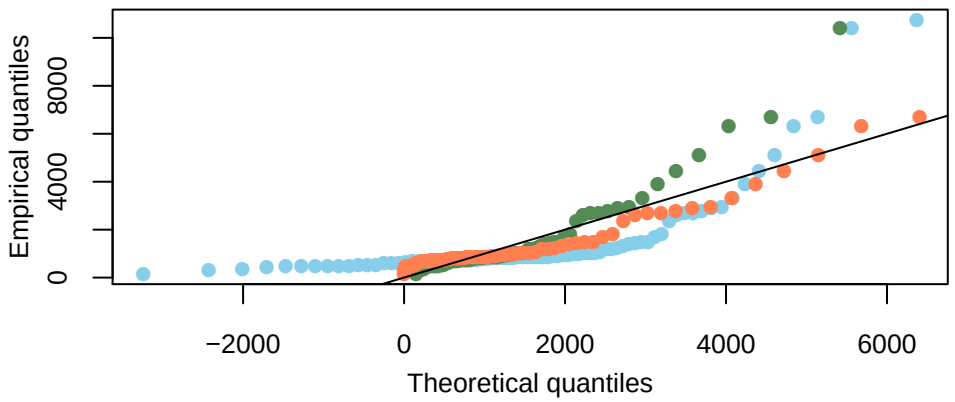
Exposure Unit:
UBC

Chemical (mg/kg):
Zinc

Legend

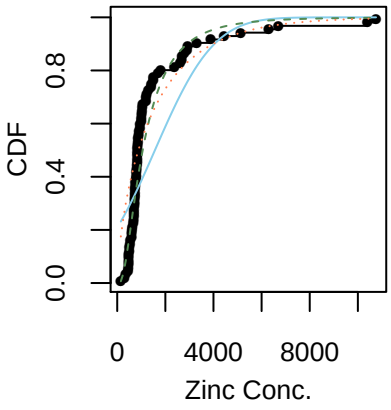
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

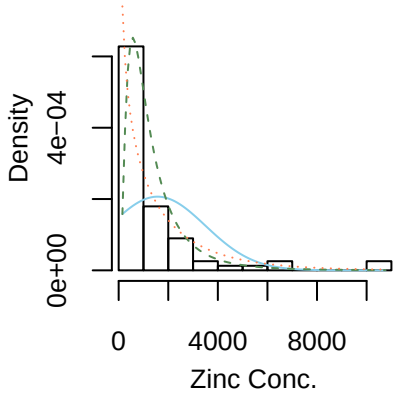


ECDF, Histogram & Q−Q (Detects Only)

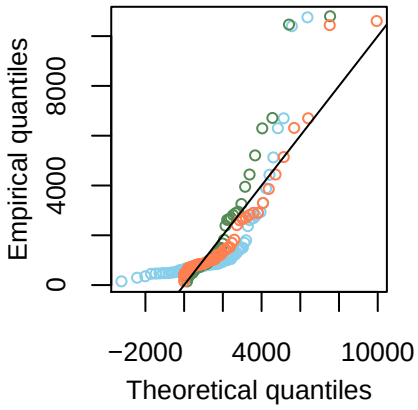
ECDF



Histogram



Q−Q



N = 78	FOD = 100%	Min (detect) = 150 J	Arithmetic Mean = 1,600
N (detect) = 78	SD (log detect) = 0.79	Max (detect) = 11,000 J	Arithmetic SD = 1,900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	8.6e−19	–	–	–	–	1405.55	1410.27
Lognormal	5e−05	1.3e−06	–	–	–	–	1274.76	1279.47
Gamma	–	–	0.3065	0.113	8.241	0.817	1325.31	1330.03

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Zinc

Media:
Surface Sediment (0−15 cm)

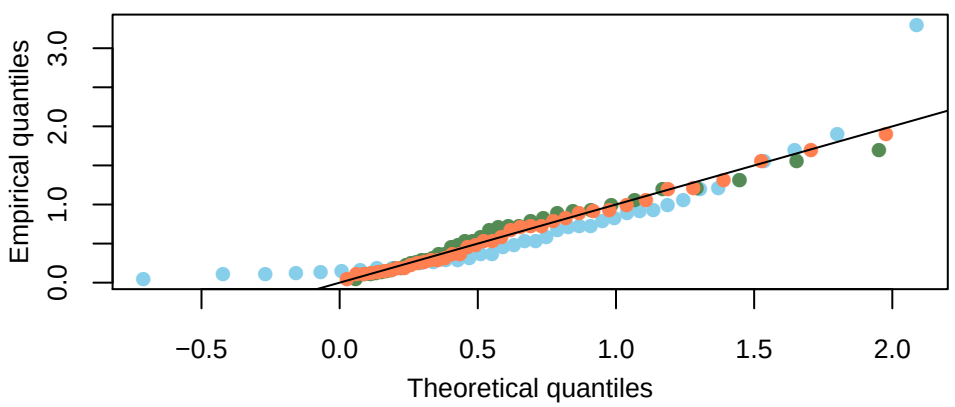
Exposure Unit:
UBC

Chemical (mg/kg):
Benz[a]anthracene

Legend

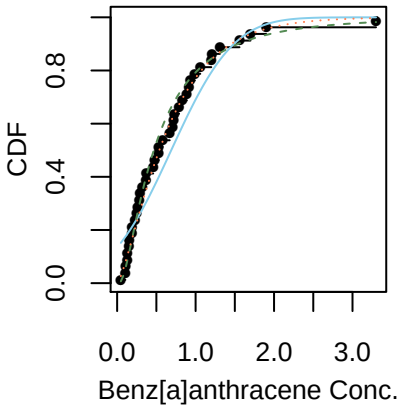
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

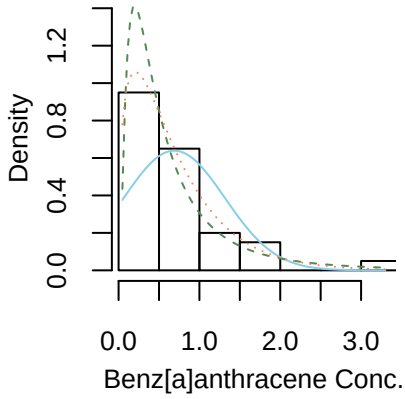


ECDF, Histogram & Q−Q (Detects Only)

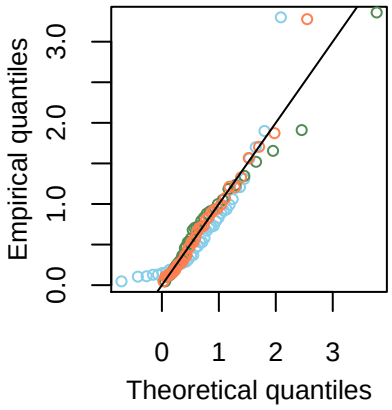
ECDF



Histogram



Q−Q



N = 40	FOD = 100%	Min (detect) = 0.047 J	Arithmetic Mean = 0.69
N (detect) = 40	SD (log detect) = 0.94	Max (detect) = 3 J	Arithmetic SD = 0.63

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.017	–	–	–	–	79.8219	83.1997
Lognormal	0.79	0.42	–	–	–	–	51.0089	54.3867
Gamma	–	–	0.07885	0.144	0.2381	0.779	51.4316	54.8094

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Benz[a]anthracene

Media:
Surface Sediment (0−15 cm)

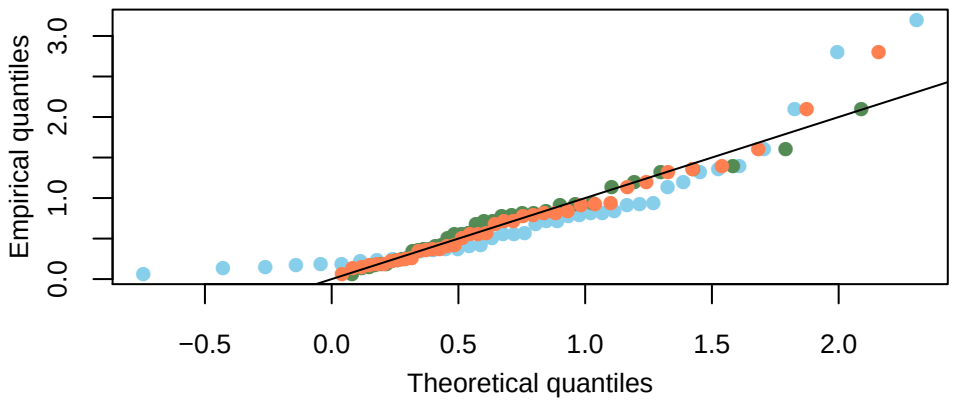
Exposure Unit:
UBC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

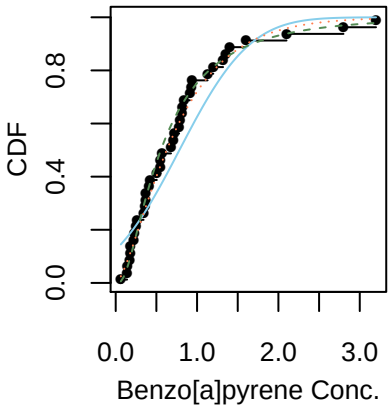
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

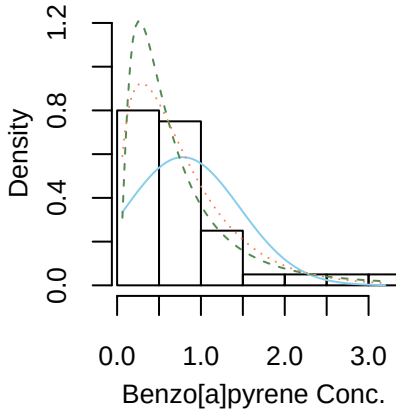


ECDF, Histogram & Q−Q (Detects Only)

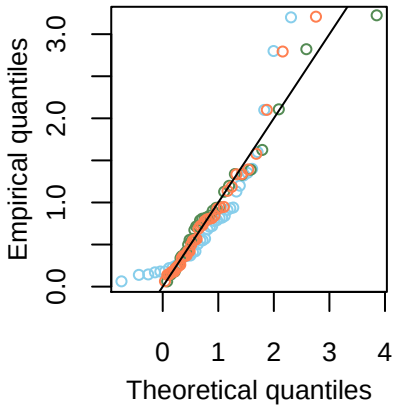
ECDF



Histogram



Q−Q



N = 40	FOD = 100%	Min (detect) = 0.063 J	Arithmetic Mean = 0.78
N (detect) = 40	SD (log detect) = 0.88	Max (detect) = 3 J	Arithmetic SD = 0.69

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.0014	–	–	–	–	86.7261	90.1039
Lognormal	0.88	0.53	–	–	–	–	58.7071	62.0849
Gamma	–	–	0.08333	0.144	0.2864	0.779	59.8409	63.2187

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Benzo[a]pyrene

Media:
Surface Sediment (0−15 cm)

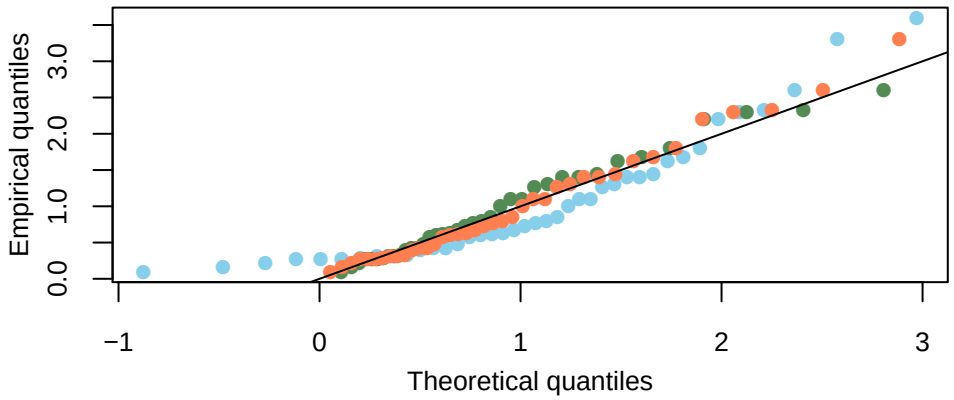
Exposure Unit:
UBC

Chemical (mg/kg):
Benzo[b]fluoranthene

Legend

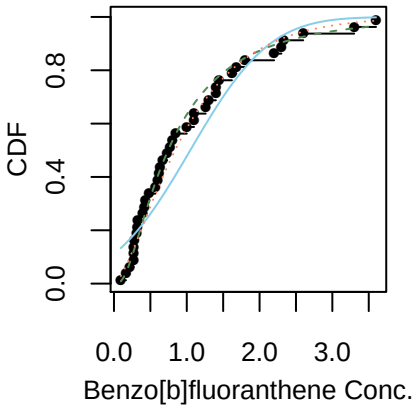
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

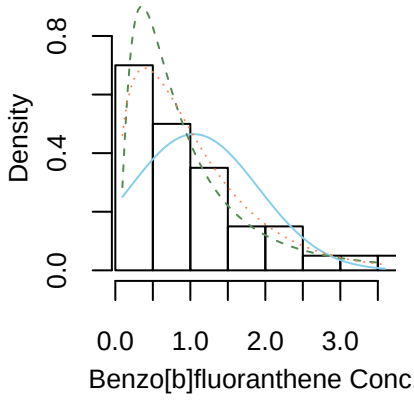


ECDF, Histogram & Q−Q (Detects Only)

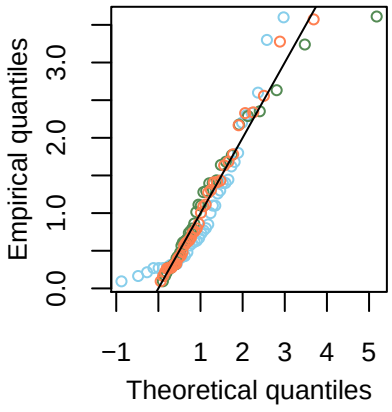
ECDF



Histogram



Q−Q



N = 40	FOD = 100%	Min (detect) = 0.094 J	Arithmetic Mean = 1
N (detect) = 40	SD (log detect) = 0.88	Max (detect) = 3 J	Arithmetic SD = 0.87

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00018	0.0077	–	–	–	–	105.285	108.663
Lognormal	0.72	0.8	–	–	–	–	82.2864	85.6641
Gamma	–	–	0.08353	0.144	0.3689	0.779	83.0845	86.4622

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Benzo[b]fluoranthene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **128**

Media:
Surface Sediment (0−15 cm)

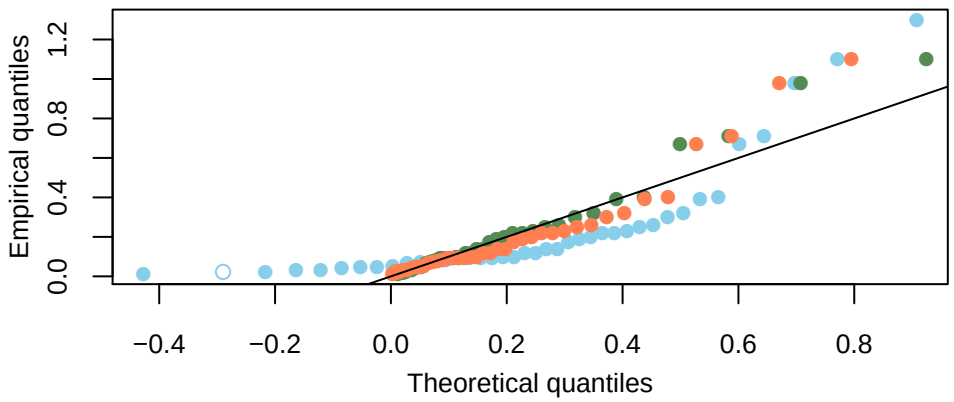
Exposure Unit:
UBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

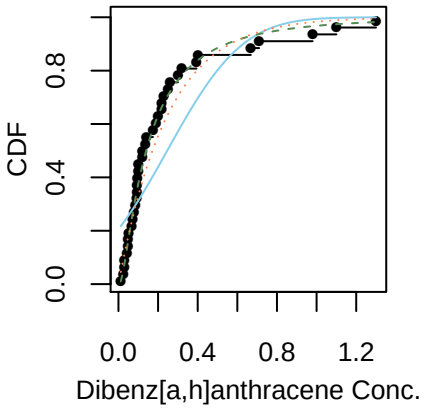
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

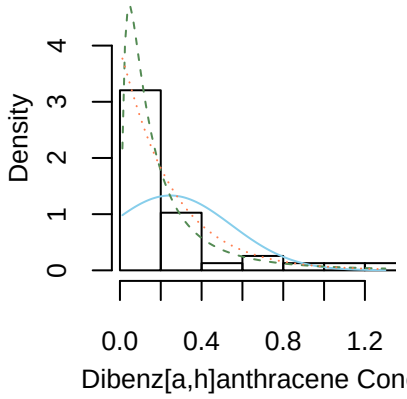


ECDF, Histogram & Q−Q (Detects Only)

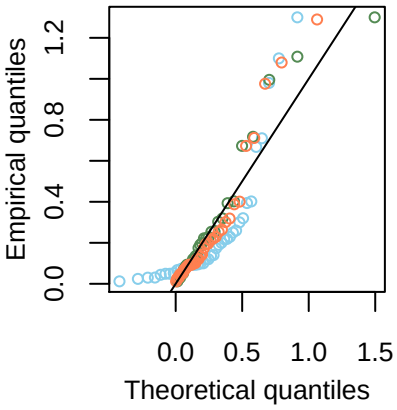
ECDF



Histogram



Q−Q



N = 40	FOD = 98%	Min (detect) = 0.012 J	Kaplan Meier Mean = 0.24
N (detect) = 39	SD (log detect) = 1.1	Max (detect) = 1 J	Kaplan Meier SD = 0.3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.2e−06	–	–	–	–	20.6202	23.998
Lognormal	0.88	0.77	–	–	–	–	−36.9143	−33.5365
Gamma	–	–	0.1313	0.148	0.9944	0.813	−30.0163	−26.6386

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−06	–	–	–	–	20.6534	23.9805
Lognormal	0.88	0.7	–	–	–	–	−34.1173	−30.7901
Gamma	–	–	0.1332	0.153	1.026	0.776	−27.3748	−24.0477

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **129**

Media:
Surface Sediment (0−15 cm)

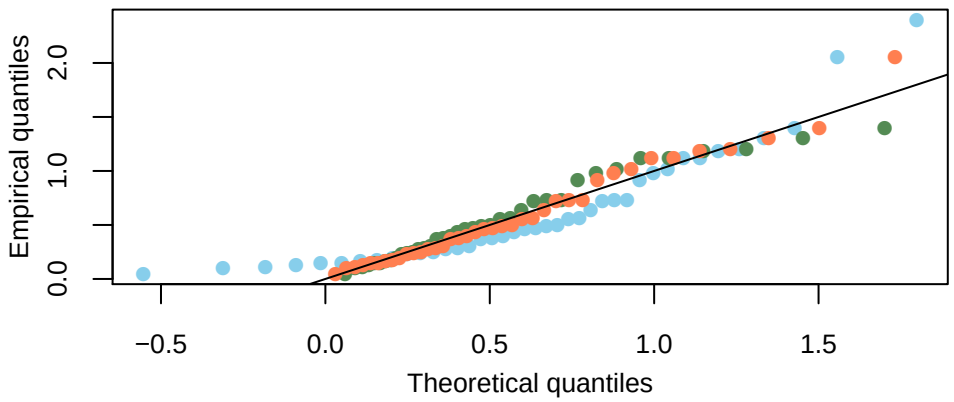
Exposure Unit:
UBC

Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

Legend

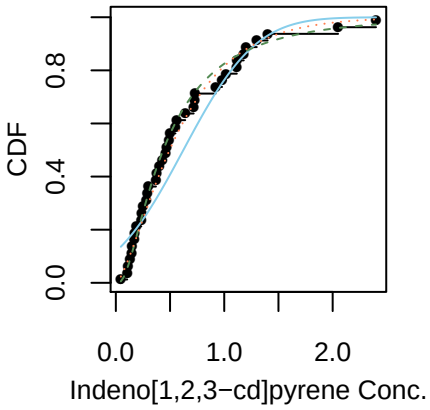
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

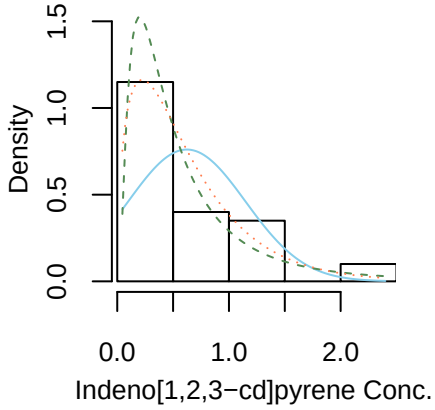


ECDF, Histogram & Q−Q (Detects Only)

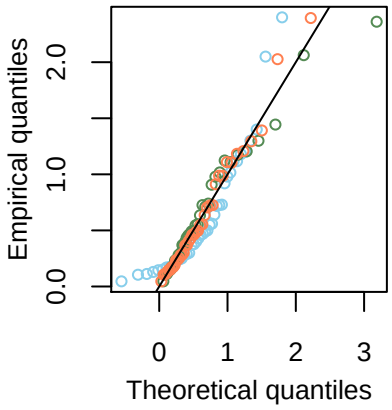
ECDF



Histogram



Q−Q



N = 40	FOD = 100%	Min (detect) = 0.046 J	Arithmetic Mean = 0.62
N (detect) = 40	SD (log detect) = 0.9	Max (detect) = 2 J	Arithmetic SD = 0.53

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	8e−05	0.0043	–	–	–	–	65.9183	69.2961
Lognormal	0.84	0.87	–	–	–	–	41.5958	44.9736
Gamma	–	–	0.07688	0.144	0.2853	0.779	41.9848	45.3626

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Indeno[1,2,3−cd]pyrene

Media:
Surface Sediment (0−15 cm)

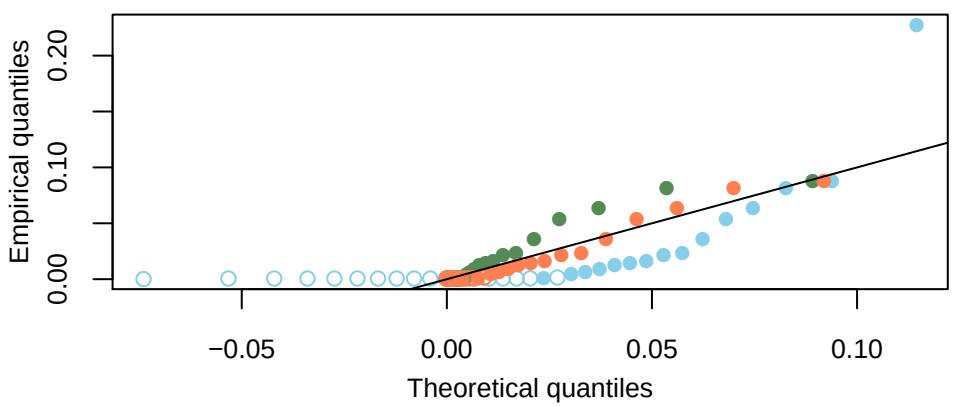
Exposure Unit:
UBC

Chemical (mg/kg):
Aldrin

Legend

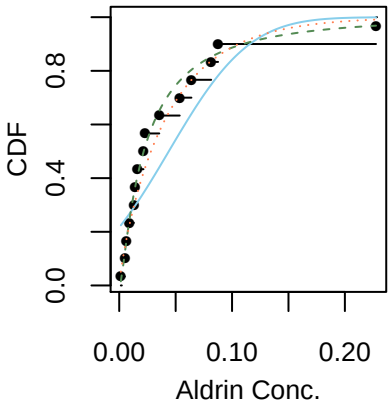
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

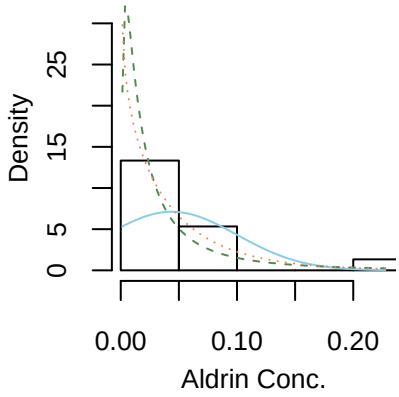


ECDF, Histogram & Q−Q (Detects Only)

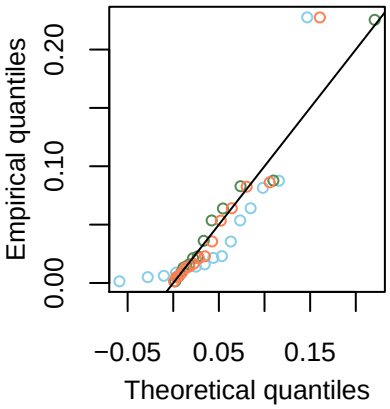
ECDF



Histogram



Q−Q



N = 33	FOD = 45%	Min (detect) = 0.0014 J	Kaplan Meier Mean = 0.02
N (detect) = 15	SD (log detect) = 1.3	Max (detect) = 0.23 J	Kaplan Meier SD = 0.044

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.3e−09	–	–	–	–	−109.238	−106.245
Lognormal	0.00017	1.8e−06	–	–	–	–	−238.091	−235.098
Gamma	–	–	0.2735	0.1775	2.908	0.9039	−224.618	−221.625

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−04	0.019	–	–	–	–	−39.8618	−38.4457
Lognormal	1	0.99	–	–	–	–	−61.3131	−59.897
Gamma	–	–	0.1601	0.234	0.2901	0.793	−60.1006	−58.6845

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Aldrin

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **131**

Media:
Surface Sediment (0−15 cm)

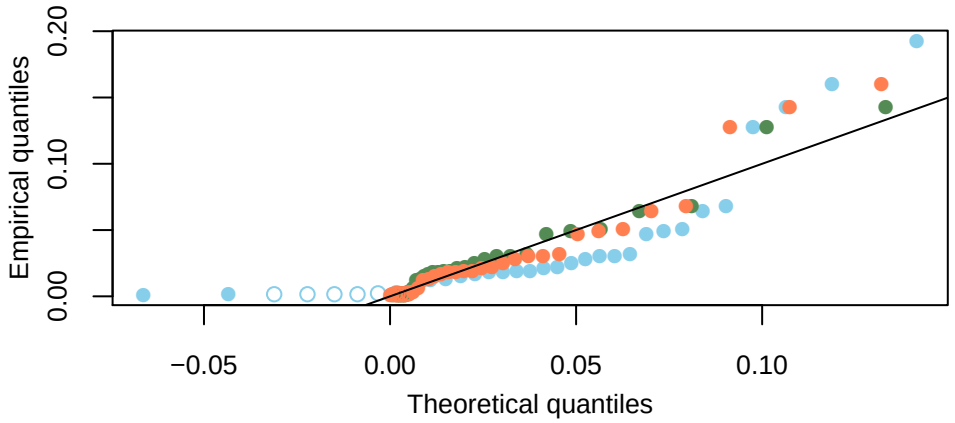
Exposure Unit:
UBC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

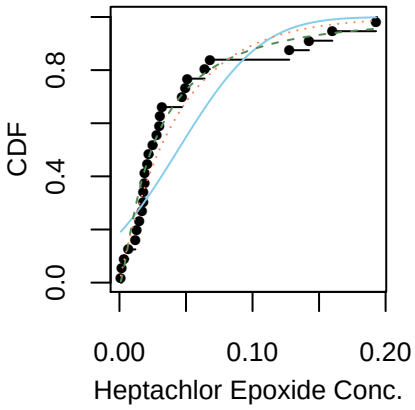
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

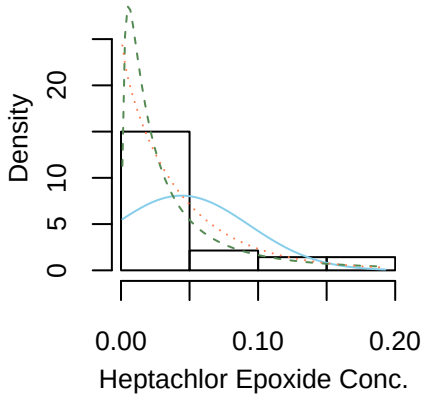


ECDF, Histogram & Q−Q (Detects Only)

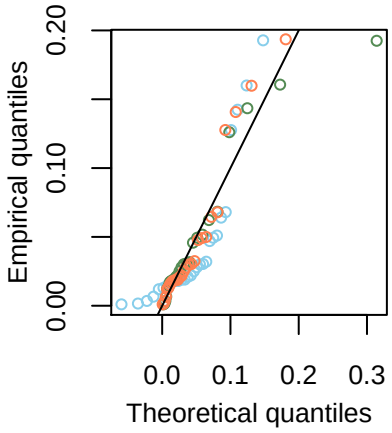
ECDF



Histogram



Q−Q



N = 33	FOD = 85%	Min (detect) = 0.001 J	Kaplan Meier Mean = 0.037
N (detect) = 28	SD (log detect) = 1.2	Max (detect) = 0.19 J	Kaplan Meier SD = 0.048

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1e−06	–	–	–	–	−102.804	−99.8106
Lognormal	0.031	0.056	–	–	–	–	−149.2	−146.207
Gamma	–	–	0.1208	0.169	0.6487	0.809	−149.311	−146.318

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	1e−05	–	–	–	–	−84.9755	−82.311
Lognormal	0.12	0.13	–	–	–	–	−113.971	−111.307
Gamma	–	–	0.1569	0.184	0.6425	0.807	−114.853	−112.188

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−Heptachlor Epoxide

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **132**

Media:
Surface Sediment (0−15 cm)

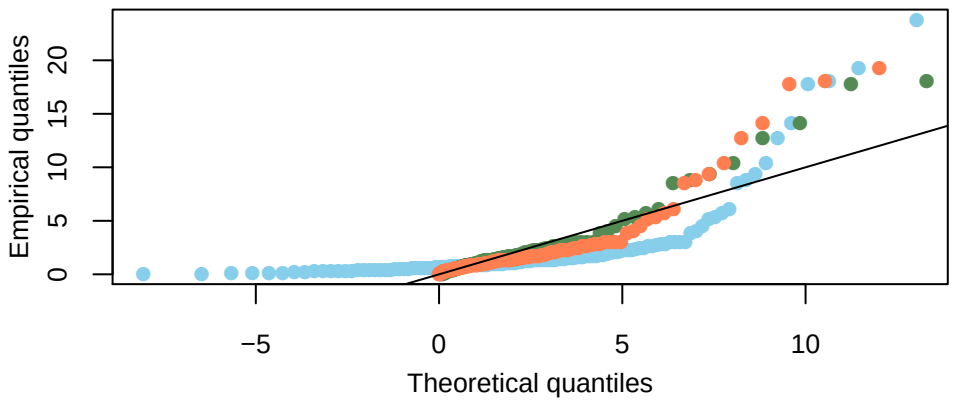
Exposure Unit:
UBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

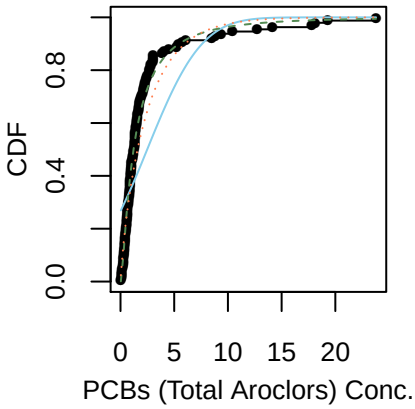
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

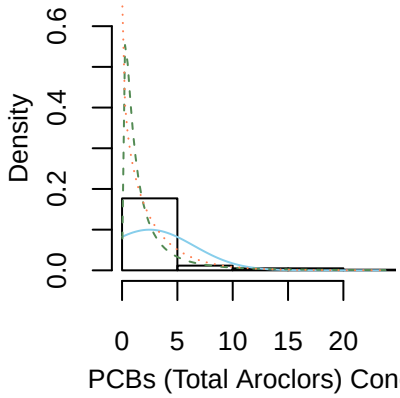


ECDF, Histogram & Q−Q (Detects Only)

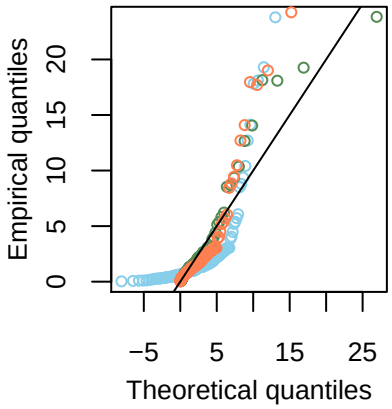
ECDF



Histogram



Q−Q



N = 121	FOD = 100%	Min (detect) = 0.03 J	Arithmetic Mean = 2
N (detect) = 121	SD (log detect) = 1.2	Max (detect) = 24 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.5e−31	–	–	–	–	682.536	688.127
Lognormal	0.095	0.071	–	–	–	–	433.003	438.594
Gamma	–	–	0.1489	0.095	4.403	0.818	463.259	468.85

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in UBC−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **133**

Media:
Surface Sediment (0−15 cm)

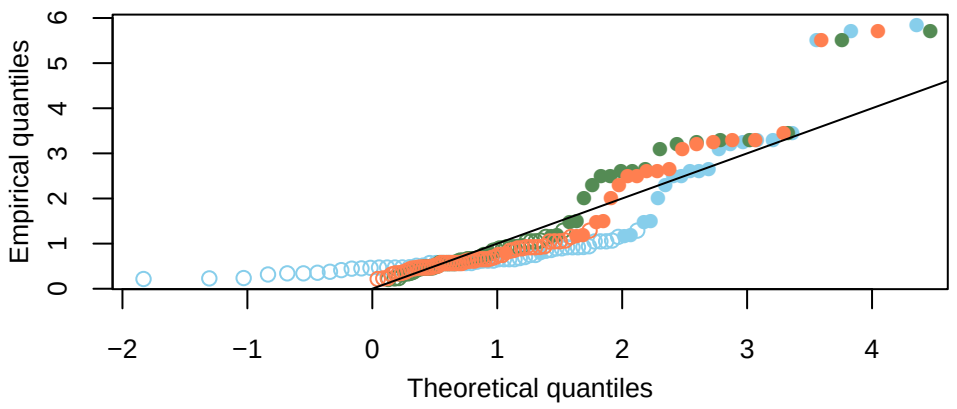
Exposure Unit:
MBC

Chemical (mg/kg):
Antimony

Legend

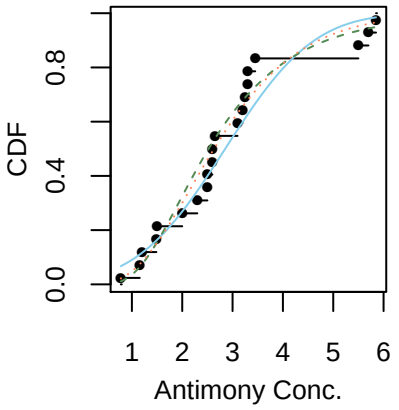
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

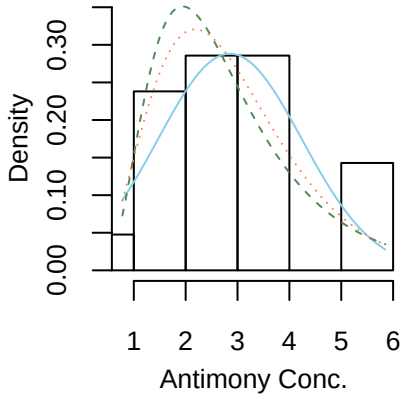


ECDF, Histogram & Q−Q (Detects Only)

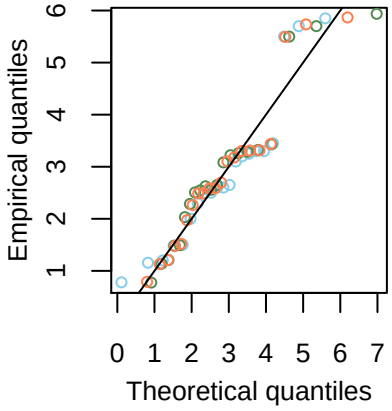
ECDF



Histogram



Q−Q



N = 80	FOD = 26%	Min (detect) = 0.78 J	Kaplan Meier Mean = 1
N (detect) = 21	SD (log detect) = 0.53	Max (detect) = 5 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.1e−14	–	–	–	–	250.387	255.022
Lognormal	0.0012	0.0044	–	–	–	–	163.334	167.969
Gamma	–	–	0.1857	0.11	3.635	0.78	180.642	185.277

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.032	0.038	–	–	–	–	77.2555	79.3446
Lognormal	0.3	0.17	–	–	–	–	74.484	76.5731
Gamma	–	–	0.1437	0.192	0.4596	0.754	73.8582	75.9472

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Antimony

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **134**

Media:
Surface Sediment (0−15 cm)

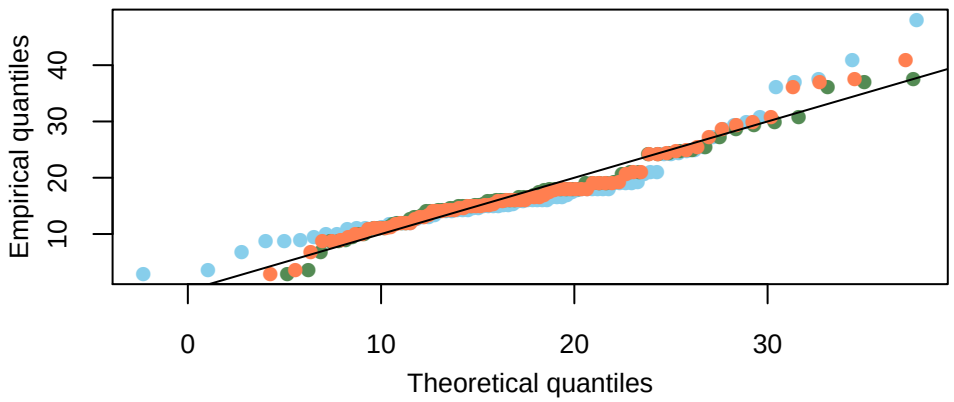
Exposure Unit:
MBC

Chemical (mg/kg):
Arsenic

Legend

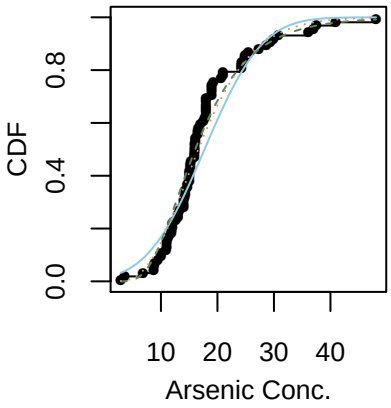
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

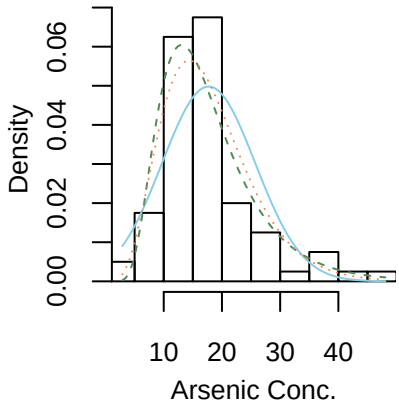


ECDF, Histogram & Q−Q (Detects Only)

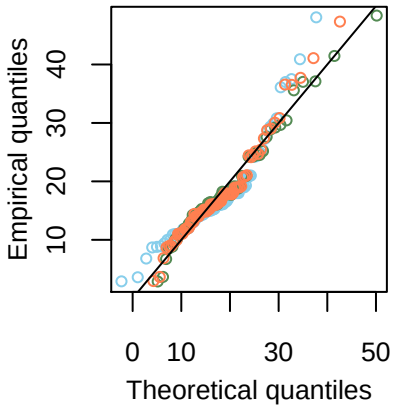
ECDF



Histogram



Q−Q



N = 80	FOD = 100%	Min (detect) = 2	Arithmetic Mean = 18
N (detect) = 80	SD (log detect) = 0.46	Max (detect) = 48 J	Arithmetic SD = 8

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.7e−07	–	–	–	–	563.953	568.717
Lognormal	0.00089	0.023	–	–	–	–	549.557	554.321
Gamma	–	–	0.1293	0.1	1.318	0.754	546.876	551.64

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Arsenic

Media:
Surface Sediment (0−15 cm)

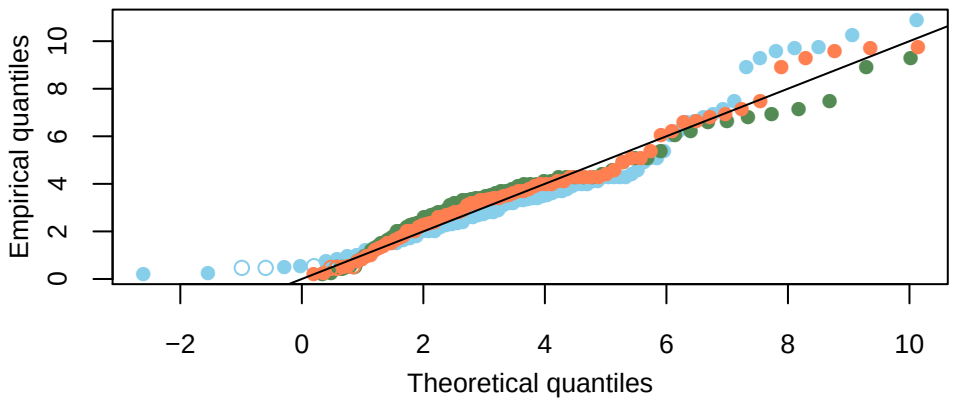
Exposure Unit:
MBC

Chemical (mg/kg):
Cadmium

Legend

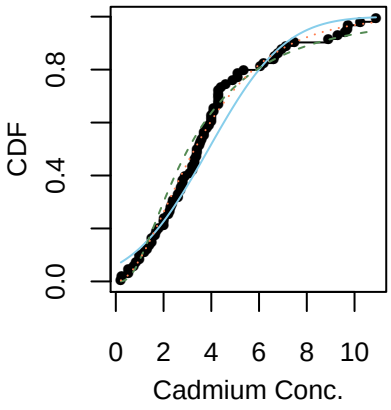
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

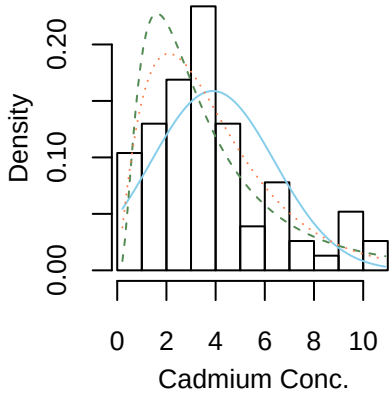


ECDF, Histogram & Q−Q (Detects Only)

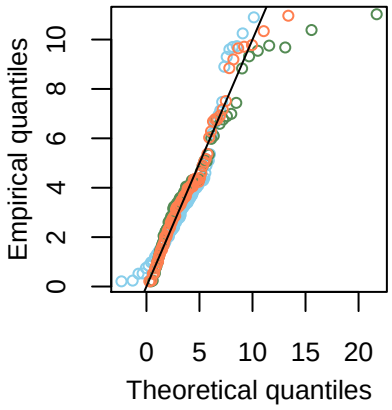
ECDF



Histogram



Q−Q



N = 80	FOD = 96%	Min (detect) = 0.21 J	Kaplan Meier Mean = 3
N (detect) = 77	SD (log detect) = 0.8	Max (detect) = 11	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	5e−05	7.2e−05	–	–	–	–	380.664	385.428
Lognormal	0.00033	0.0043	–	–	–	–	371.68	376.444
Gamma	–	–	0.0744	0.103	0.5588	0.782	359.362	364.126

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	6e−05	3.2e−05	–	–	–	–	364.384	369.072
Lognormal	0.00039	0.017	–	–	–	–	357.434	362.122
Gamma	–	–	0.08007	0.108	0.4677	0.763	345.617	350.304

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Cadmium

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
MBC
Chemical (mg/kg):
Chromium (VI)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 45	Arithmetic Mean = 45
N (detect) = 1	SD (log detect) = 0	Max (detect) = 45	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Chromium (VI)

Media:
Surface Sediment (0−15 cm)

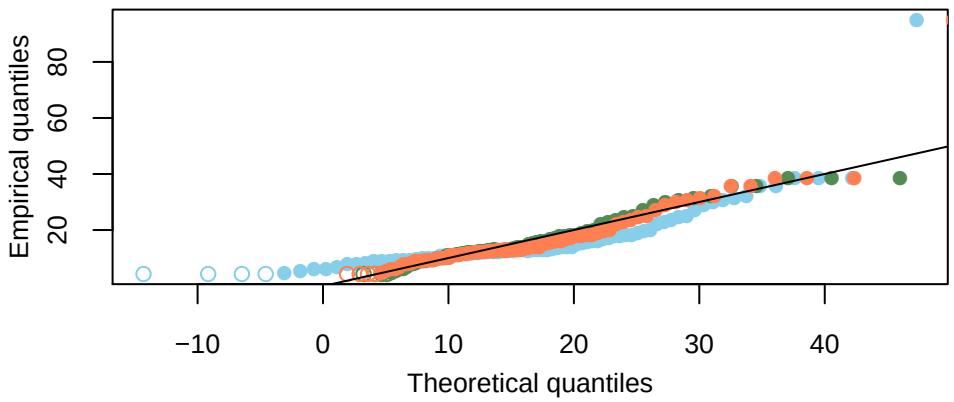
Exposure Unit:
MBC

Chemical (mg/kg):
Cobalt

Legend

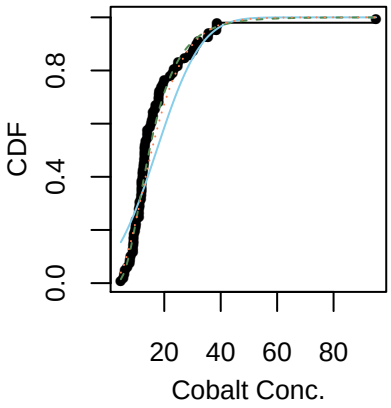
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

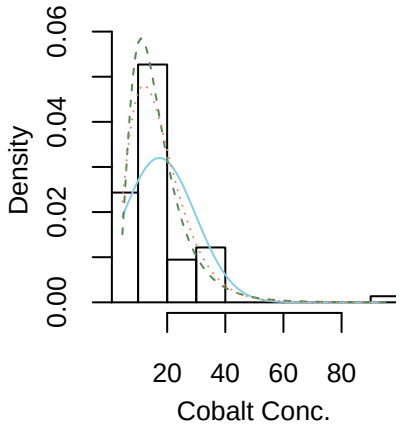


ECDF, Histogram & Q−Q (Detects Only)

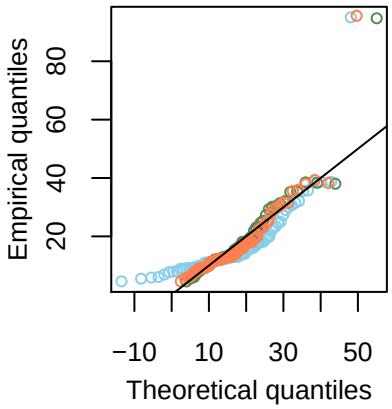
ECDF



Histogram



Q−Q



N = 80	FOD = 92%	Min (detect) = 4 J	Kaplan Meier Mean = 16
N (detect) = 74	SD (log detect) = 0.54	Max (detect) = 95 J	Kaplan Meier SD = 13

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.3e−08	–	–	–	–	633.117	637.881
Lognormal	0.056	0.043	–	–	–	–	563.403	568.167
Gamma	–	–	0.1422	0.101	1.544	0.763	574.546	579.31

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.5e−08	–	–	–	–	587.368	591.976
Lognormal	0.04	0.012	–	–	–	–	519.155	523.763
Gamma	–	–	0.1526	0.108	1.854	0.763	532.355	536.963

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Cobalt

Media:
Surface Sediment (0−15 cm)

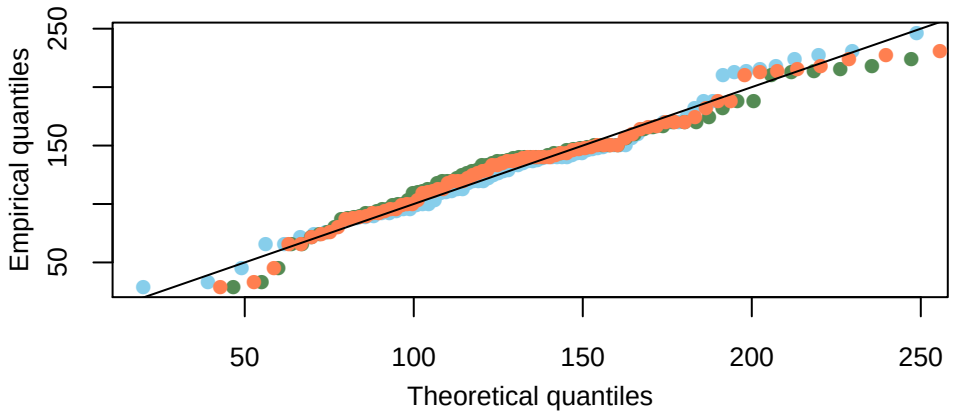
Exposure Unit:
MBC

Chemical (mg/kg):
Copper

Legend

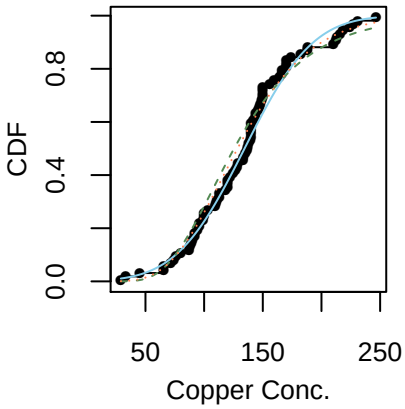
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

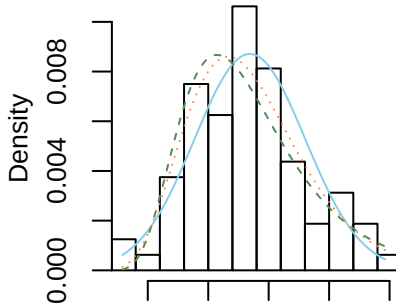


ECDF, Histogram & Q−Q (Detects Only)

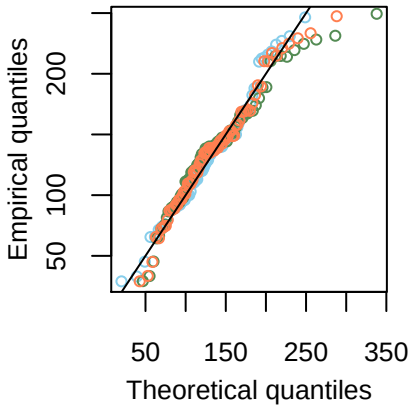
ECDF



Histogram



Q−Q



N = 80	FOD = 100%	Min (detect) = 29	Arithmetic Mean = 130
N (detect) = 80	SD (log detect) = 0.4	Max (detect) = 250 J	Arithmetic SD = 46

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.28	0.028	–	–	–	–	842.908	847.672
Lognormal	0.00012	0.023	–	–	–	–	856.227	860.991
Gamma	–	–	0.08702	0.1	0.7036	0.754	847.069	851.833

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Copper

Media:
Surface Sediment (0−15 cm)

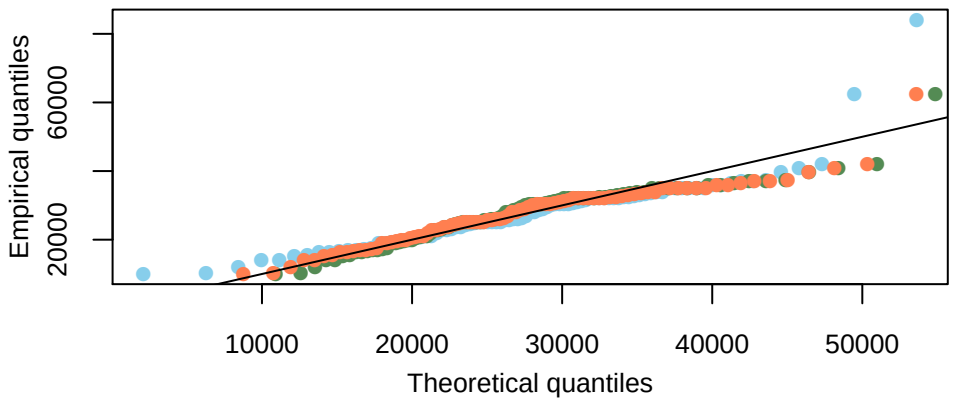
Exposure Unit:
MBC

Chemical (mg/kg):
Iron

Legend

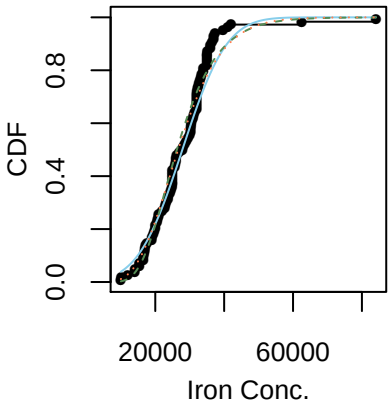
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

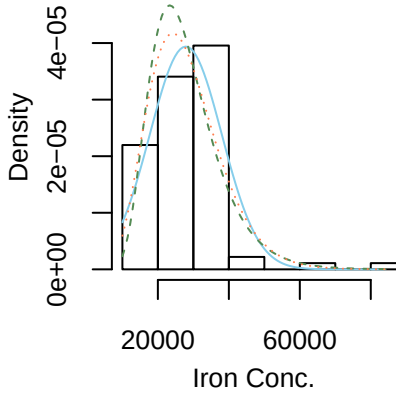


ECDF, Histogram & Q−Q (Detects Only)

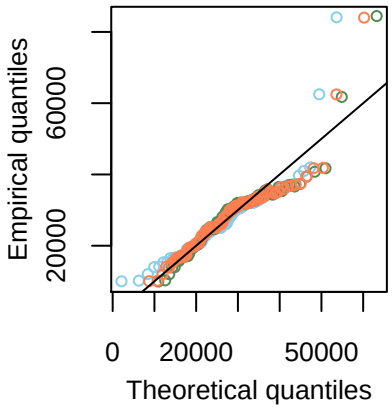
ECDF



Histogram



Q−Q



N = 91	FOD = 100%	Min (detect) = 10,000	Arithmetic Mean = 28,000
N (detect) = 91	SD (log detect) = 0.35	Max (detect) = 84,000 J	Arithmetic SD = 10,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.0026	–	–	–	–	1940.9	1945.92
Lognormal	0.0029	0.026	–	–	–	–	1920.83	1925.85
Gamma	–	–	0.1113	0.094	1.417	0.755	1922.45	1927.48

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Iron

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **140**

Media:
Surface Sediment (0−15 cm)

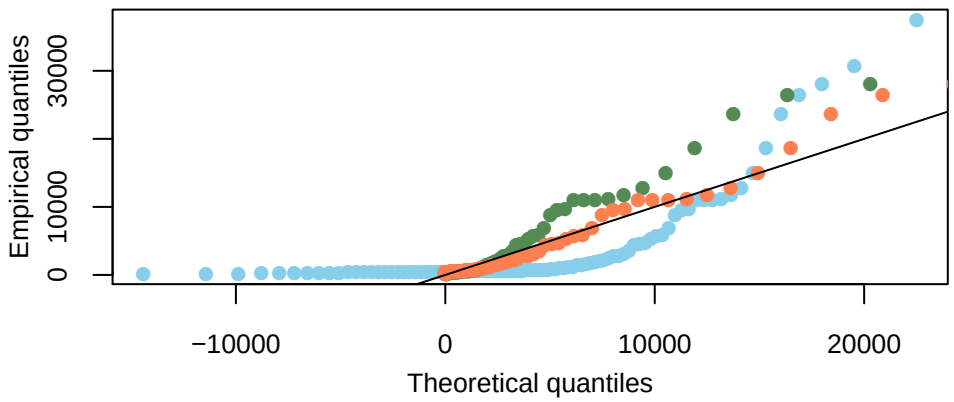
Exposure Unit:
MBC

Chemical (mg/kg):
Manganese

Legend

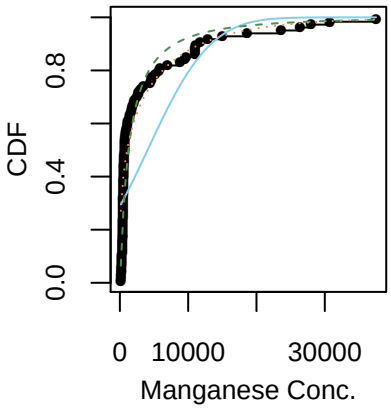
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

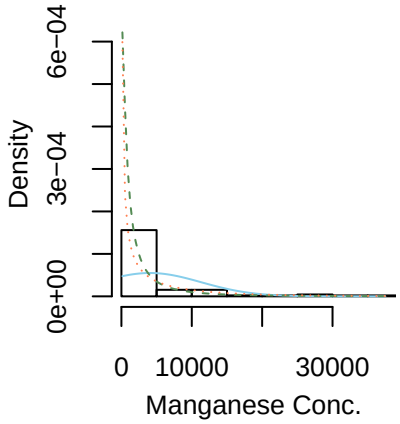


ECDF, Histogram & Q−Q (Detects Only)

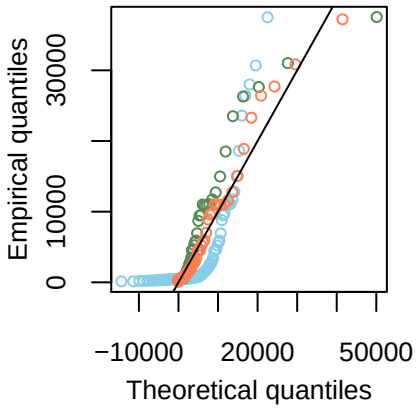
ECDF



Histogram



Q−Q



N = 91	FOD = 100%	Min (detect) = 140	Arithmetic Mean = 4,100
N (detect) = 91	SD (log detect) = 1.5	Max (detect) = 38,000 J	Arithmetic SD = 7,300

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.7e−22	–	–	–	–	1880.26	1885.28
Lognormal	0	1.3e−08	–	–	–	–	1629.01	1634.03
Gamma	–	–	0.277	0.1043	7.703	0.9159	1684.64	1689.66

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Manganese

Media:
Surface Sediment (0−15 cm)

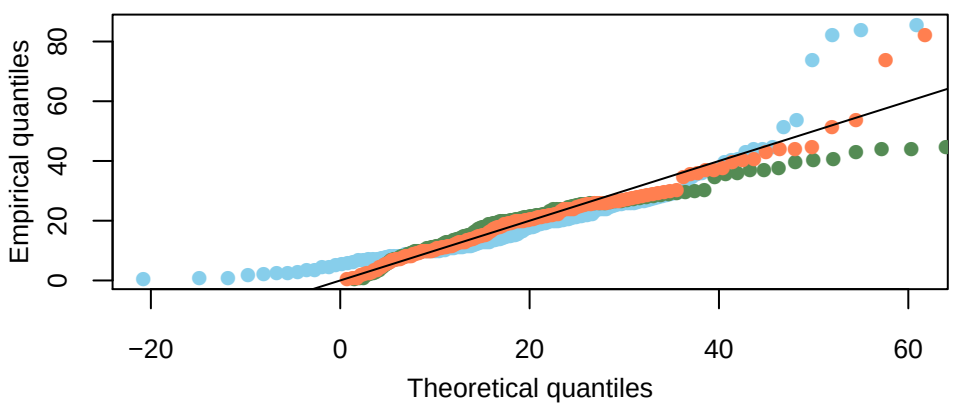
Exposure Unit:
MBC

Chemical (mg/kg):
Mercury

Legend

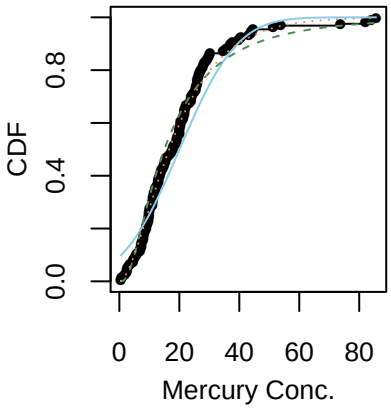
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

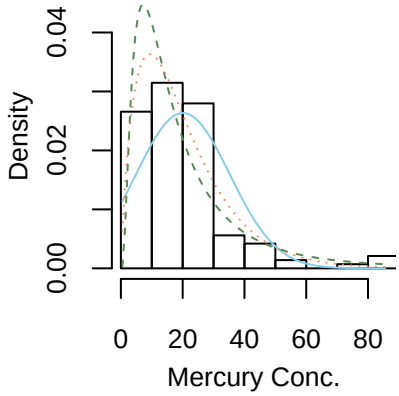


ECDF, Histogram & Q−Q (Detects Only)

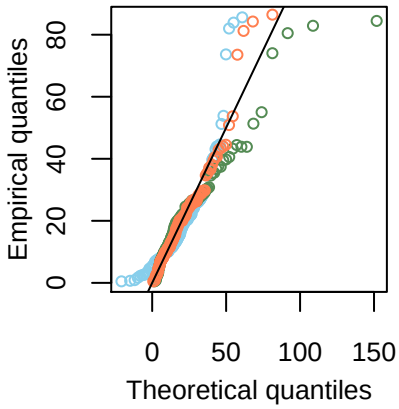
ECDF



Histogram



Q−Q



N = 143	FOD = 100%	Min (detect) = 0.49	Arithmetic Mean = 20
N (detect) = 143	SD (log detect) = 0.86	Max (detect) = 86	Arithmetic SD = 15

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	8.6e−06	–	–	–	–	1187	1192.92
Lognormal	0	0.013	–	–	–	–	1140.57	1146.5
Gamma	–	–	0.06838	0.092	0.7096	0.783	1119.96	1125.88

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **142**

Media:
Surface Sediment (0−15 cm)

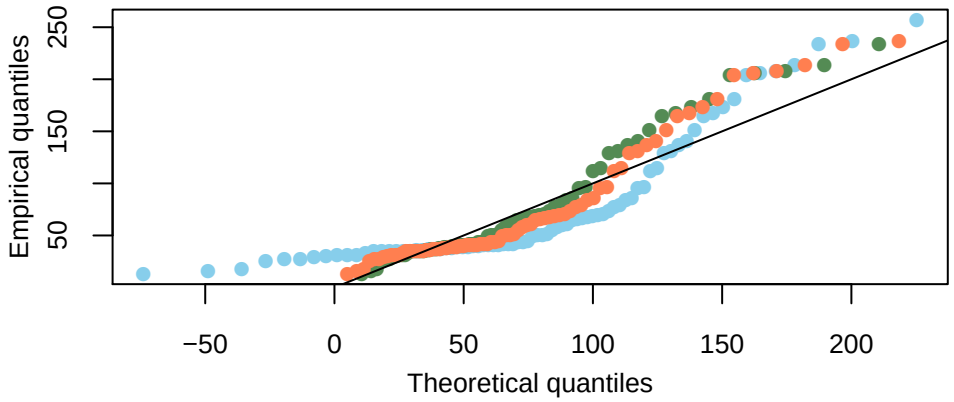
Exposure Unit:
MBC

Chemical (mg/kg):
Nickel

Legend

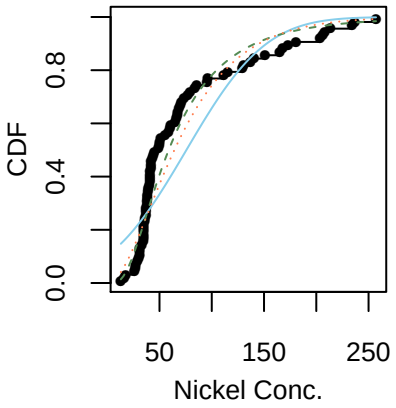
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

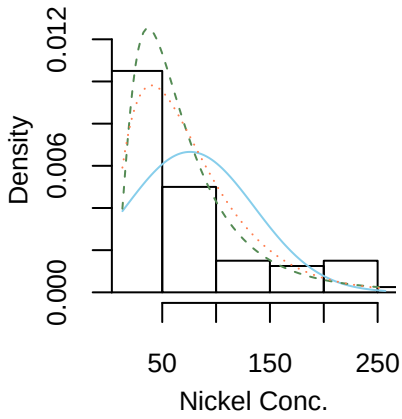


ECDF, Histogram & Q−Q (Detects Only)

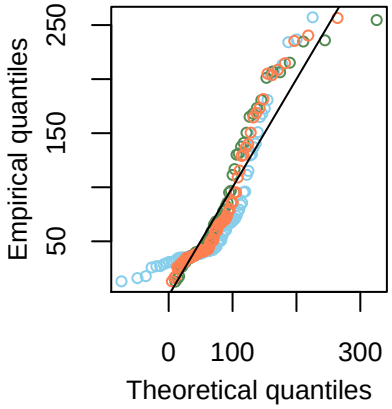
ECDF



Histogram



Q−Q



N = 80	FOD = 100%	Min (detect) = 13	Arithmetic Mean = 76
N (detect) = 80	SD (log detect) = 0.69	Max (detect) = 260 J	Arithmetic SD = 60

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.3e−10	–	–	–	–	885.845	890.609
Lognormal	0.00064	0.00011	–	–	–	–	822.389	827.153
Gamma	–	–	0.177	0.101	3.561	0.763	834.921	839.685

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

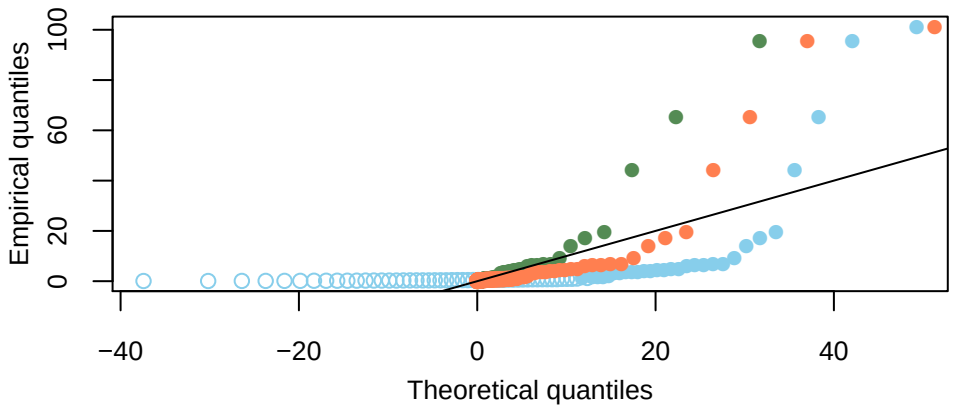
DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Nickel

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
MBC
Chemical (mg/kg):
Thallium

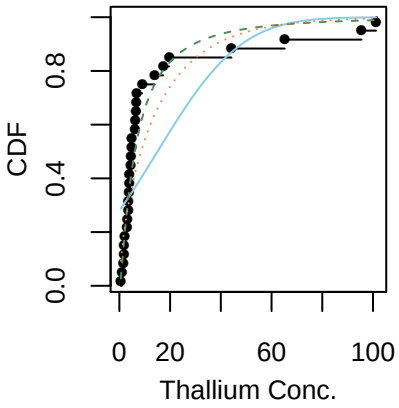
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

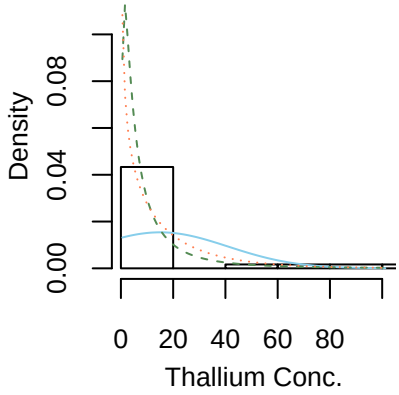


ECDF, Histogram & Q−Q (Detects Only)

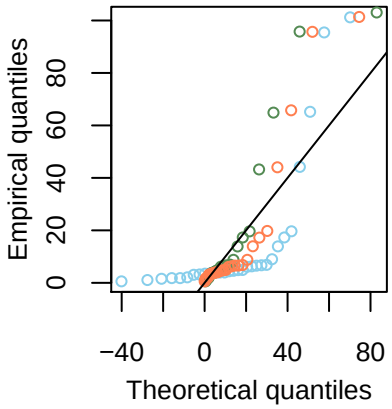
ECDF



Histogram



Q−Q



N = 80	FOD = 38%	Min (detect) = 0.57 J	Kaplan Meier Mean = 6
N (detect) = 30	SD (log detect) = 1.3	Max (detect) = 100 J	Kaplan Meier SD = 17

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.7e−32	–	–	–	–	687.715	692.479
Lognormal	0.00058	0.00024	–	–	–	–	322.505	327.269
Gamma	–	–	0.2462	0.1111	7.305	0.9148	376.799	381.563

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	9.3e−11	–	–	–	–	284.411	287.214
Lognormal	0.044	0.0052	–	–	–	–	209.691	212.494
Gamma	–	–	0.2893	0.169	2.535	0.809	222.889	225.691

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Thallium

Media:
Surface Sediment (0−15 cm)

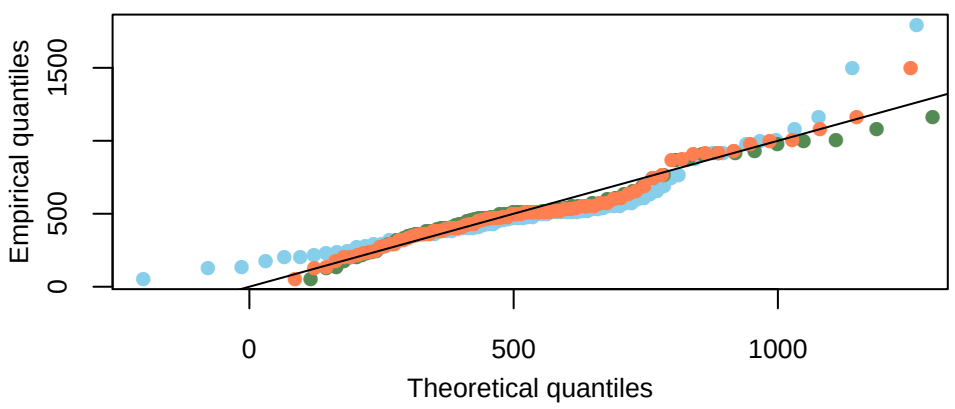
Exposure Unit:
MBC

Chemical (mg/kg):
Zinc

Legend

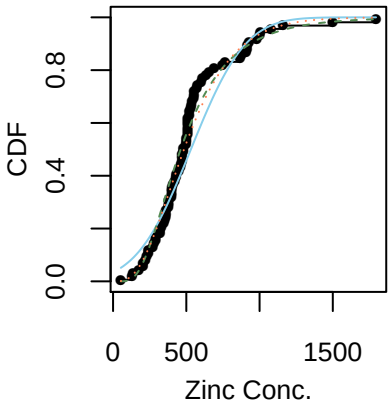
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

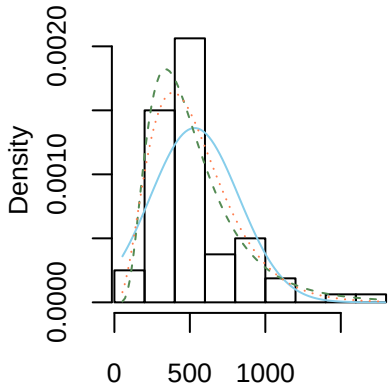


ECDF, Histogram & Q−Q (Detects Only)

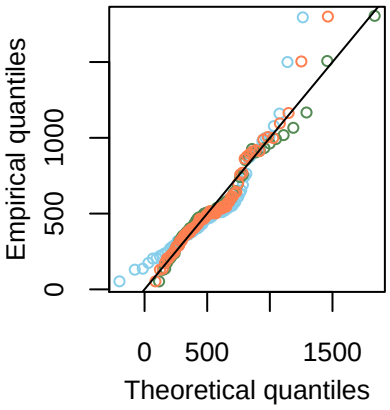
ECDF



Histogram



Q−Q



N = 80	FOD = 100%	Min (detect) = 53	Arithmetic Mean = 530
N (detect) = 80	SD (log detect) = 0.56	Max (detect) = 1,800 J	Arithmetic SD = 290

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.5e−08	–	–	–	–	1139.81	1144.58
Lognormal	0.0084	0.052	–	–	–	–	1117.75	1122.51
Gamma	–	–	0.1273	0.101	0.9995	0.763	1115.04	1119.81

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Zinc

Media:
Surface Sediment (0−15 cm)

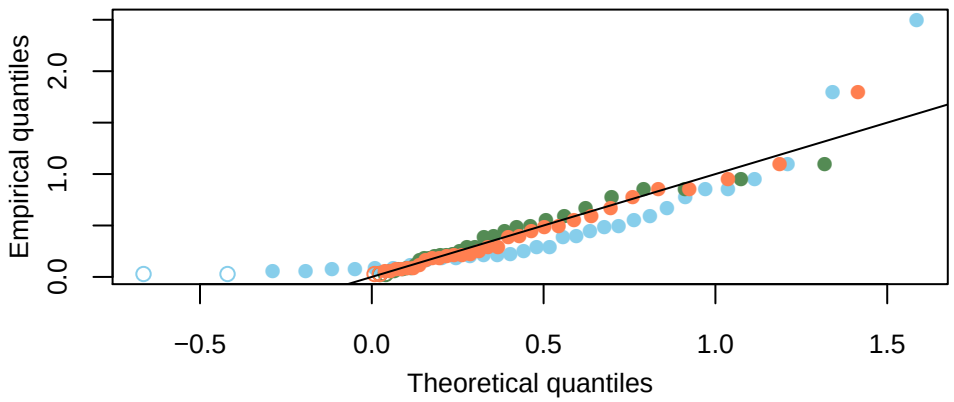
Exposure Unit:
MBC

Chemical (mg/kg):
Benz[a]anthracene

Legend

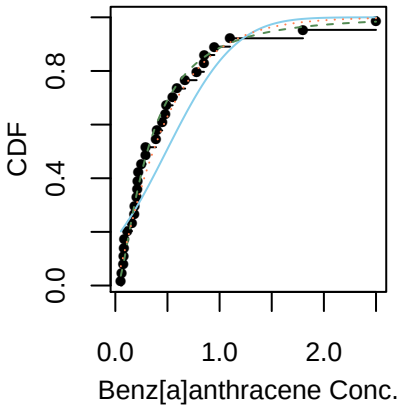
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

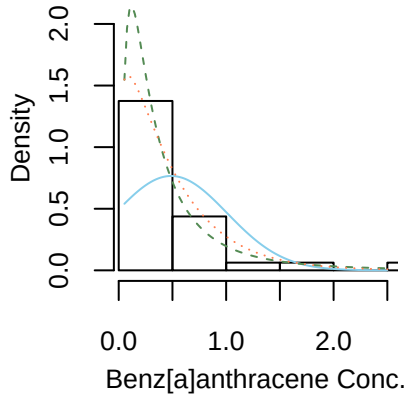


ECDF, Histogram & Q−Q (Detects Only)

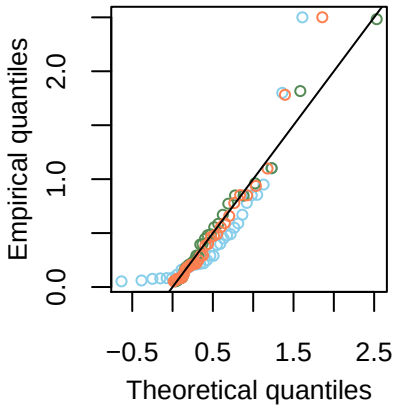
ECDF



Histogram



Q−Q



N = 34	FOD = 94%	Min (detect) = 0.053 J	Kaplan Meier Mean = 0.46
N (detect) = 32	SD (log detect) = 1	Max (detect) = 2 J	Kaplan Meier SD = 0.52

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00091	–	–	–	–	55.5852	58.6379
Lognormal	0.83	0.86	–	–	–	–	17.185	20.2377
Gamma	–	–	0.09967	0.165	0.3223	0.775	19.2972	22.3499

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.0014	–	–	–	–	53.0578	55.9893
Lognormal	0.74	0.79	–	–	–	–	17.8077	20.7392
Gamma	–	–	0.1146	0.165	0.4372	0.775	21.3856	24.3171

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Benz[a]anthracene

Media:
Surface Sediment (0−15 cm)

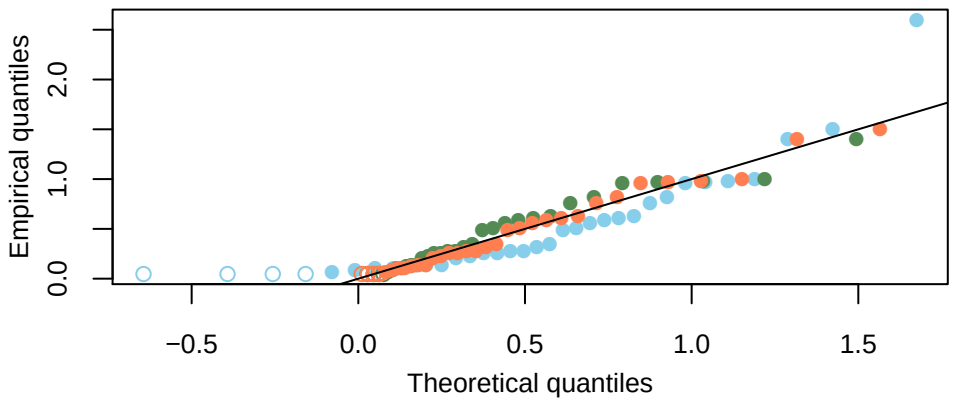
Exposure Unit:
MBC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

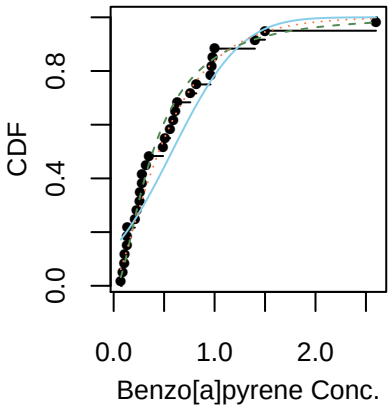
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

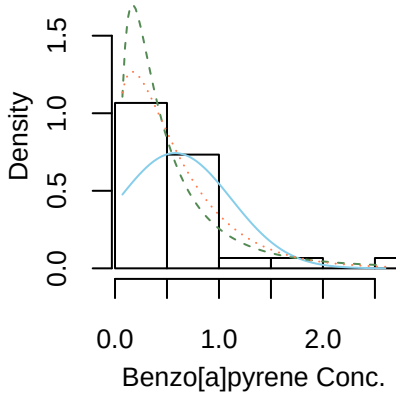


ECDF, Histogram & Q−Q (Detects Only)

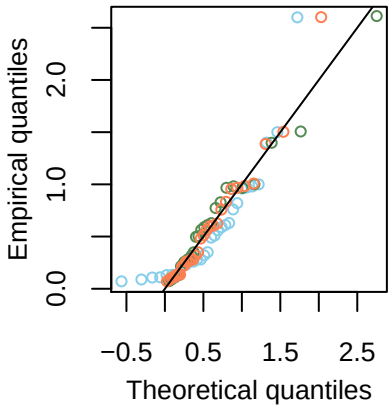
ECDF



Histogram



Q−Q



N = 34	FOD = 88%	Min (detect) = 0.071	Kaplan Meier Mean = 0.51
N (detect) = 30	SD (log detect) = 0.94	Max (detect) = 2 J	Kaplan Meier SD = 0.54

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−05	0.0025	–	–	–	–	57.6507	60.7034
Lognormal	0.23	0.41	–	–	–	–	25.8053	28.858
Gamma	–	–	0.1094	0.165	0.3768	0.775	26.8389	29.8917

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	6e−05	0.018	–	–	–	–	51.8259	54.6283
Lognormal	0.61	0.56	–	–	–	–	27.4226	30.225
Gamma	–	–	0.1138	0.165	0.3681	0.775	29.2034	32.0058

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Benzo[a]pyrene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **147**

Media:
Surface Sediment (0−15 cm)

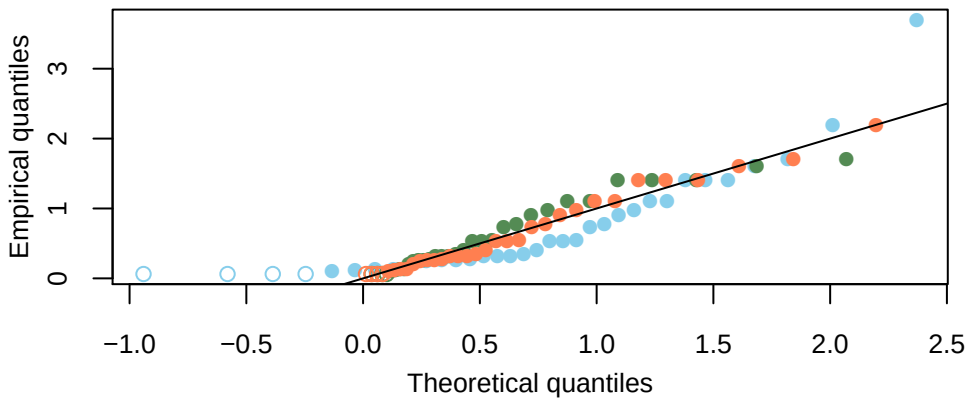
Exposure Unit:
MBC

Chemical (mg/kg):
Benzo[b]fluoranthene

Legend

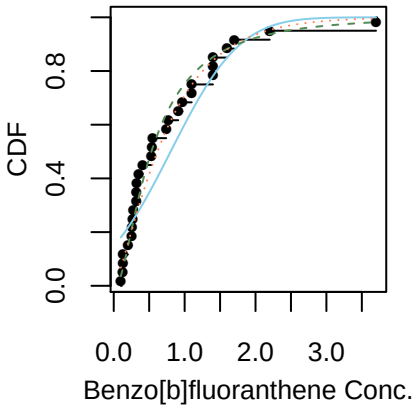
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

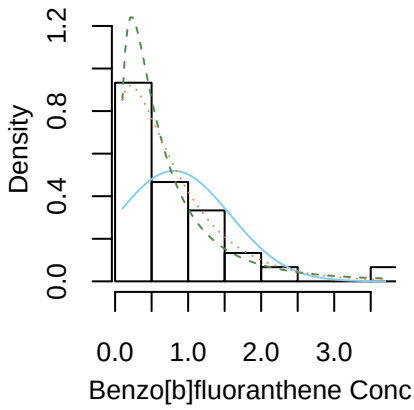


ECDF, Histogram & Q−Q (Detects Only)

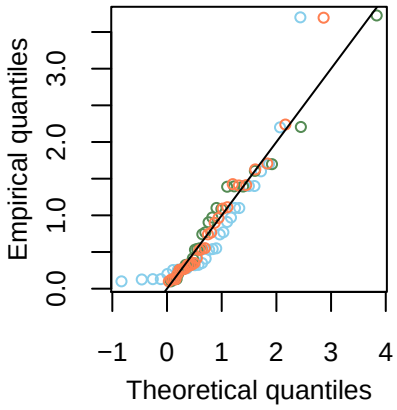
ECDF



Histogram



Q−Q



N = 34	FOD = 88%	Min (detect) = 0.1	Kaplan Meier Mean = 0.71
N (detect) = 30	SD (log detect) = 0.94	Max (detect) = 3 J	Kaplan Meier SD = 0.77

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.0011	–	–	–	–	81.8505	84.9032
Lognormal	0.27	0.8	–	–	–	–	47.5557	50.6084
Gamma	–	–	0.1216	0.165	0.4365	0.775	49.1965	52.2492

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	4e−05	0.0057	–	–	–	–	73.3421	76.1445
Lognormal	0.56	0.56	–	–	–	–	46.7468	49.5492
Gamma	–	–	0.1403	0.165	0.4921	0.775	49.247	52.0494

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Benzo[b]fluoranthene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **148**

Media:
Surface Sediment (0−15 cm)

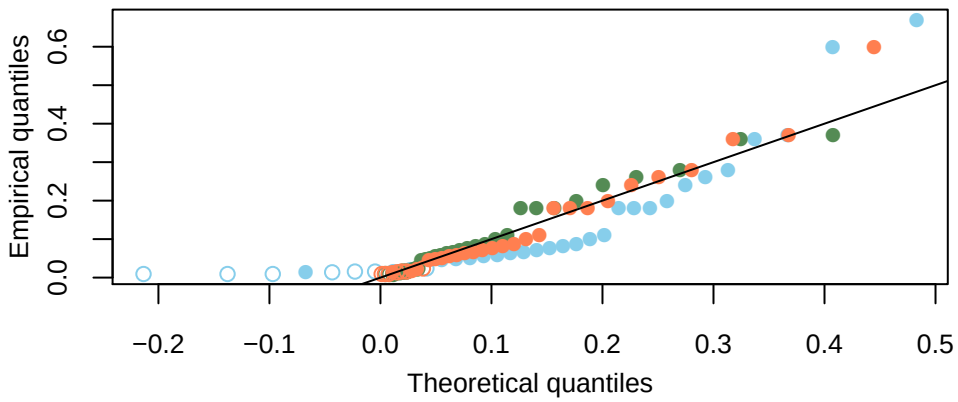
Exposure Unit:
MBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

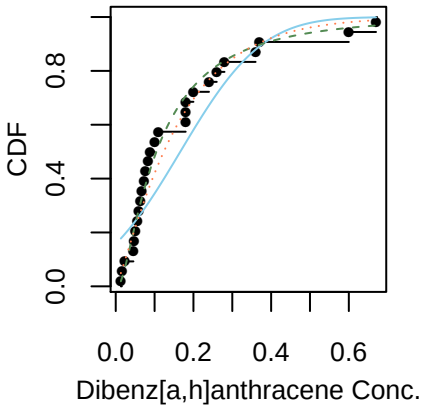
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

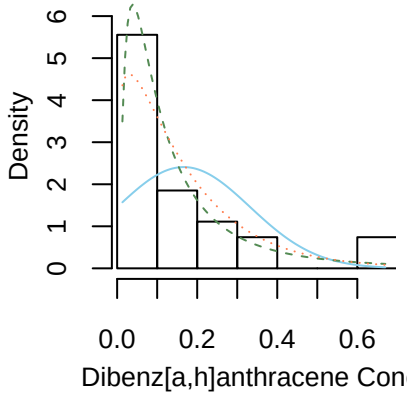


ECDF, Histogram & Q−Q (Detects Only)

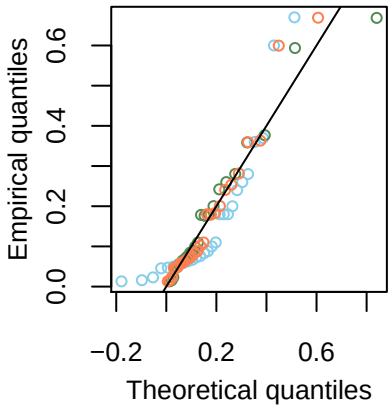
ECDF



Histogram



Q−Q



N = 34	FOD = 79%	Min (detect) = 0.013 J	Kaplan Meier Mean = 0.13
N (detect) = 27	SD (log detect) = 1	Max (detect) = 0.67 J	Kaplan Meier SD = 0.16

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4e−05	–	–	–	–	−24.1591	−21.1064
Lognormal	0.18	0.34	–	–	–	–	−67.8129	−64.7602
Gamma	–	–	0.1169	0.169	0.6122	0.809	−64.7253	−61.6725

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	7e−05	0.0013	–	–	–	–	−16.4791	−13.8874
Lognormal	0.71	0.55	–	–	–	–	−41.3058	−38.7141
Gamma	–	–	0.1435	0.18	0.4994	0.773	−39.5257	−36.934

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **149**

Media:
Surface Sediment (0−15 cm)

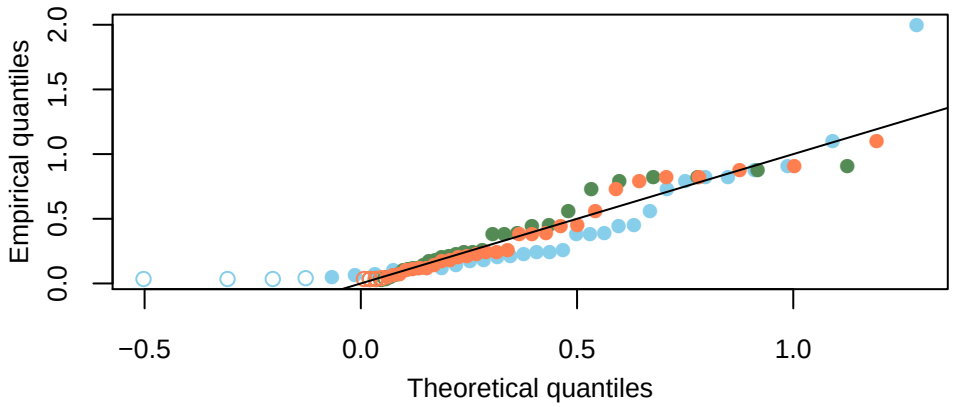
Exposure Unit:
MBC

Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

Legend

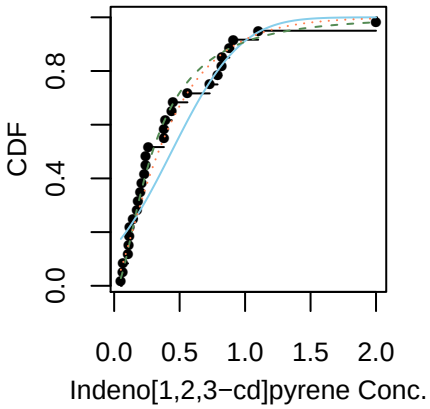
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

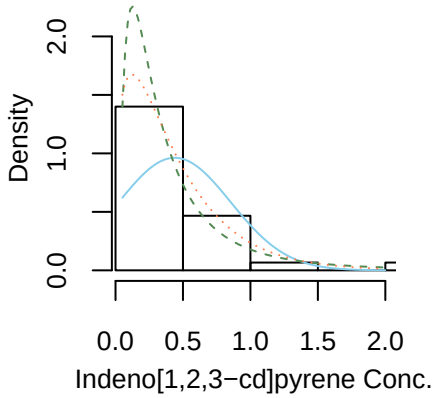


ECDF, Histogram & Q−Q (Detects Only)

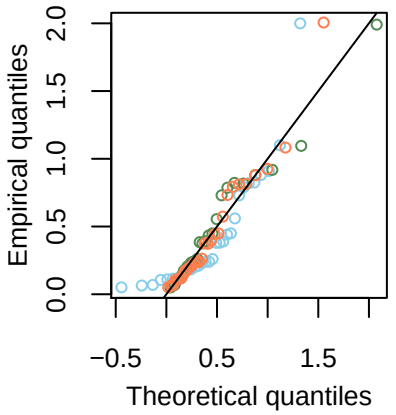
ECDF



Histogram



Q−Q



N = 34	FOD = 88%	Min (detect) = 0.051 J	Kaplan Meier Mean = 0.39
N (detect) = 30	SD (log detect) = 0.94	Max (detect) = 2 J	Kaplan Meier SD = 0.41

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.00047	–	–	–	–	39.9471	42.9999
Lognormal	0.31	0.74	–	–	–	–	6.60032	9.65304
Gamma	–	–	0.1127	0.165	0.4296	0.775	8.1633	11.216

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	4e−05	0.0041	–	–	–	–	36.3111	39.1135
Lognormal	0.71	0.59	–	–	–	–	10.5149	13.3173
Gamma	–	–	0.1397	0.165	0.4869	0.775	12.8555	15.6579

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Indeno[1,2,3−cd]pyrene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **150**

Media:
Surface Sediment (0−15 cm)

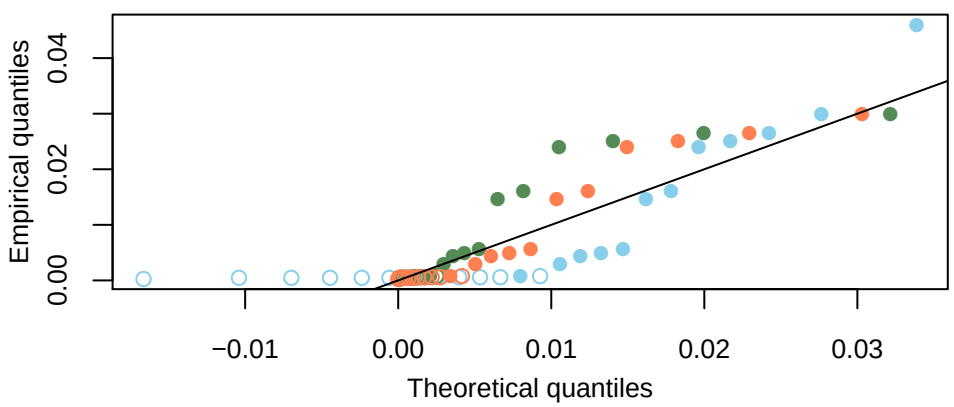
Exposure Unit:
MBC

Chemical (mg/kg):
Aldrin

Legend

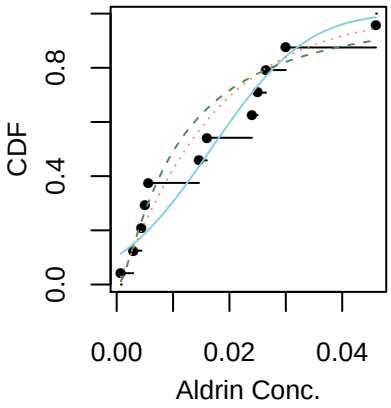
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

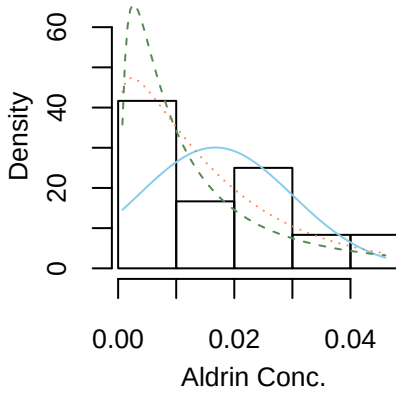


ECDF, Histogram & Q−Q (Detects Only)

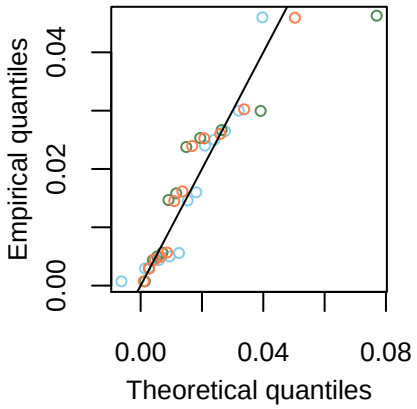
ECDF



Histogram



Q−Q



N = 24	FOD = 50%	Min (detect) = 0.00074 J	Kaplan Meier Mean = 0.0084
N (detect) = 12	SD (log detect) = 1.2	Max (detect) = 0.046 J	Kaplan Meier SD = 0.013

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	4.3e−06	–	–	–	–	−138.603	−136.247
Lognormal	0.00098	9.9e−05	–	–	–	–	−193.904	−191.548
Gamma	–	–	0.2937	0.1974	1.981	0.8987	−188.149	−185.792

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.22	0.17	–	–	–	–	−65.6754	−64.7056
Lognormal	0.23	0.22	–	–	–	–	−68.208	−67.2382
Gamma	–	–	0.1802	0.274	0.3706	0.748	−70.333	−69.3632

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Aldrin

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **151**

Media:
Surface Sediment (0−15 cm)

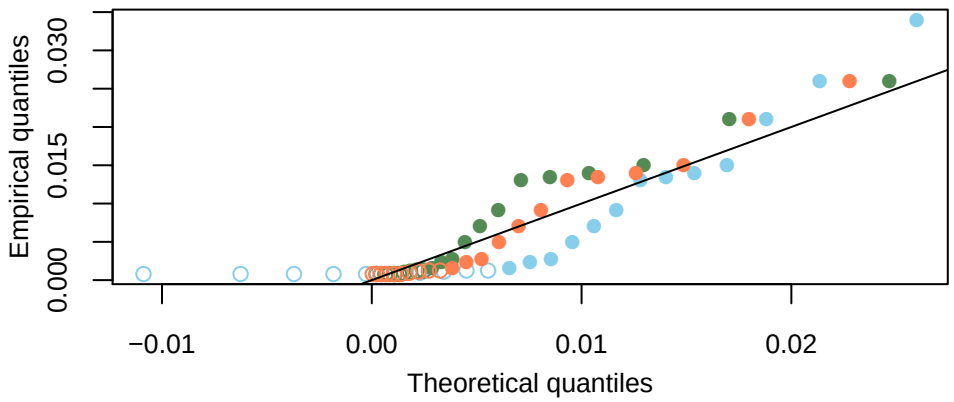
Exposure Unit:
MBC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

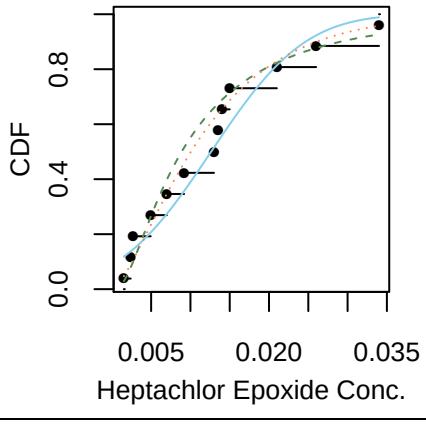
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

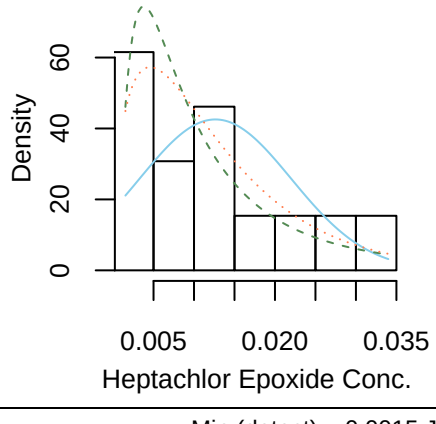


ECDF, Histogram & Q−Q (Detects Only)

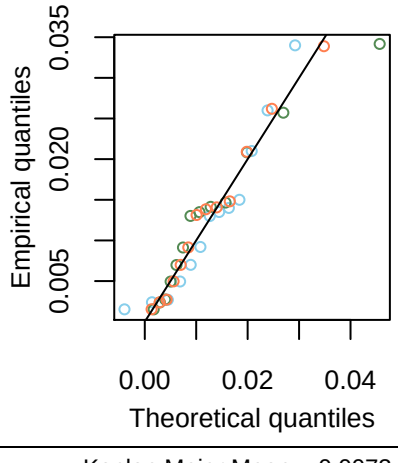
ECDF



Histogram



Q−Q



N = 23	FOD = 57%	Min (detect) = 0.0015 J	Kaplan Meier Mean = 0.0073
N (detect) = 13	SD (log detect) = 0.96	Max (detect) = 0.034 J	Kaplan Meier SD = 0.0094

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−04	0.00023	–	–	–	–	−146.761	−144.49
Lognormal	0.0036	0.02	–	–	–	–	−180.298	−178.027
Gamma	–	–	0.2244	0.192	1.391	0.805	−176.446	−174.175

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.23	0.35	–	–	–	–	−80.5164	−79.3865
Lognormal	0.47	0.21	–	–	–	–	−83.9271	−82.7972
Gamma	–	–	0.158	0.274	0.2392	0.748	−85.0413	−83.9114

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−Heptachlor Epoxide

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **152**

Media:
Surface Sediment (0−15 cm)

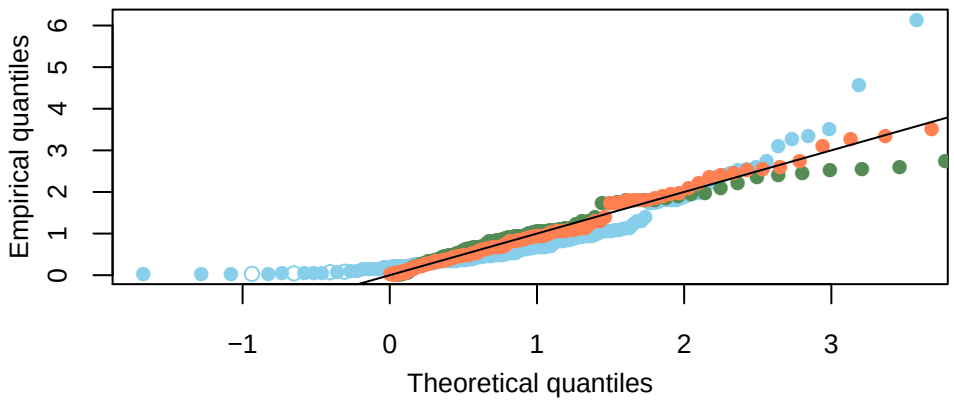
Exposure Unit:
MBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

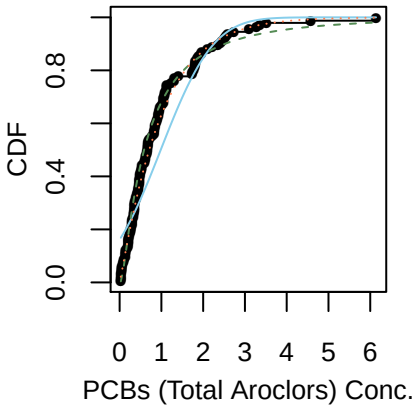
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

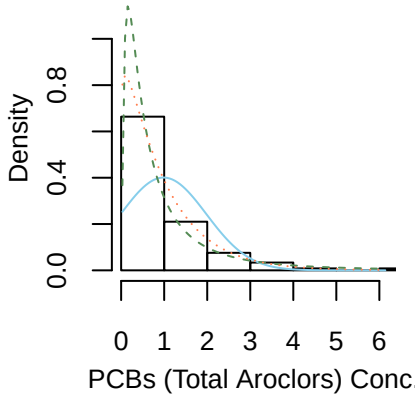


ECDF, Histogram & Q−Q (Detects Only)

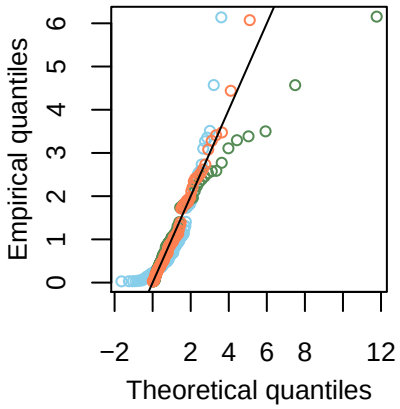
ECDF



Histogram



Q−Q



N = 123	FOD = 97%	Min (detect) = 0.029 J	Kaplan Meier Mean = 0.95
N (detect) = 119	SD (log detect) = 1.1	Max (detect) = 6 J	Kaplan Meier SD = 0.99

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.8e−11	–	–	–	–	351.226	356.85
Lognormal	0.001	0.11	–	–	–	–	247.316	252.941
Gamma	–	–	0.0626	0.092	0.3658	0.783	238.376	244

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.2e−11	–	–	–	–	340.561	346.12
Lognormal	0.0024	0.24	–	–	–	–	245.51	251.069
Gamma	–	–	0.06834	0.092	0.3972	0.783	237.477	243.036

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in MBC−PCBs (Total Aroclors)

Media:
Surface Sediment (0−15 cm)

Exposure Unit:
BCC

Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 22	FOD = 9%	Min (detect) = 1 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 4 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Antimony

Media:
Surface Sediment (0−15 cm)

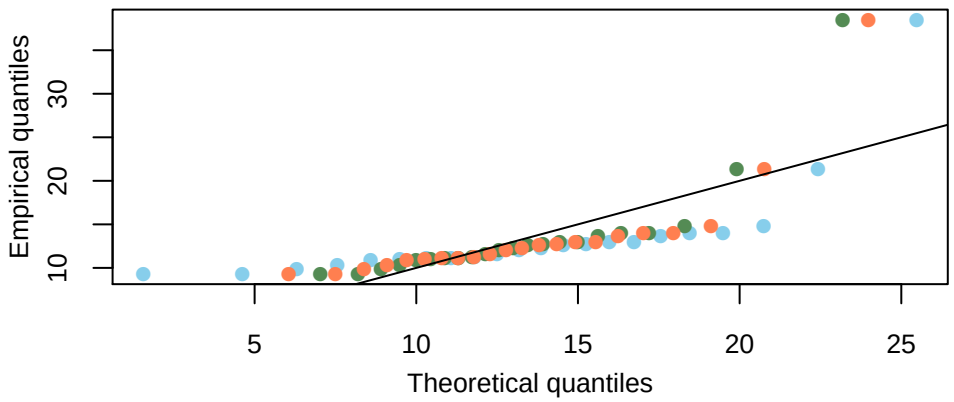
Exposure Unit:
BCC

Chemical (mg/kg):
Arsenic

Legend

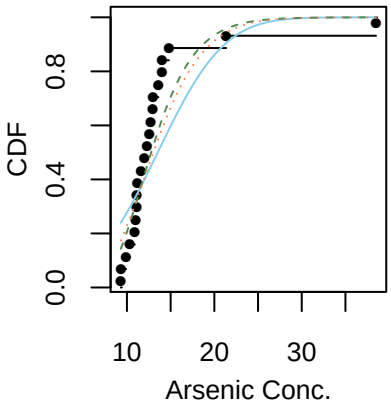
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

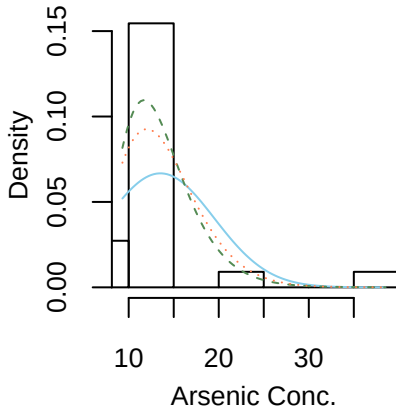


ECDF, Histogram & Q−Q (Detects Only)

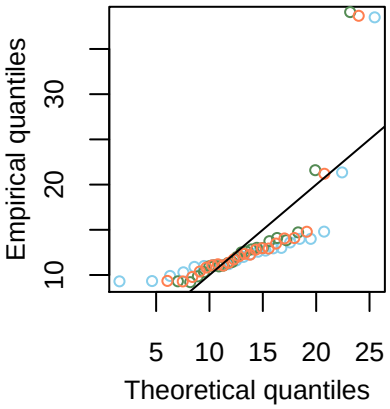
ECDF



Histogram



Q−Q



N = 22	FOD = 100%	Min (detect) = 9 J	Arithmetic Mean = 14
N (detect) = 22	SD (log detect) = 0.31	Max (detect) = 38 J	Arithmetic SD = 6

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.5e−07	–	–	–	–	145.108	147.291
Lognormal	6e−05	0.0013	–	–	–	–	125.251	127.433
Gamma	–	–	0.2782	0.186	2.282	0.746	131.137	133.319

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Arsenic

Media:
Surface Sediment (0−15 cm)

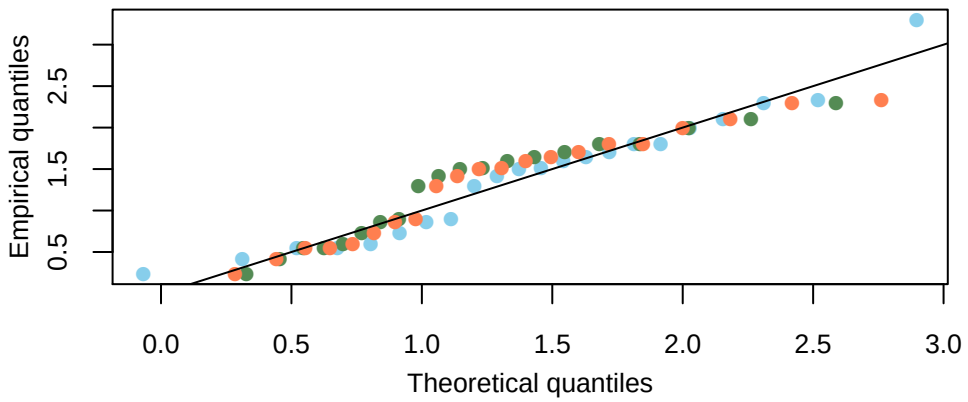
Exposure Unit:
BCC

Chemical (mg/kg):
Cadmium

Legend

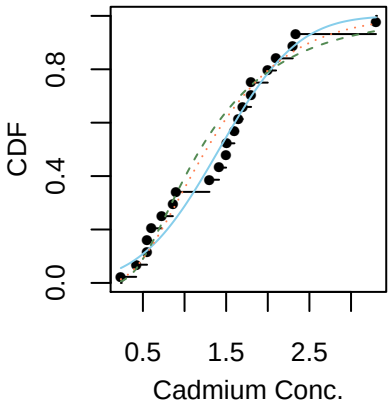
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

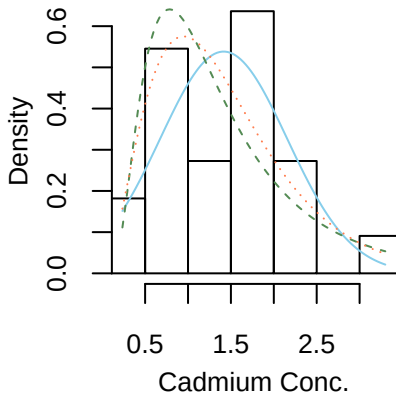


ECDF, Histogram & Q−Q (Detects Only)

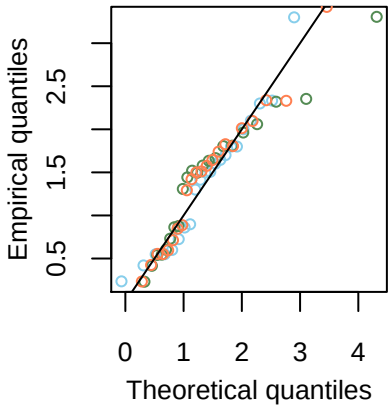
ECDF



Histogram



Q−Q



N = 22	FOD = 100%	Min (detect) = 0.24 J	Arithmetic Mean = 1
N (detect) = 22	SD (log detect) = 0.66	Max (detect) = 3 J	Arithmetic SD = 0.76

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.42	0.61	–	–	–	–	53.2443	55.4264
Lognormal	0.11	0.029	–	–	–	–	54.7102	56.8923
Gamma	–	–	0.1673	0.188	0.5148	0.756	52.1126	54.2947

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Cadmium

Media:
Surface Sediment (0−15 cm)

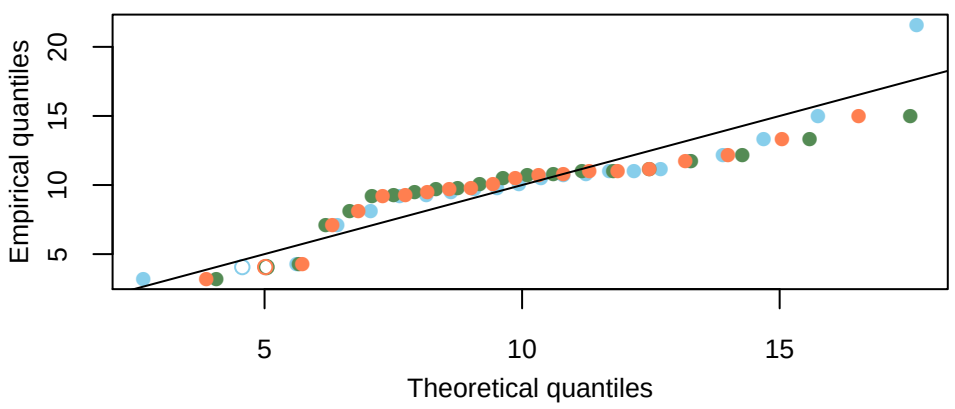
Exposure Unit:
BCC

Chemical (mg/kg):
Cobalt

Legend

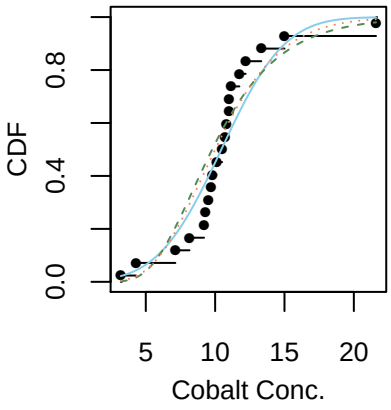
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

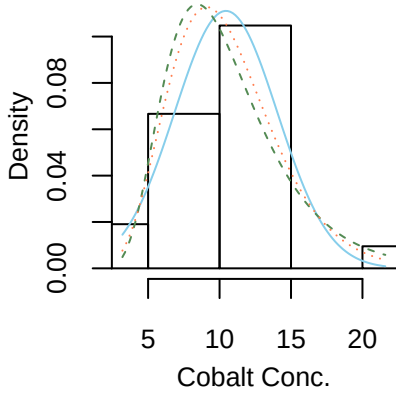


ECDF, Histogram & Q−Q (Detects Only)

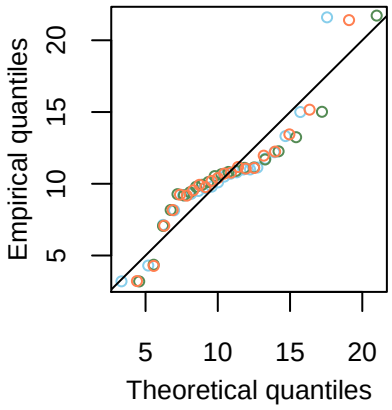
ECDF



Histogram



Q−Q



N = 22	FOD = 95%	Min (detect) = 3 J	Kaplan Meier Mean = 10
N (detect) = 21	SD (log detect) = 0.4	Max (detect) = 22 J	Kaplan Meier SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.024	0.08	–	–	–	–	124.619	126.801
Lognormal	0.0071	0.00077	–	–	–	–	126.727	128.909
Gamma	–	–	0.2252	0.186	1.118	0.746	124.546	126.728

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.017	0.051	–	–	–	–	117.295	119.384
Lognormal	0.0054	0.0016	–	–	–	–	119.35	121.439
Gamma	–	–	0.22	0.19	1.082	0.745	117.199	119.288

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Cobalt

Media:
Surface Sediment (0−15 cm)

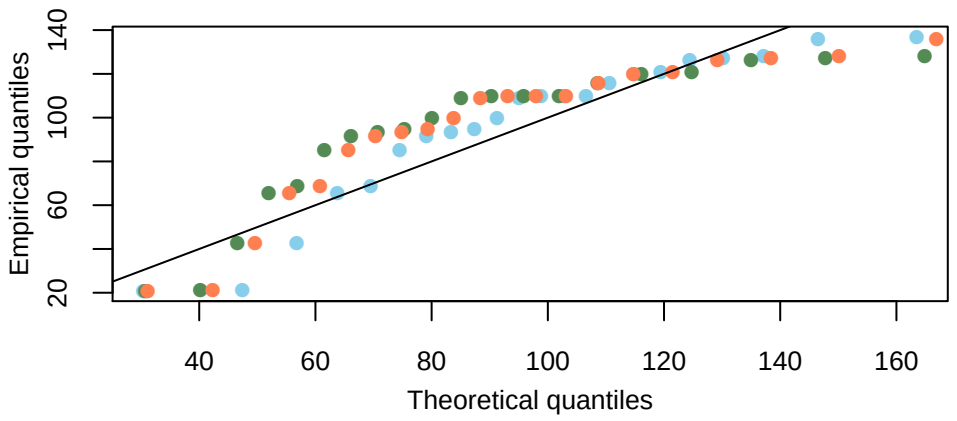
Exposure Unit:
BCC

Chemical (mg/kg):
Copper

Legend

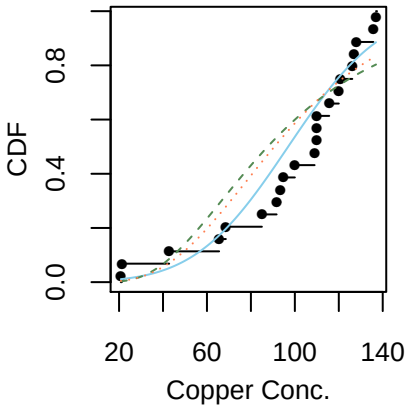
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

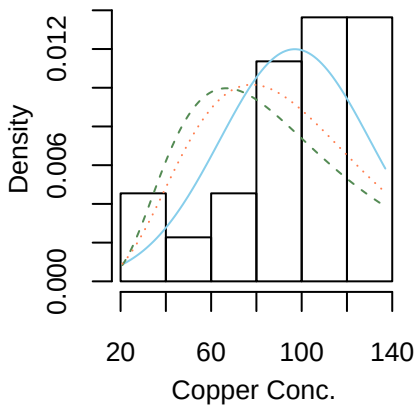


ECDF, Histogram & Q−Q (Detects Only)

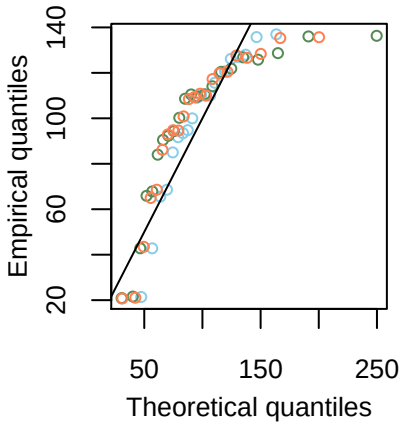
ECDF



Histogram



Q−Q



N = 22	FOD = 100%	Min (detect) = 21 J	Arithmetic Mean = 97
N (detect) = 22	SD (log detect) = 0.54	Max (detect) = 140 J	Arithmetic SD = 34

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.011	0.052	–	–	–	–	220.637	222.82
Lognormal	4e−05	0.00042	–	–	–	–	234.778	236.96
Gamma	–	–	0.2369	0.186	1.802	0.746	228.838	231.02

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Copper

Media:
Surface Sediment (0−15 cm)

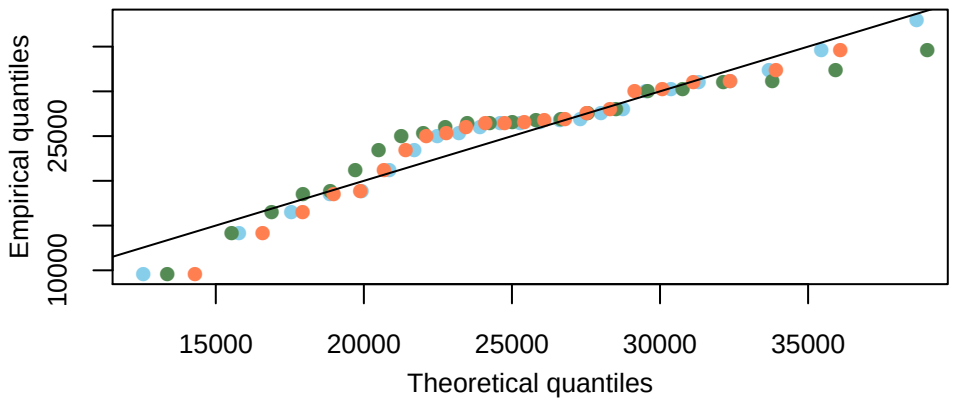
Exposure Unit:
BCC

Chemical (mg/kg):
Iron

Legend

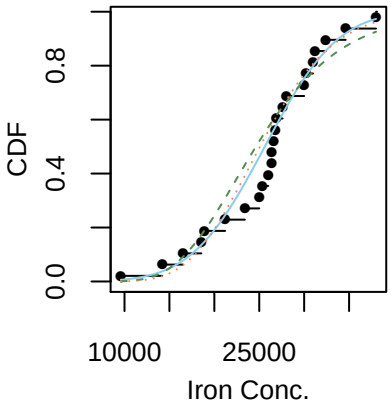
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

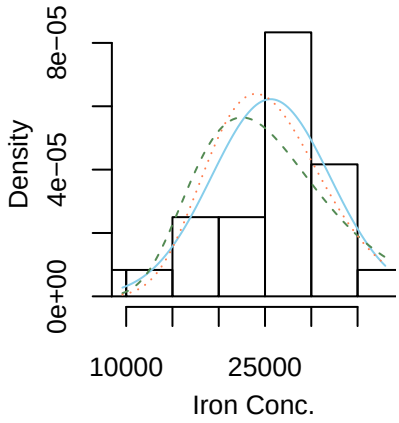


ECDF, Histogram & Q−Q (Detects Only)

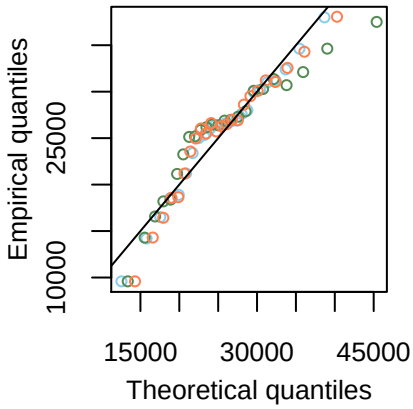
ECDF



Histogram



Q−Q



N = 24	FOD = 100%	Min (detect) = 9,600 J	Arithmetic Mean = 26,000
N (detect) = 24	SD (log detect) = 0.31	Max (detect) = 38,000 J	Arithmetic SD = 6,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.45	0.068	–	–	–	–	492.859	495.215
Lognormal	0.0057	0.0023	–	–	–	–	499.696	502.052
Gamma	–	–	0.203	0.178	0.8841	0.744	497.345	499.701

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Iron

Media:
Surface Sediment (0−15 cm)

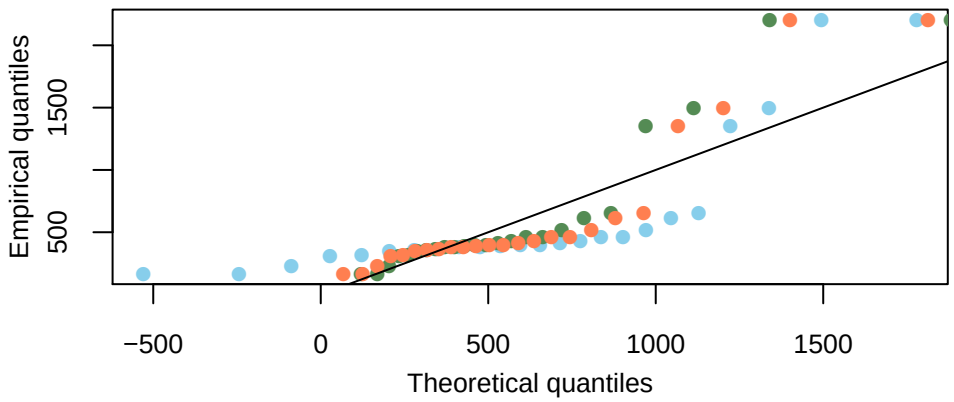
Exposure Unit:
BCC

Chemical (mg/kg):
Manganese

Legend

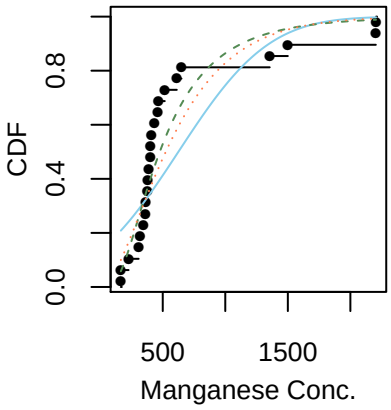
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

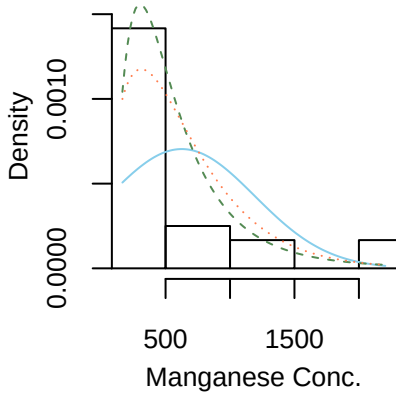


ECDF, Histogram & Q−Q (Detects Only)

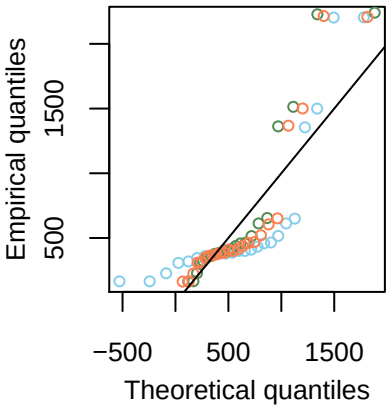
ECDF



Histogram



Q−Q



N = 24	FOD = 100%	Min (detect) = 160 J	Arithmetic Mean = 630
N (detect) = 24	SD (log detect) = 0.69	Max (detect) = 2,200 J	Arithmetic SD = 580

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.5e−07	–	–	–	–	376.421	378.777
Lognormal	0.0049	0.0034	–	–	–	–	349.185	351.541
Gamma	–	–	0.2697	0.183	2.148	0.772	355.535	357.892

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Manganese

Media:
Surface Sediment (0−15 cm)

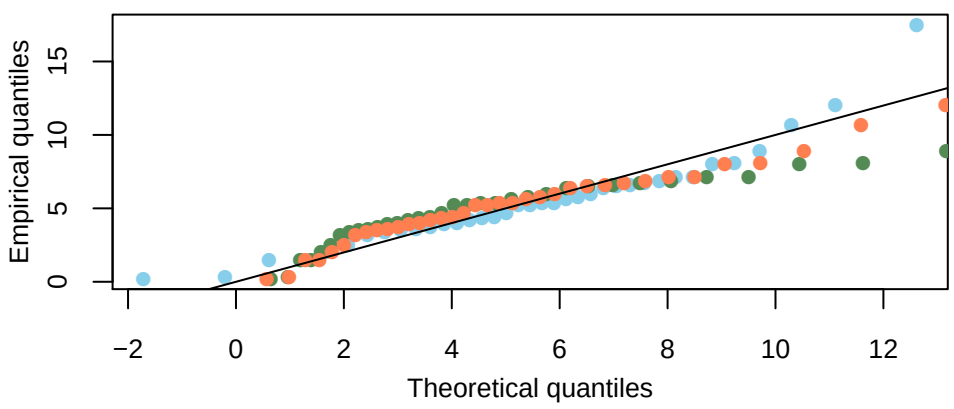
Exposure Unit:
BCC

Chemical (mg/kg):
Mercury

Legend

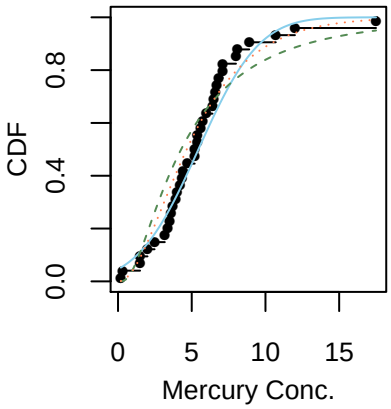
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

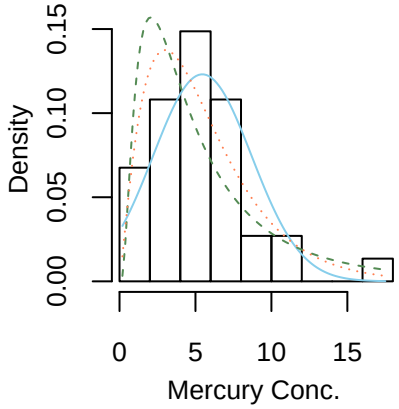


ECDF, Histogram & Q−Q (Detects Only)

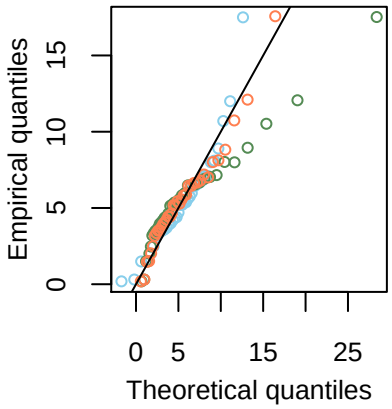
ECDF



Histogram



Q−Q



N = 37	FOD = 100%	Min (detect) = 0.19 J	Arithmetic Mean = 5
N (detect) = 37	SD (log detect) = 0.87	Max (detect) = 18 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0037	0.045	–	–	–	–	196.02	199.242
Lognormal	2e−05	0.00054	–	–	–	–	205.081	208.303
Gamma	–	–	0.1446	0.151	0.9538	0.76	192.583	195.804

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Mercury

Media:
Surface Sediment (0−15 cm)

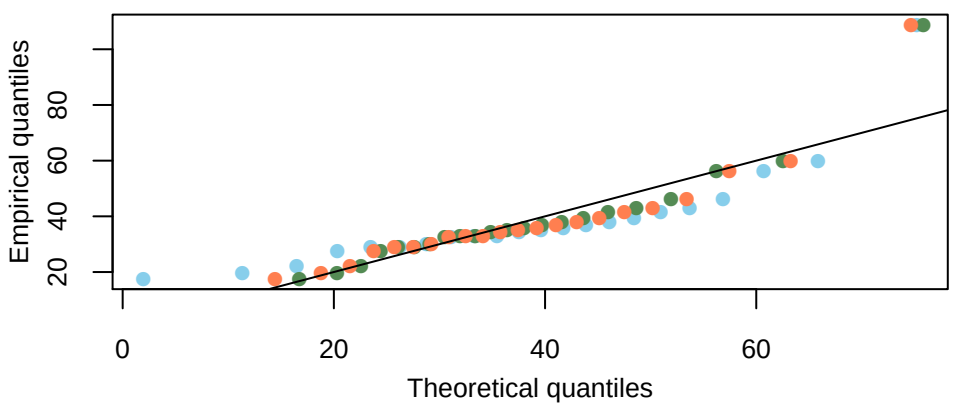
Exposure Unit:
BCC

Chemical (mg/kg):
Nickel

Legend

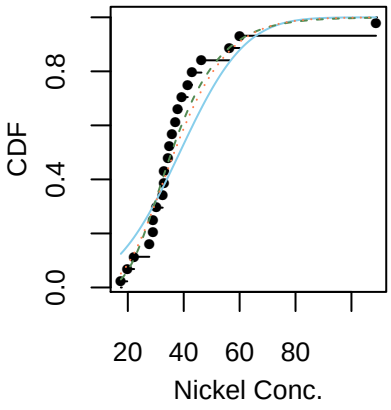
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

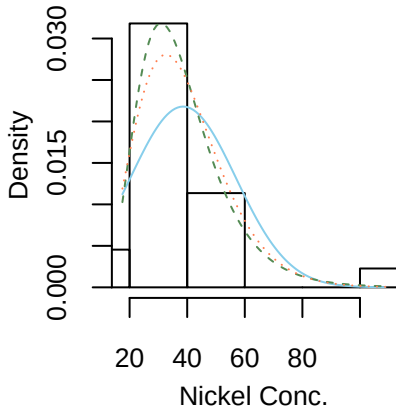


ECDF, Histogram & Q−Q (Detects Only)

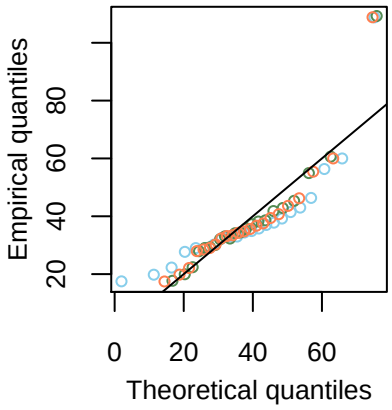
ECDF



Histogram



Q−Q



N = 22	FOD = 100%	Min (detect) = 18 J	Arithmetic Mean = 39
N (detect) = 22	SD (log detect) = 0.39	Max (detect) = 110 J	Arithmetic SD = 19

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	5e−05	0.005	–	–	–	–	194.346	196.528
Lognormal	0.15	0.41	–	–	–	–	180.807	182.989
Gamma	–	–	0.1591	0.186	0.7986	0.746	183.909	186.091

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Nickel

Media:
Surface Sediment (0−15 cm)

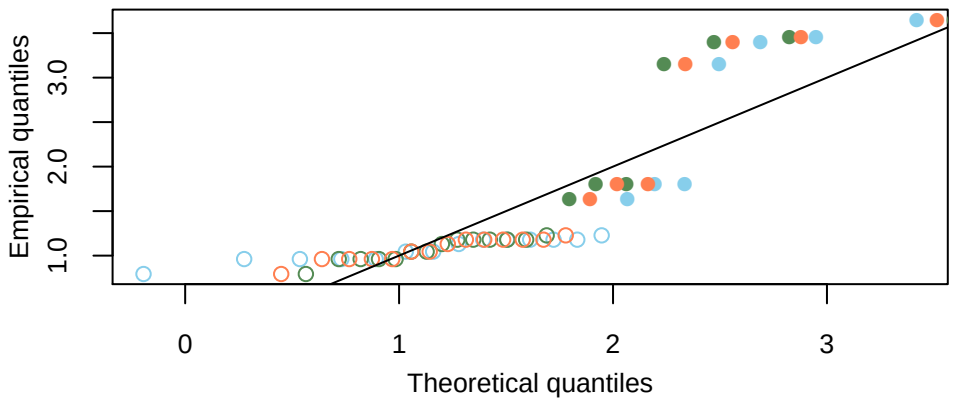
Exposure Unit:
BCC

Chemical (mg/kg):
Thallium

Legend

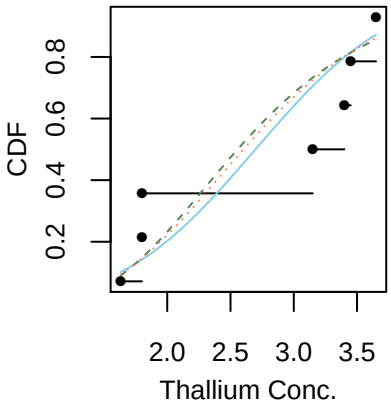
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

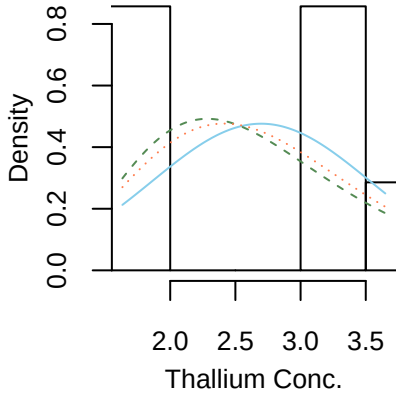


ECDF, Histogram & Q−Q (Detects Only)

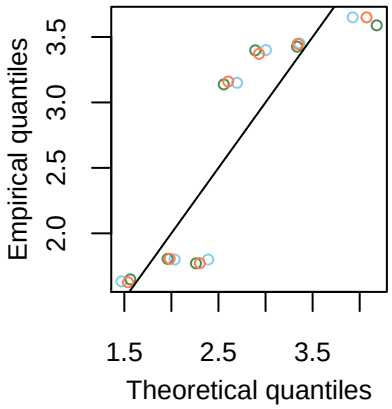
ECDF



Histogram



Q−Q



N = 22	FOD = 32%	Min (detect) = 1 J	Kaplan Meier Mean = 1
N (detect) = 7	SD (log detect) = 0.36	Max (detect) = 3 J	Kaplan Meier SD = 0.88

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	4e−05	2.7e−06	–	–	–	–	59.7494	61.8385
Lognormal	0.001	7.8e−05	–	–	–	–	46.5033	48.5924
Gamma	–	–	0.3093	0.192	2.075	0.754	50.0938	52.1828

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.041	0.13	–	–	–	–	21.3901	21.282
Lognormal	0.031	0.079	–	–	–	–	21.7208	21.6126
Gamma	–	–	NA	NA	NA	NA	21.5159	21.4077

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Thallium

Media:
Surface Sediment (0−15 cm)

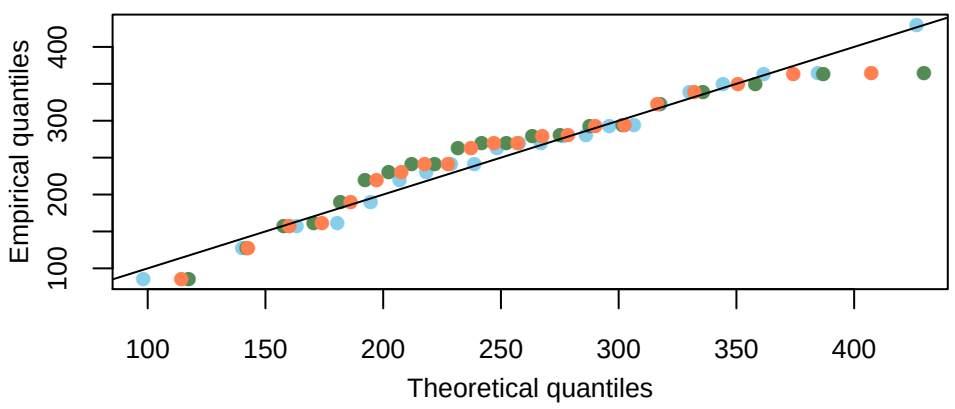
Exposure Unit:
BCC

Chemical (mg/kg):
Zinc

Legend

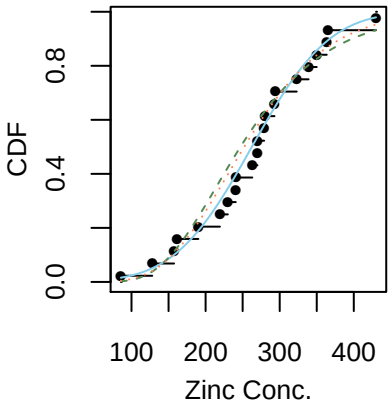
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

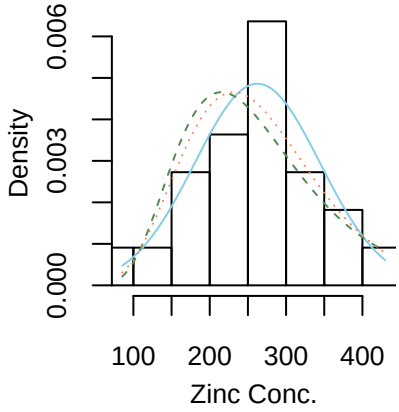


ECDF, Histogram & Q−Q (Detects Only)

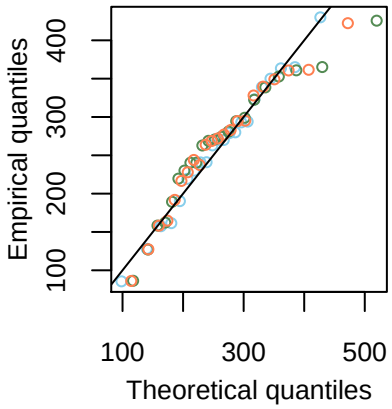
ECDF



Histogram



Q−Q



N = 22	FOD = 100%	Min (detect) = 86 J	Arithmetic Mean = 260
N (detect) = 22	SD (log detect) = 0.38	Max (detect) = 430 J	Arithmetic SD = 84

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.98	0.88	–	–	–	–	260.374	262.556
Lognormal	0.056	0.18	–	–	–	–	265.309	267.491
Gamma	–	–	0.1393	0.186	0.4537	0.746	262.79	264.972

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Zinc

Media:
Surface Sediment (0−15 cm)

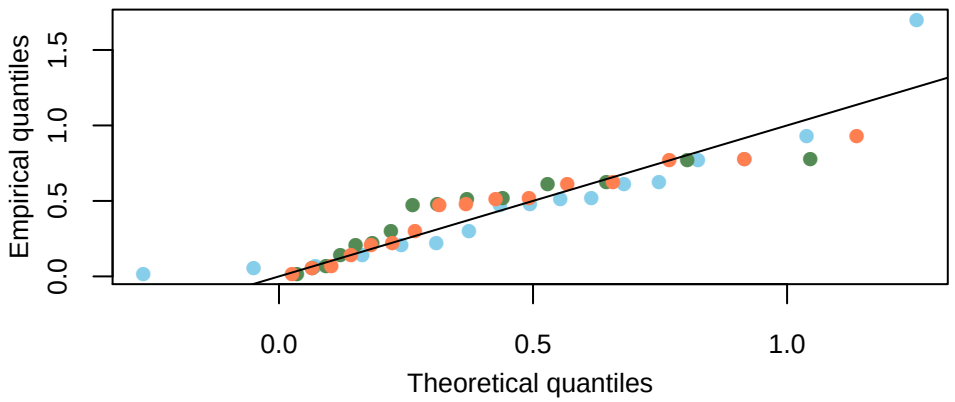
Exposure Unit:
BCC

Chemical (mg/kg):
Benz[a]anthracene

Legend

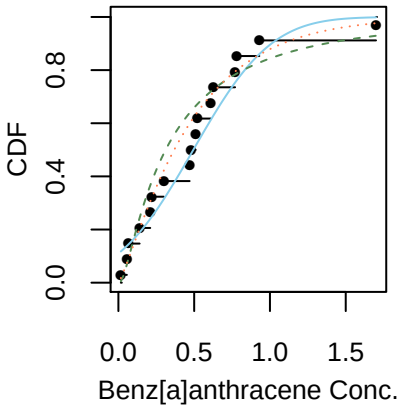
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

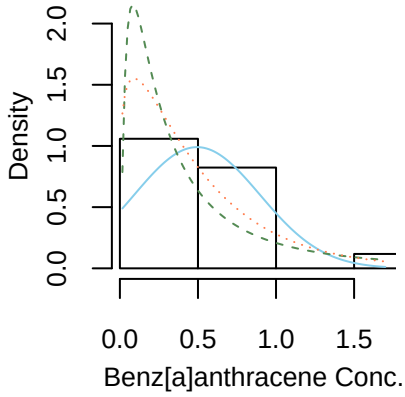


ECDF, Histogram & Q−Q (Detects Only)

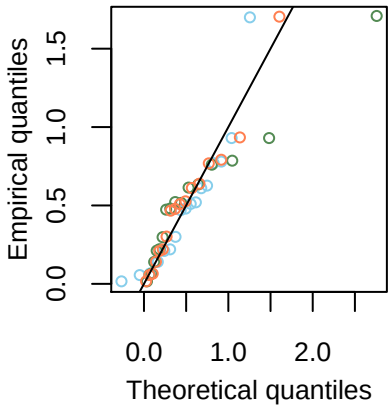
ECDF



Histogram



Q−Q



N = 17	FOD = 100%	Min (detect) = 0.016 J	Arithmetic Mean = 0.49
N (detect) = 17	SD (log detect) = 1.2	Max (detect) = 1 J	Arithmetic SD = 0.42

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.026	0.51	–	–	–	–	21.3225	22.989
Lognormal	0.084	0.024	–	–	–	–	17.4819	19.1483
Gamma	–	–	0.1871	0.215	0.3378	0.766	13.6377	15.3041

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Benz[a]anthracene

Media:
Surface Sediment (0−15 cm)

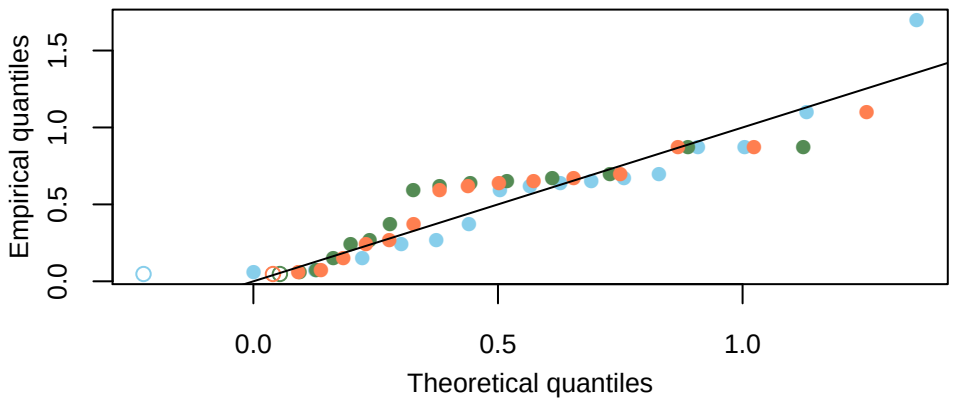
Exposure Unit:
BCC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

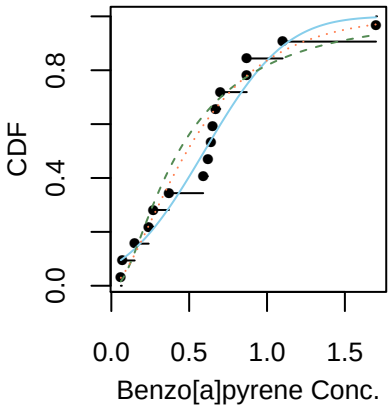
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

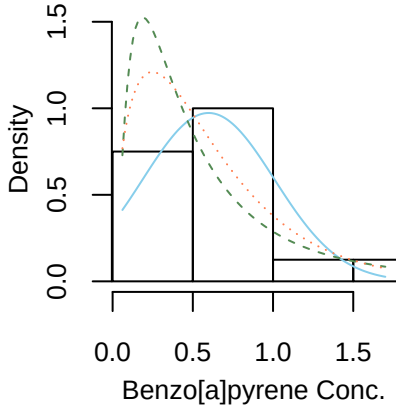


ECDF, Histogram & Q−Q (Detects Only)

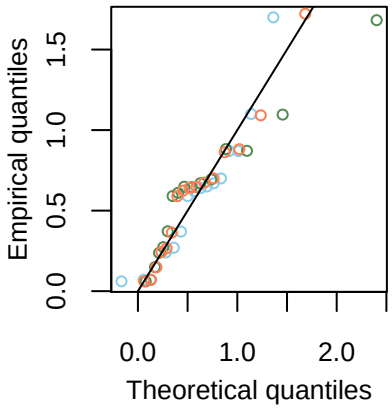
ECDF



Histogram



Q−Q



N = 17	FOD = 94%	Min (detect) = 0.061 J	Kaplan Meier Mean = 0.56
N (detect) = 16	SD (log detect) = 0.95	Max (detect) = 1 J	Kaplan Meier SD = 0.42

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.093	0.47	–	–	–	–	22.6127	24.2791
Lognormal	0.048	0.0067	–	–	–	–	20.497	22.1635
Gamma	–	–	0.2187	0.215	0.5364	0.766	17.5383	19.2047

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.13	0.38	–	–	–	–	20.8744	22.4196
Lognormal	0.072	0.0077	–	–	–	–	19.9713	21.5165
Gamma	–	–	0.2199	0.221	0.4756	0.763	17.2273	18.7725

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Benzo[a]pyrene

Media:
Surface Sediment (0−15 cm)

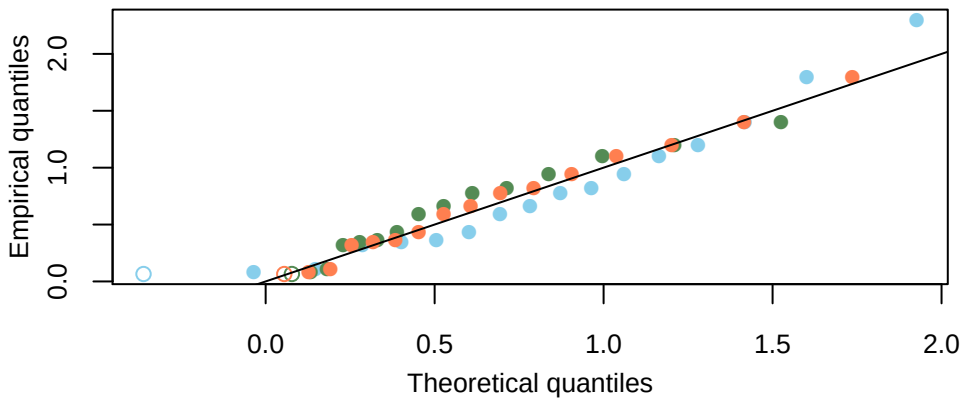
Exposure Unit:
BCC

Chemical (mg/kg):
Benzo[b]fluoranthene

Legend

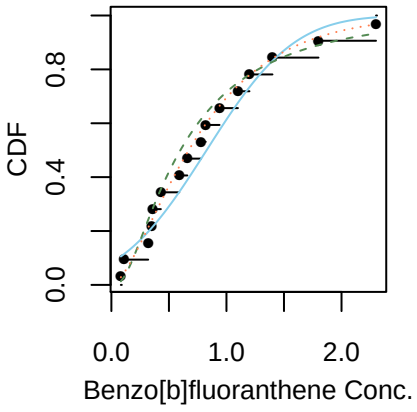
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

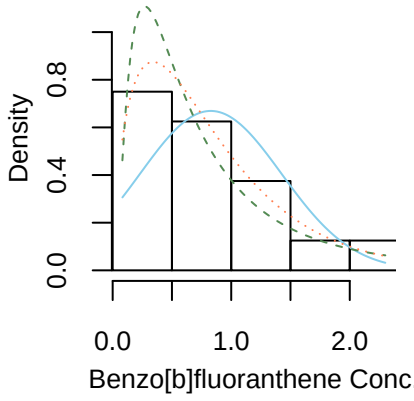


ECDF, Histogram & Q−Q (Detects Only)

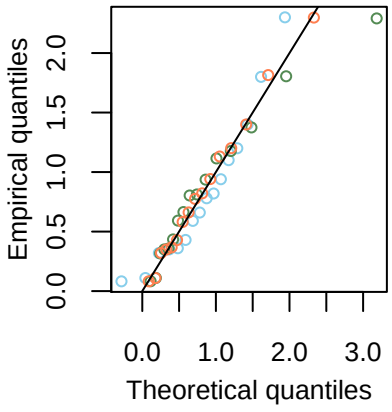
ECDF



Histogram



Q−Q



N = 17	FOD = 94%	Min (detect) = 0.082 J	Kaplan Meier Mean = 0.78
N (detect) = 16	SD (log detect) = 0.93	Max (detect) = 2 J	Kaplan Meier SD = 0.61

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.12	0.67	–	–	–	–	35.1886	36.855
Lognormal	0.2	0.5	–	–	–	–	30.8939	32.5603
Gamma	–	–	0.1031	0.215	0.2006	0.766	28.5855	30.252

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.18	0.67	–	–	–	–	32.8553	34.4005
Lognormal	0.38	0.74	–	–	–	–	29.5401	31.0853
Gamma	–	–	0.08763	0.221	0.1489	0.763	27.6282	29.1734

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Benzo[b]fluoranthene

Media:
Surface Sediment (0−15 cm)

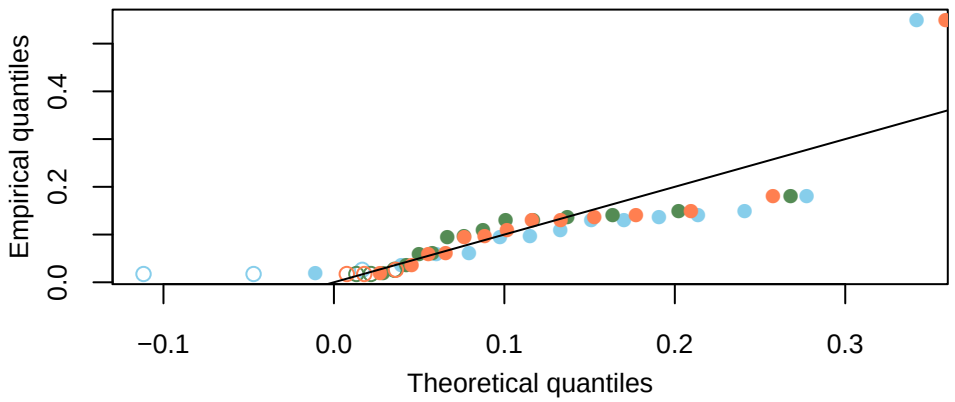
Exposure Unit:
BCC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

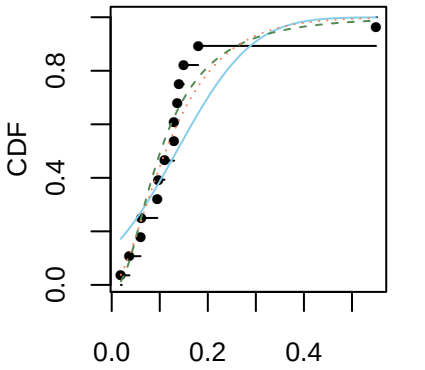
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

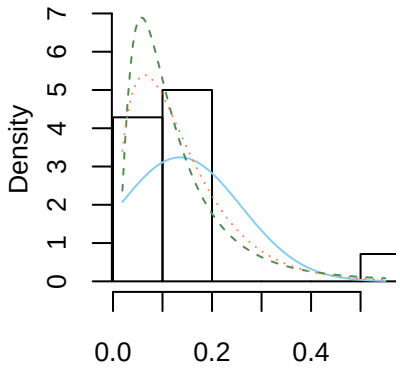


ECDF, Histogram & Q−Q (Detects Only)

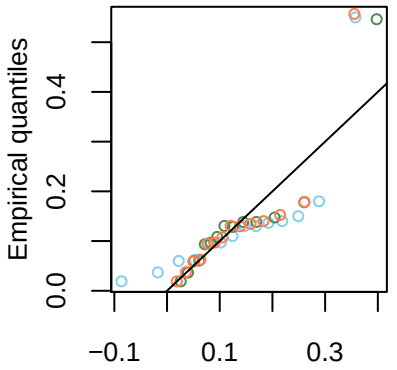
ECDF



Histogram



Q−Q



N = 17	FOD = 82%	Min (detect) = 0.019 J	Kaplan Meier Mean = 0.11
N (detect) = 14	SD (log detect) = 0.78	Max (detect) = 0.55 J	Kaplan Meier SD = 0.12

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	4e−05	0.0017	–	–	–	–	−19.8279	−18.1615
Lognormal	0.17	0.16	–	–	–	–	−37.7254	−36.059
Gamma	–	–	0.1548	0.215	0.5524	0.766	−36.3861	−34.7196

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00011	0.00064	–	–	–	–	−14.9175	−13.6394
Lognormal	0.34	0.26	–	–	–	–	−28.0783	−26.8002
Gamma	–	–	0.2072	0.274	0.6346	0.748	−26.792	−25.5139

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **168**

Media:
Surface Sediment (0−15 cm)

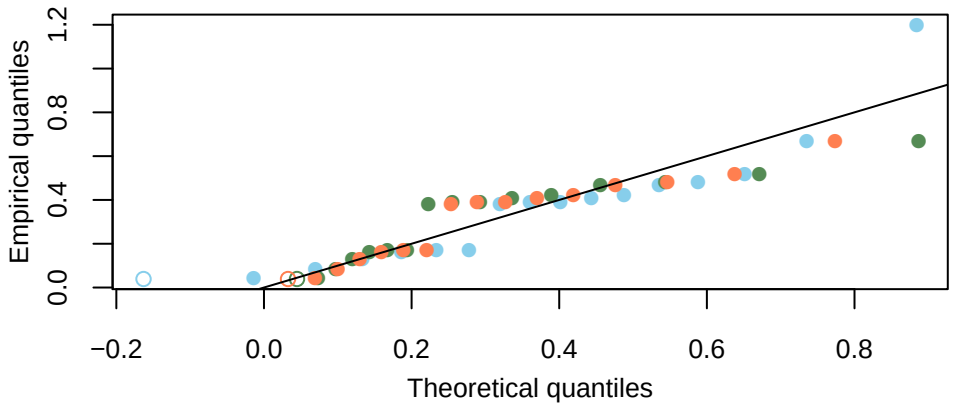
Exposure Unit:
BCC

Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

Legend

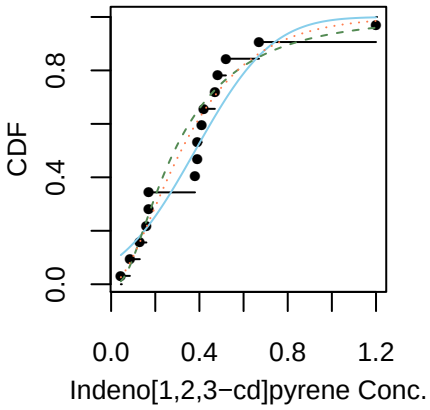
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

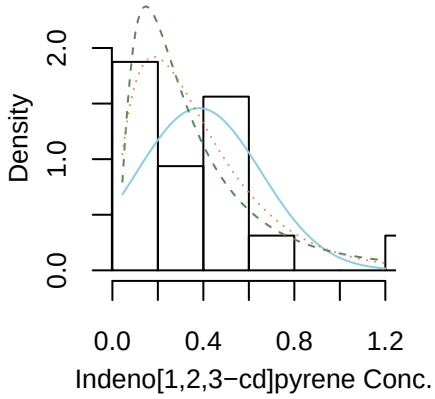


ECDF, Histogram & Q−Q (Detects Only)

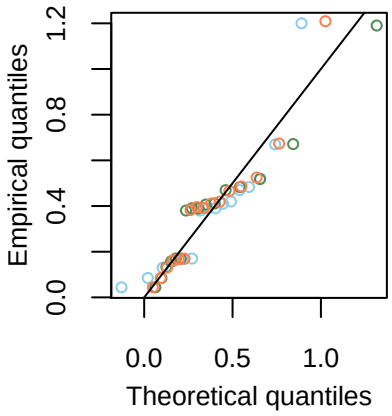
ECDF



Histogram



Q−Q



N = 17	FOD = 94%	Min (detect) = 0.044 J	Kaplan Meier Mean = 0.36
N (detect) = 16	SD (log detect) = 0.84	Max (detect) = 1 J	Kaplan Meier SD = 0.28

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.012	0.21	–	–	–	–	8.62454	10.291
Lognormal	0.15	0.0058	–	–	–	–	3.03829	4.70471
Gamma	–	–	0.2184	0.215	0.4941	0.766	1.38248	3.04891

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.013	0.15	–	–	–	–	7.91622	9.4614
Lognormal	0.27	0.0065	–	–	–	–	3.0104	4.55557
Gamma	–	–	0.2198	0.221	0.4869	0.763	1.7659	3.31107

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Indeno[1,2,3−cd]pyrene

Media:
Surface Sediment (0−15 cm)

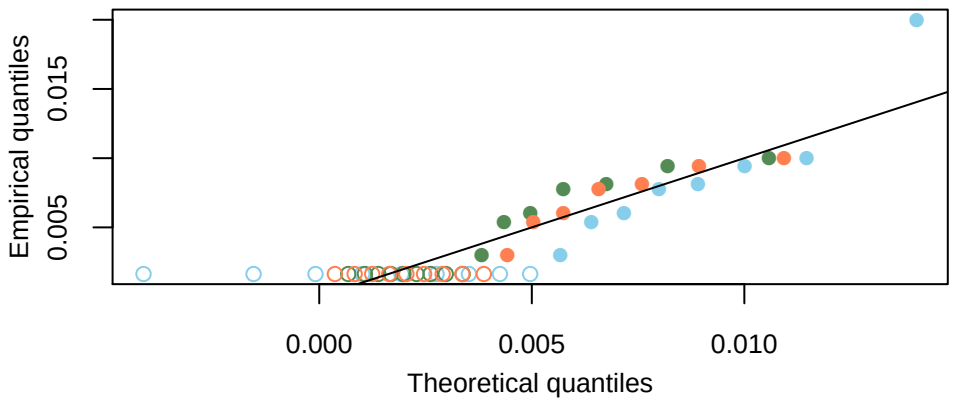
Exposure Unit:
BCC

Chemical (mg/kg):
Aldrin

Legend

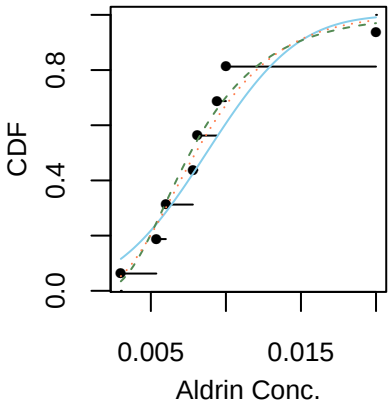
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

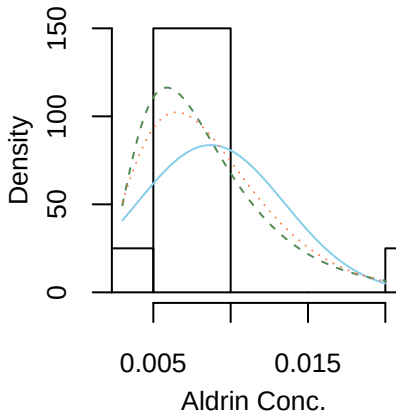


ECDF, Histogram & Q−Q (Detects Only)

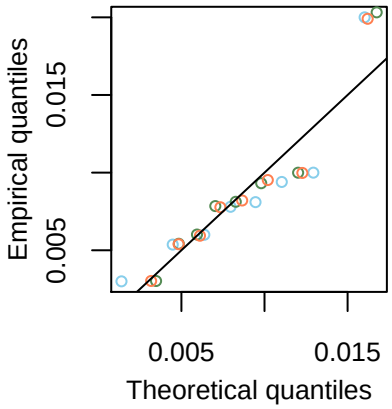
ECDF



Histogram



Q−Q



N = 17	FOD = 47%	Min (detect) = 0.003 J	Kaplan Meier Mean = 0.0042
N (detect) = 8	SD (log detect) = 0.55	Max (detect) = 0.02 J	Kaplan Meier SD = 0.0054

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00021	0.0011	–	–	–	–	−129.187	−127.521
Lognormal	0.0013	3.6e−05	–	–	–	–	−146.968	−145.301
Gamma	–	–	NA	NA	NA	NA	−143.638	−141.972

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.076	0.076	–	–	–	–	−58.8276	−58.6687
Lognormal	0.87	0.57	–	–	–	–	−62.0011	−61.8422
Gamma	–	–	0.2021	0.297	0.3036	0.724	−61.5995	−61.4406

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Aldrin

Media:
Surface Sediment (0−15 cm)

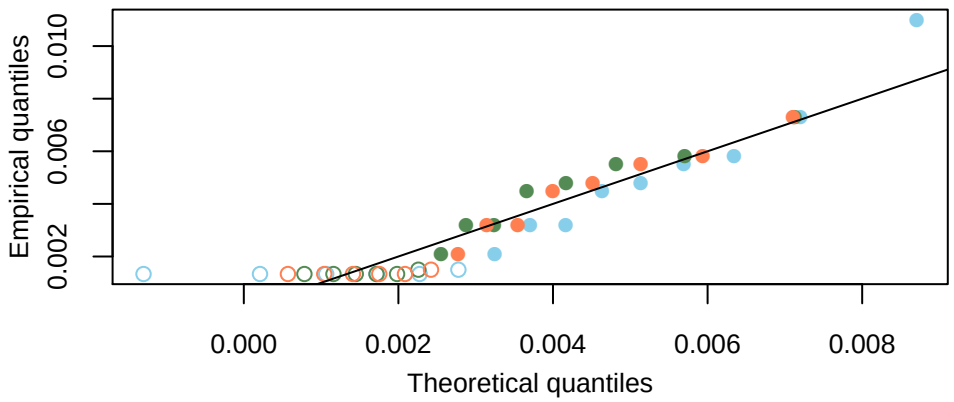
Exposure Unit:
BCC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

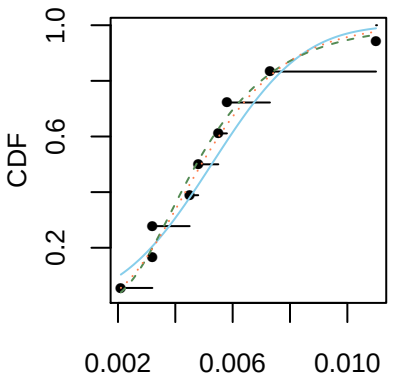
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

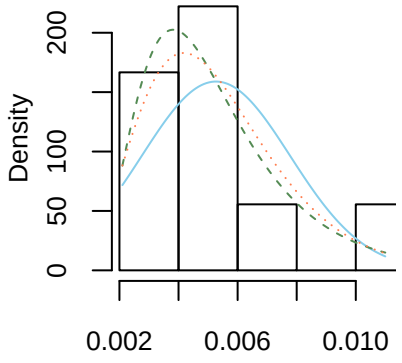


ECDF, Histogram & Q−Q (Detects Only)

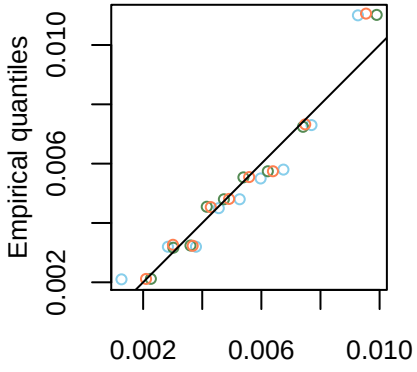
ECDF



Histogram



Q−Q



N = 15	FOD = 60%	Min (detect) = 0.0021 J	Kaplan Meier Mean = 0.0033
N (detect) = 9	SD (log detect) = 0.49	Max (detect) = 0.011 J	Kaplan Meier SD = 0.0031

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0092	0.11	–	–	–	–	−130.56	−129.144
Lognormal	0.041	0.067	–	–	–	–	−139.318	−137.902
Gamma	–	–	0.2164	0.224	0.7384	0.747	−137.95	−136.534

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.31	0.39	–	–	–	–	−78.2306	−77.8361
Lognormal	0.98	0.95	–	–	–	–	−80.6664	−80.272
Gamma	–	–	0.1367	0.282	0.1982	0.73	−80.3784	−79.9839

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−Heptachlor Epoxide

Media:
Surface Sediment (0−15 cm)

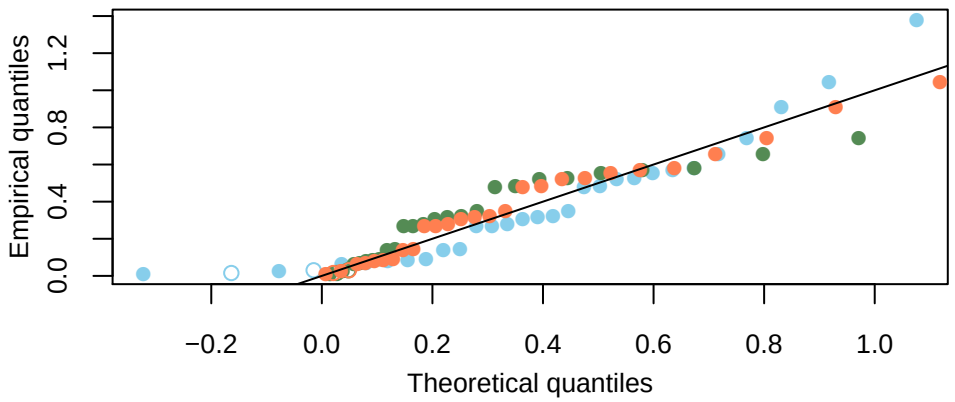
Exposure Unit:
BCC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

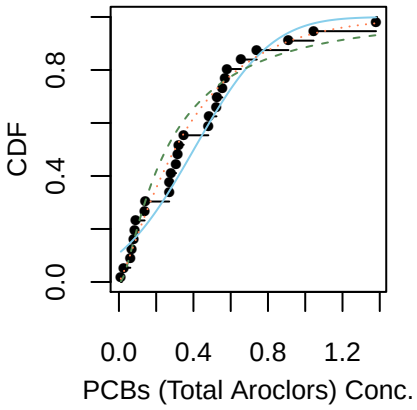
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

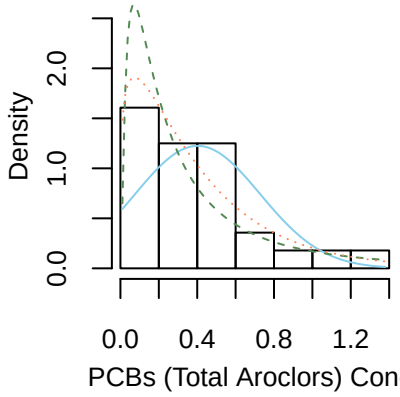


ECDF, Histogram & Q−Q (Detects Only)

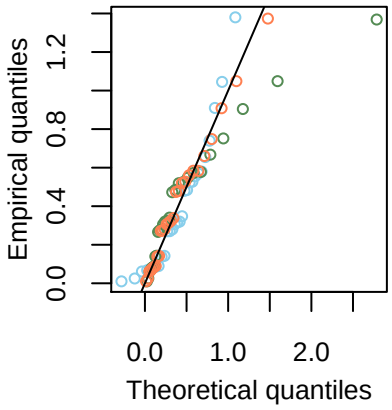
ECDF



Histogram



Q−Q



N = 30	FOD = 93%	Min (detect) = 0.01 J	Kaplan Meier Mean = 0.38
N (detect) = 28	SD (log detect) = 1.2	Max (detect) = 1 J	Kaplan Meier SD = 0.33

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0048	0.17	–	–	–	–	22.3714	25.1738
Lognormal	0.029	0.0027	–	–	–	–	11.0408	13.8432
Gamma	–	–	0.1413	0.165	0.4203	0.775	5.43171	8.2341

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.012	0.2	–	–	–	–	20.6571	23.3215
Lognormal	0.033	0.0055	–	–	–	–	14.0056	16.67
Gamma	–	–	0.1386	0.18	0.3686	0.773	8.30999	10.9744

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in BCC−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **172**

Media:
Surface Sediment (0−15 cm)

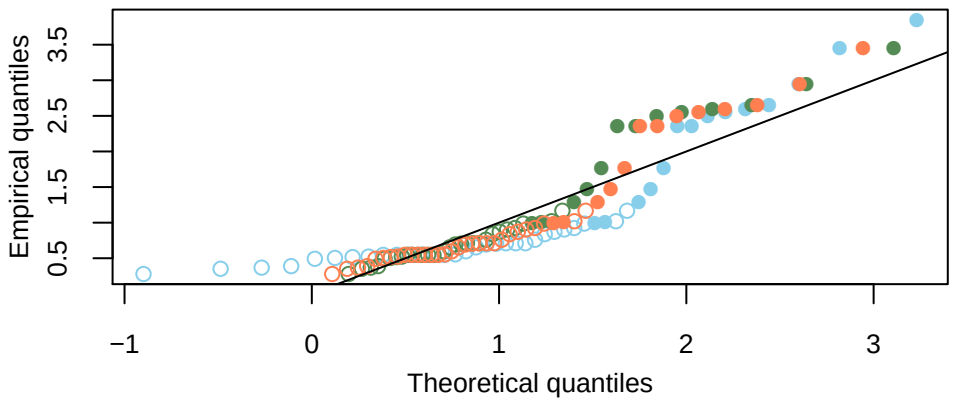
Exposure Unit:
LBC

Chemical (mg/kg):
Antimony

Legend

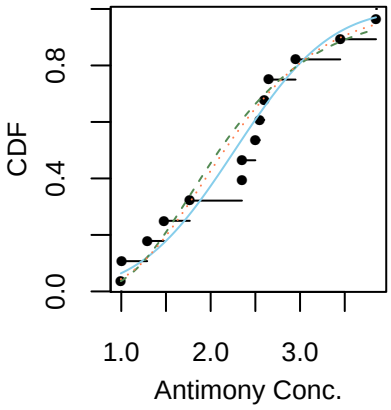
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

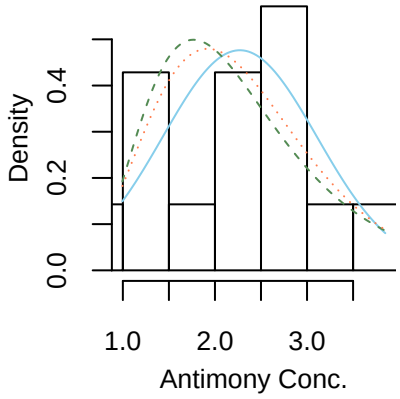


ECDF, Histogram & Q−Q (Detects Only)

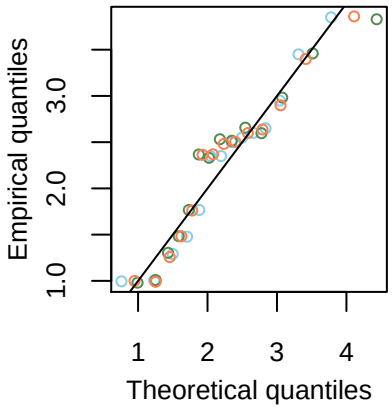
ECDF



Histogram



Q−Q



N = 44	FOD = 32%	Min (detect) = 1 J	Kaplan Meier Mean = 1
N (detect) = 14	SD (log detect) = 0.43	Max (detect) = 3 J	Kaplan Meier SD = 0.84

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.6e−08	–	–	–	–	120.216	123.784
Lognormal	0.0073	0.025	–	–	–	–	85.7912	89.3595
Gamma	–	–	0.1899	0.141	2.175	0.759	93.0079	96.5763

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.54	0.26	–	–	–	–	38.76	40.0381
Lognormal	0.17	0.021	–	–	–	–	39.8713	41.1494
Gamma	–	–	0.2296	0.267	0.4836	0.729	38.9979	40.276

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Antimony

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **173**

Media:
Surface Sediment (0−15 cm)

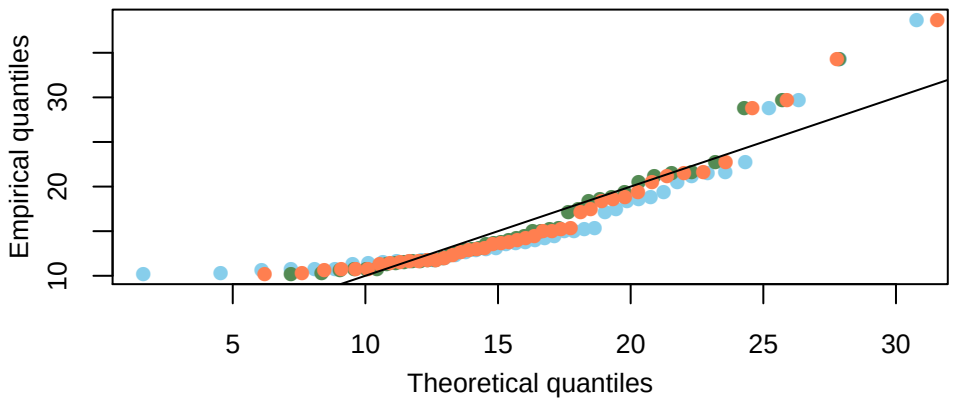
Exposure Unit:
LBC

Chemical (mg/kg):
Arsenic

Legend

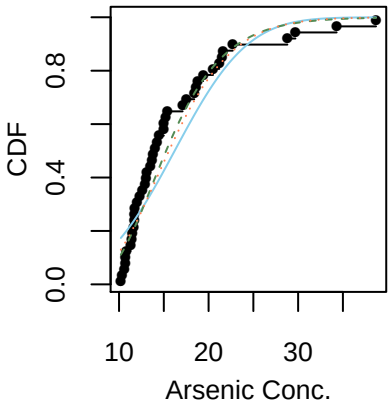
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

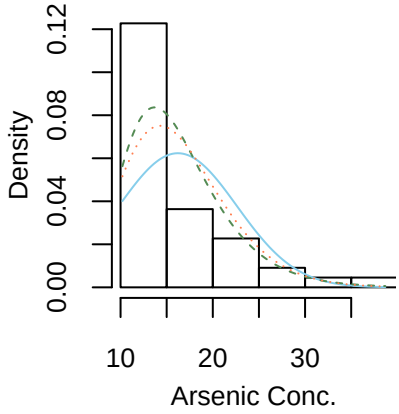


ECDF, Histogram & Q−Q (Detects Only)

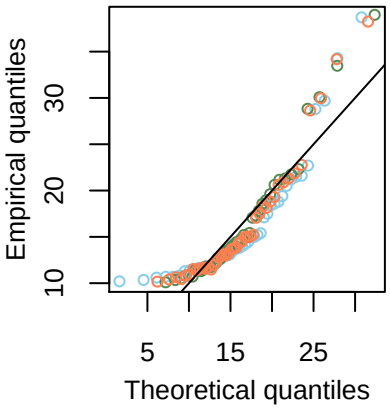
ECDF



Histogram



Q−Q



N = 44	FOD = 100%	Min (detect) = 10 J	Arithmetic Mean = 16
N (detect) = 44	SD (log detect) = 0.33	Max (detect) = 39 J	Arithmetic SD = 6

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.6e−05	–	–	–	–	292.198	295.766
Lognormal	0.001	0.017	–	–	–	–	271.11	274.678
Gamma	–	–	0.1718	0.14	1.788	0.751	276.802	280.37

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Arsenic

Media:
Surface Sediment (0−15 cm)

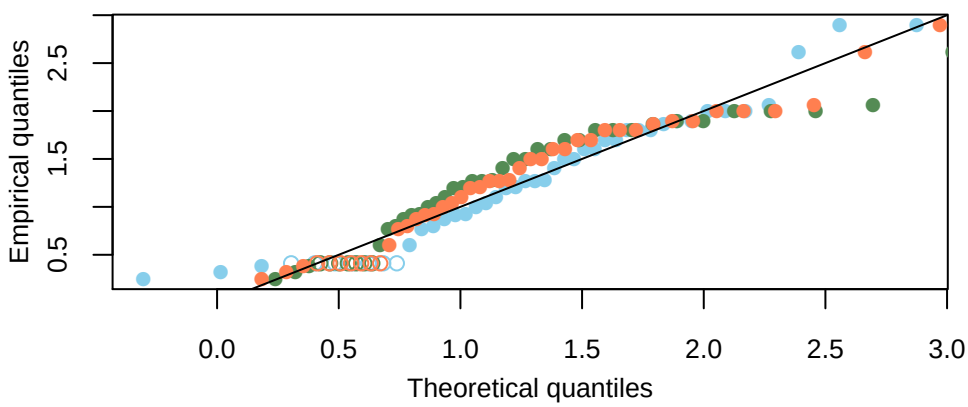
Exposure Unit:
LBC

Chemical (mg/kg):
Cadmium

Legend

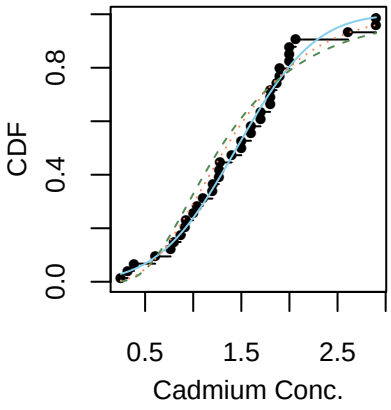
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

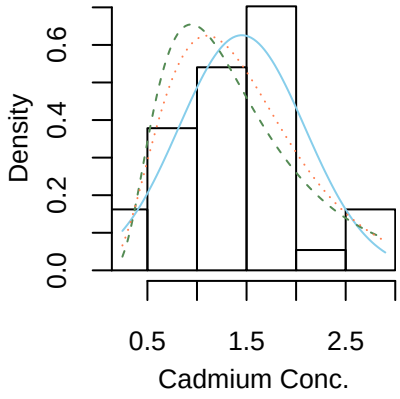


ECDF, Histogram & Q−Q (Detects Only)

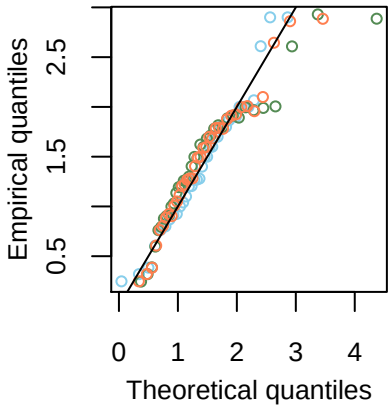
ECDF



Histogram



Q−Q



N = 44	FOD = 84%	Min (detect) = 0.25 J	Kaplan Meier Mean = 1
N (detect) = 37	SD (log detect) = 0.56	Max (detect) = 2 J	Kaplan Meier SD = 0.77

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.033	0.12	–	–	–	–	97.1748	100.743
Lognormal	0.0029	0.012	–	–	–	–	97.7777	101.346
Gamma	–	–	0.1476	0.141	1.045	0.759	93.7289	97.2973

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.48	0.63	–	–	–	–	75.6778	78.8996
Lognormal	0.0032	0.12	–	–	–	–	83.7713	86.9932
Gamma	–	–	0.1046	0.151	0.6128	0.76	77.7934	81.0152

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Cadmium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **175**

Media:
Surface Sediment (0−15 cm)

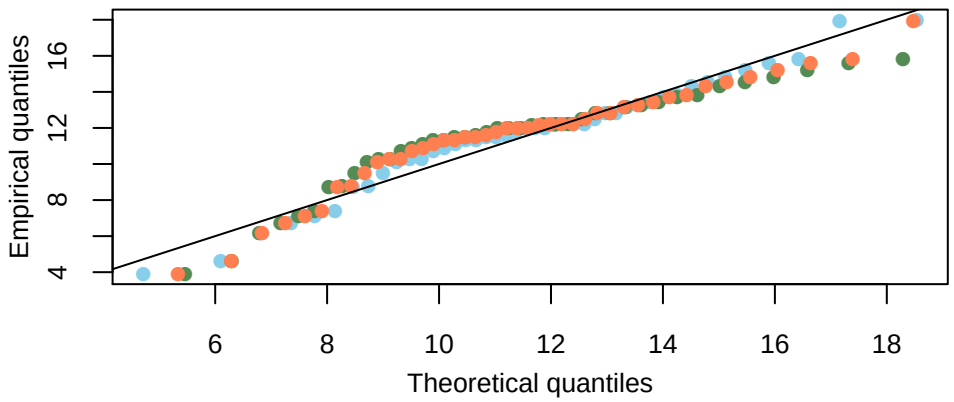
Exposure Unit:
LBC

Chemical (mg/kg):
Cobalt

Legend

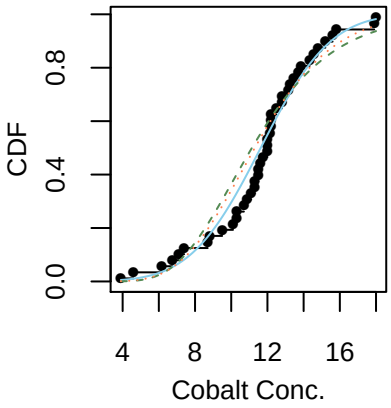
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

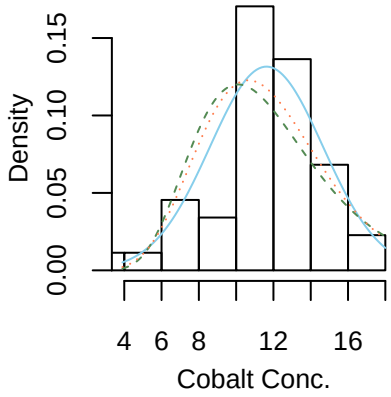


ECDF, Histogram & Q−Q (Detects Only)

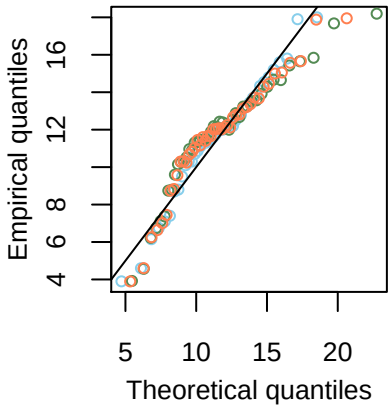
ECDF



Histogram



Q−Q



N = 44	FOD = 100%	Min (detect) = 3 J	Arithmetic Mean = 12
N (detect) = 44	SD (log detect) = 0.32	Max (detect) = 18 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.22	0.14	–	–	–	–	226.502	230.071
Lognormal	0.00019	0.0014	–	–	–	–	238.881	242.449
Gamma	–	–	0.1585	0.139	1.335	0.748	233.281	236.849

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Cobalt

Media:
Surface Sediment (0−15 cm)

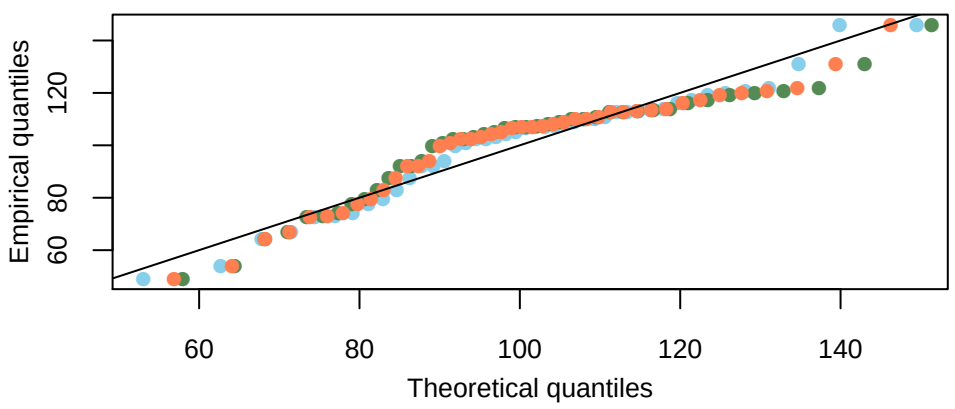
Exposure Unit:
LBC

Chemical (mg/kg):
Copper

Legend

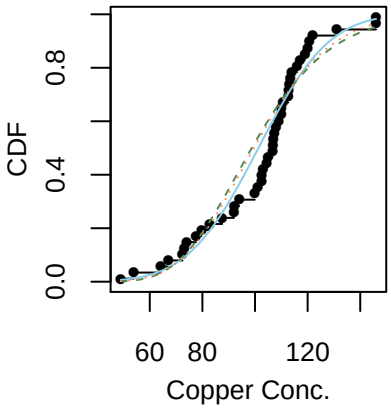
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

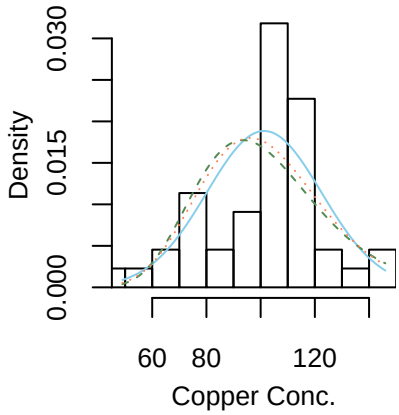


ECDF, Histogram & Q−Q (Detects Only)

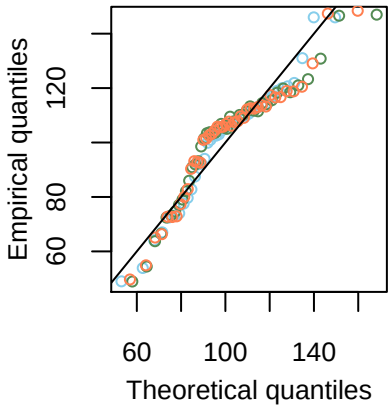
ECDF



Histogram



Q−Q



N = 44	FOD = 100%	Min (detect) = 49 J	Arithmetic Mean = 100
N (detect) = 44	SD (log detect) = 0.24	Max (detect) = 150 J	Arithmetic SD = 21

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.054	0.007	–	–	–	–	397.496	401.064
Lognormal	0.001	0.00012	–	–	–	–	405.228	408.796
Gamma	–	–	0.1872	0.139	1.516	0.747	401.914	405.483

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Copper

Media:
Surface Sediment (0−15 cm)

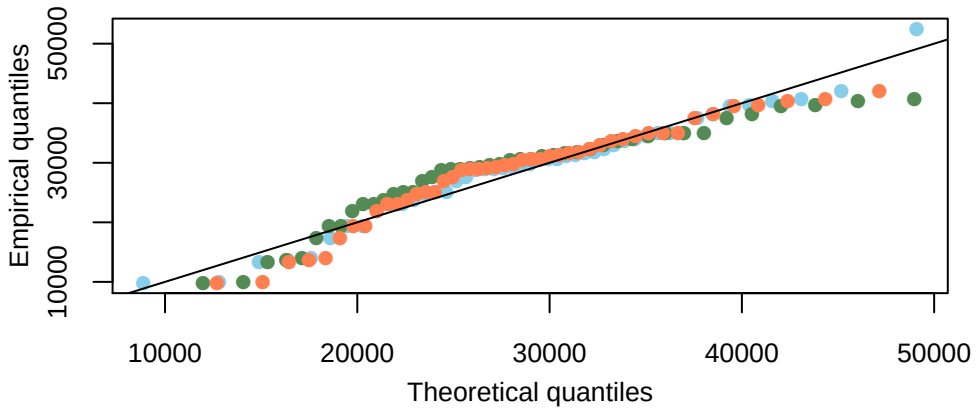
Exposure Unit:
LBC

Chemical (mg/kg):
Iron

Legend

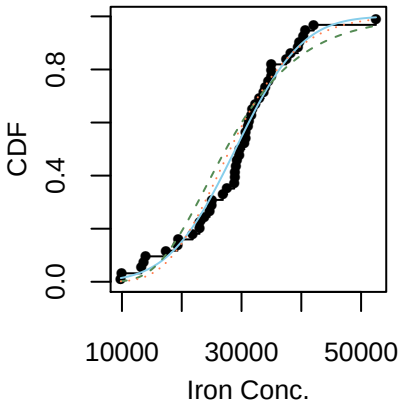
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

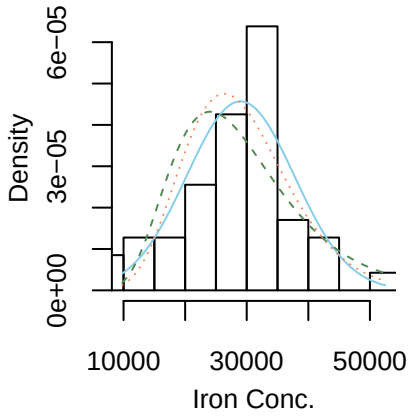


ECDF, Histogram & Q−Q (Detects Only)

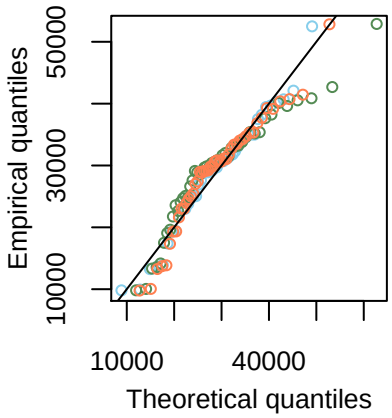
ECDF



Histogram



Q−Q



N = 47	FOD = 100%	Min (detect) = 9,800 J	Arithmetic Mean = 29,000
N (detect) = 47	SD (log detect) = 0.36	Max (detect) = 52,000 J	Arithmetic SD = 8,800

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.3	0.046	–	–	–	–	990.402	994.102
Lognormal	0.00037	0.00015	–	–	–	–	1001.76	1005.47
Gamma	–	–	0.1697	0.132	1.308	0.748	997.153	1000.85

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Iron

Media:
Surface Sediment (0−15 cm)

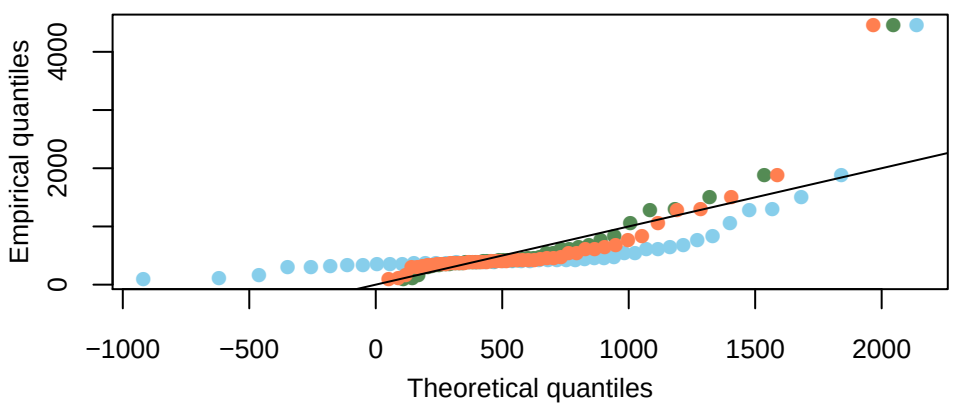
Exposure Unit:
LBC

Chemical (mg/kg):
Manganese

Legend

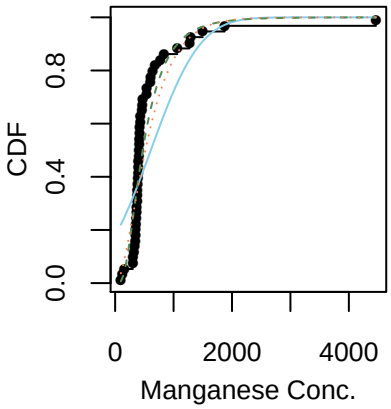
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

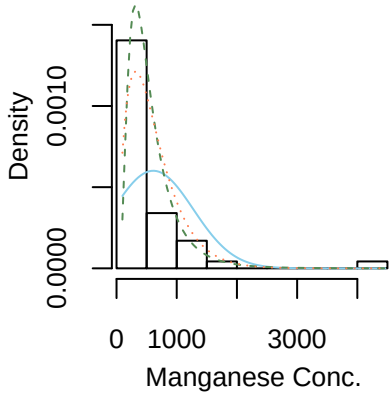


ECDF, Histogram & Q−Q (Detects Only)

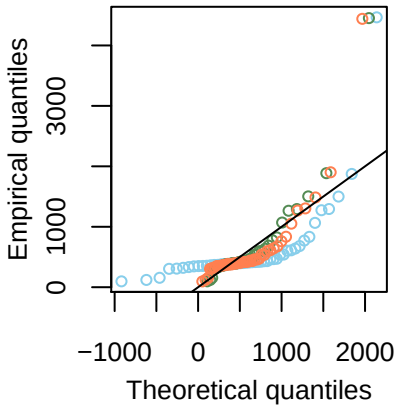
ECDF



Histogram



Q−Q



N = 47	FOD = 100%	Min (detect) = 97 J	Arithmetic Mean = 610
N (detect) = 47	SD (log detect) = 0.64	Max (detect) = 4,500 J	Arithmetic SD = 670

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.2e−11	–	–	–	–	748.183	751.883
Lognormal	8e−05	4.4e−05	–	–	–	–	673.705	677.406
Gamma	–	–	0.2509	0.133	3.921	0.761	688.859	692.559

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Manganese

Media:
Surface Sediment (0−15 cm)

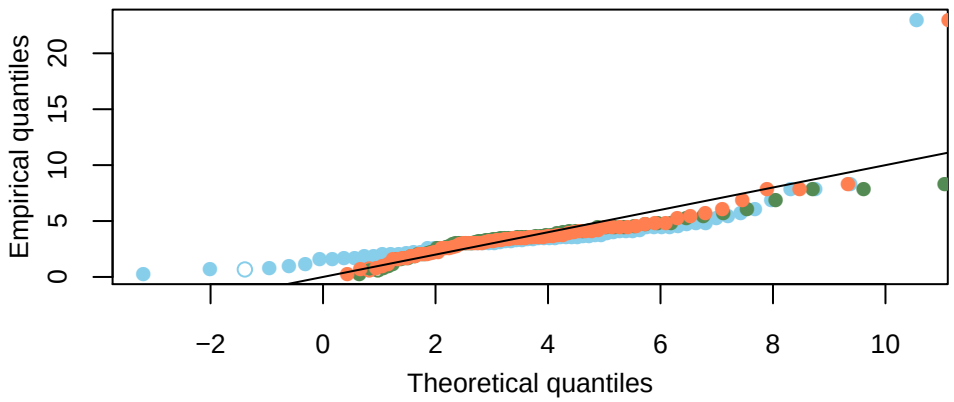
Exposure Unit:
LBC

Chemical (mg/kg):
Mercury

Legend

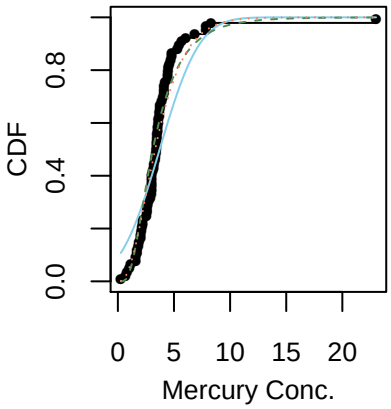
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

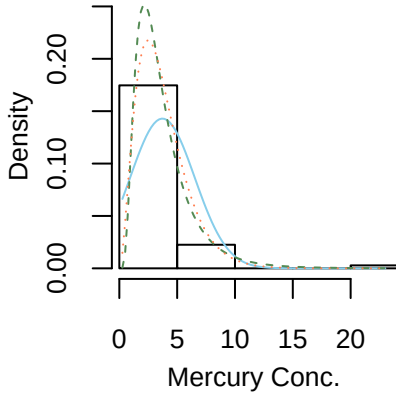


ECDF, Histogram & Q−Q (Detects Only)

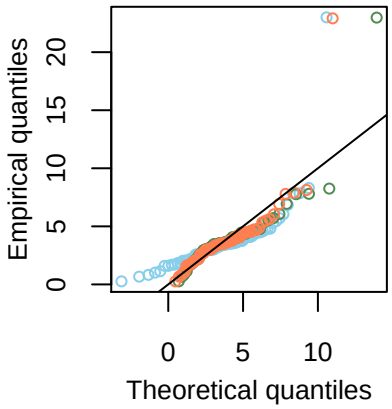
ECDF



Histogram



Q−Q



N = 72	FOD = 99%	Min (detect) = 0.26 J	Kaplan Meier Mean = 3
N (detect) = 71	SD (log detect) = 0.61	Max (detect) = 23 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.5e−09	–	–	–	–	356.317	360.87
Lognormal	9e−05	0.00028	–	–	–	–	302.951	307.505
Gamma	–	–	0.129	0.108	1.663	0.763	302.324	306.877

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.6e−09	–	–	–	–	351.246	355.772
Lognormal	8e−05	0.00061	–	–	–	–	296.808	301.334
Gamma	–	–	0.1318	0.108	1.679	0.763	297.107	301.632

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **180**

Media:
Surface Sediment (0−15 cm)

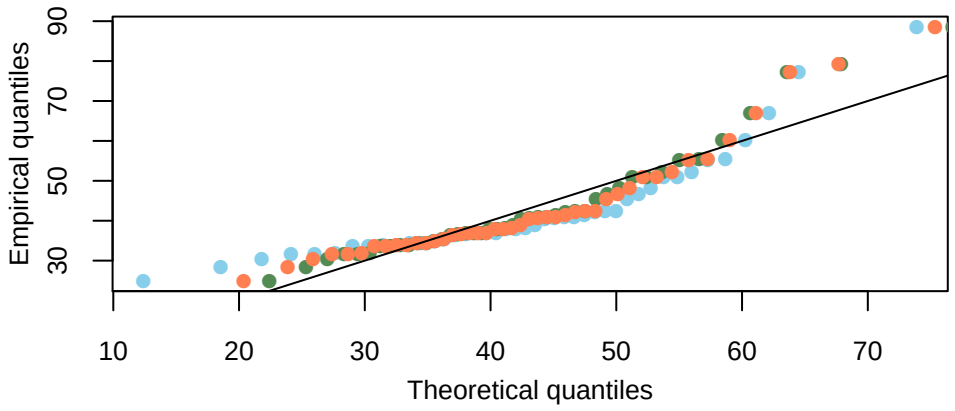
Exposure Unit:
LBC

Chemical (mg/kg):
Nickel

Legend

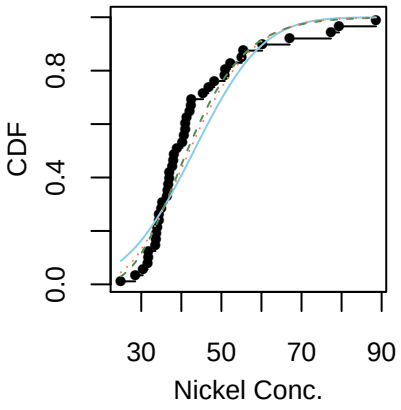
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

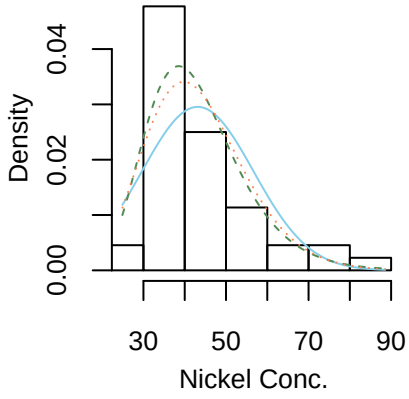


ECDF, Histogram & Q−Q (Detects Only)

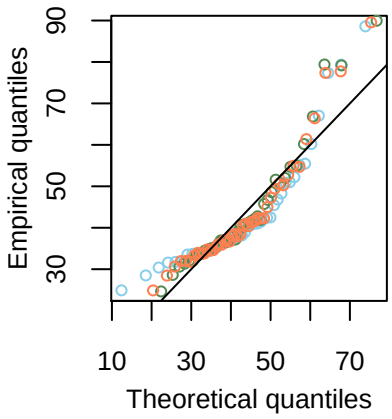
ECDF



Histogram



Q−Q



N = 44	FOD = 100%	Min (detect) = 25 J	Arithmetic Mean = 43
N (detect) = 44	SD (log detect) = 0.27	Max (detect) = 89 J	Arithmetic SD = 14

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	7.8e−06	–	–	–	–	357.891	361.46
Lognormal	0.006	0.003	–	–	–	–	341.52	345.088
Gamma	–	–	0.1887	0.139	1.663	0.748	345.99	349.558

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Nickel

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **181**

Media:
Surface Sediment (0−15 cm)

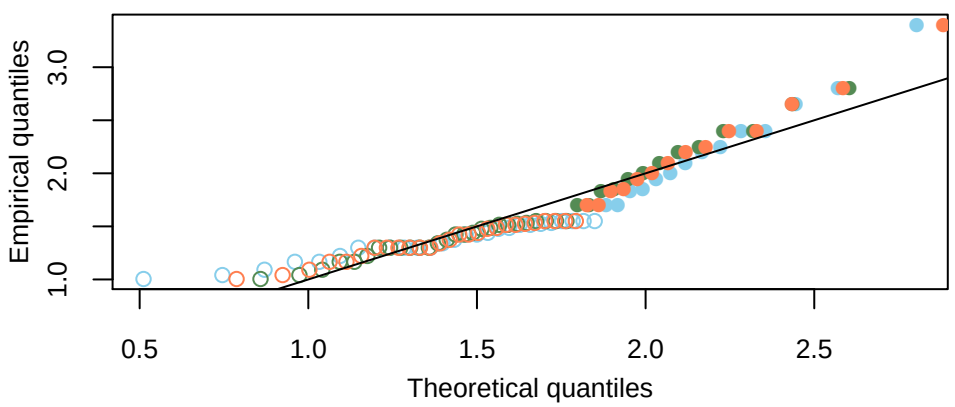
Exposure Unit:
LBC

Chemical (mg/kg):
Thallium

Legend

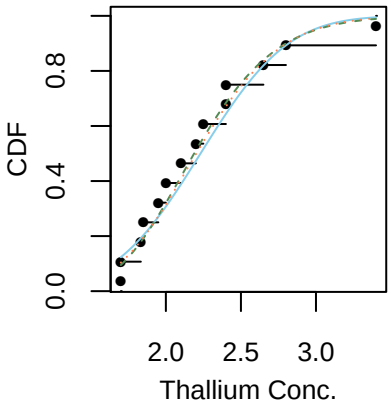
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

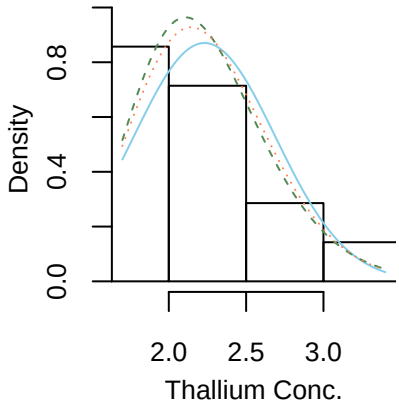


ECDF, Histogram & Q−Q (Detects Only)

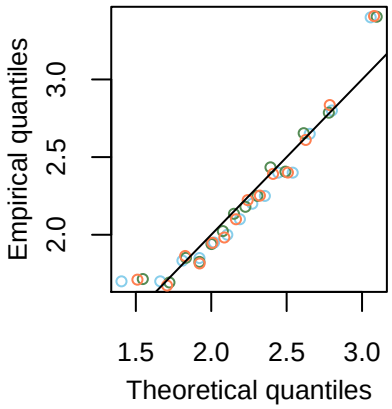
ECDF



Histogram



Q−Q



N = 44	FOD = 32%	Min (detect) = 1 J	Kaplan Meier Mean = 1
N (detect) = 14	SD (log detect) = 0.2	Max (detect) = 3 J	Kaplan Meier SD = 0.61

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00019	2.3e−06	–	–	–	–	65.024	68.4512
Lognormal	0.051	0.00036	–	–	–	–	52.5128	55.94
Gamma	–	–	0.2144	0.139	1.164	0.748	55.7809	59.2081

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.15	0.57	–	–	–	–	21.8861	23.1642
Lognormal	0.56	0.93	–	–	–	–	19.5442	20.8223
Gamma	–	–	0.1148	0.266	0.2965	0.725	20.186	21.4642

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Thallium

Media:
Surface Sediment (0−15 cm)

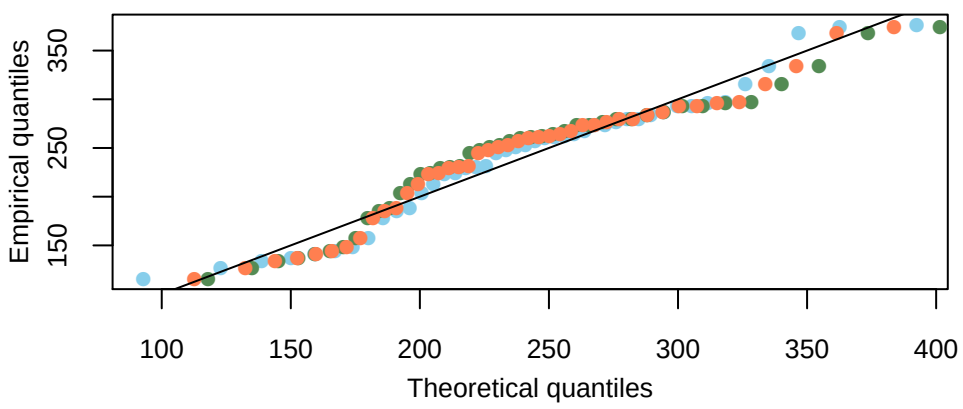
Exposure Unit:
LBC

Chemical (mg/kg):
Zinc

Legend

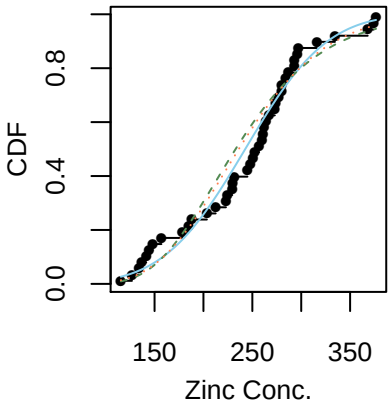
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

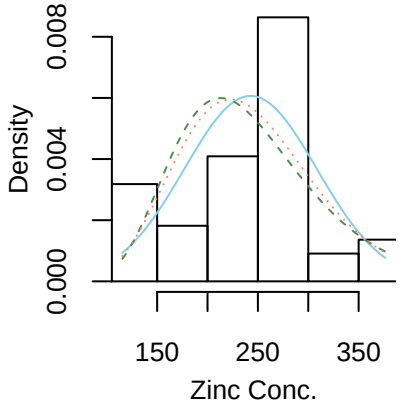


ECDF, Histogram & Q−Q (Detects Only)

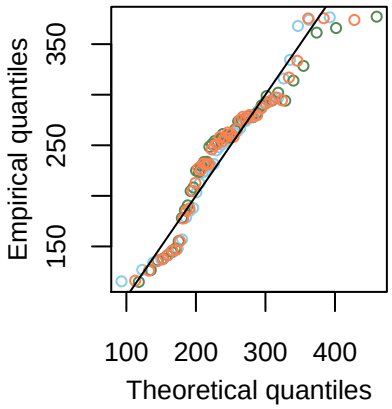
ECDF



Histogram



Q−Q



N = 44	FOD = 100%	Min (detect) = 120 J	Arithmetic Mean = 240
N (detect) = 44	SD (log detect) = 0.3	Max (detect) = 380 J	Arithmetic SD = 67

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.13	0.27	–	–	–	–	497.228	500.797
Lognormal	0.0062	0.0078	–	–	–	–	502.197	505.765
Gamma	–	–	0.1418	0.139	1.094	0.748	499.576	503.144

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Zinc

Media:
Surface Sediment (0−15 cm)

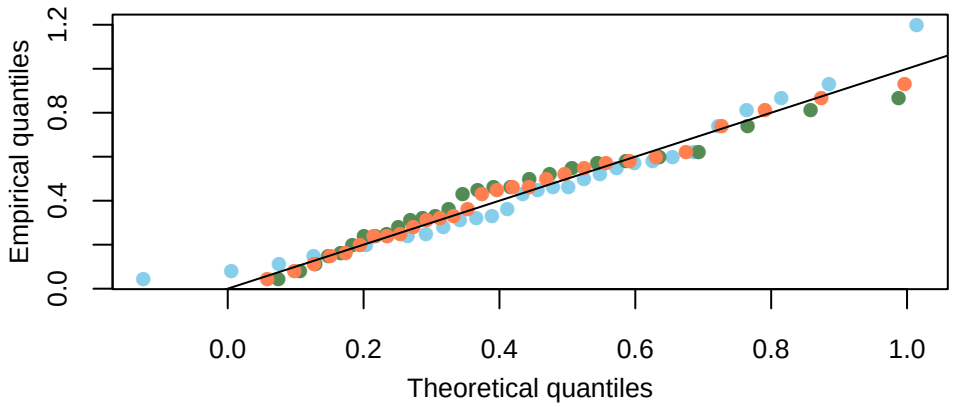
Exposure Unit:
LBC

Chemical (mg/kg):
Benz[a]anthracene

Legend

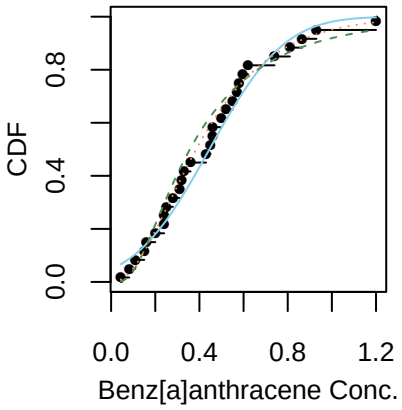
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

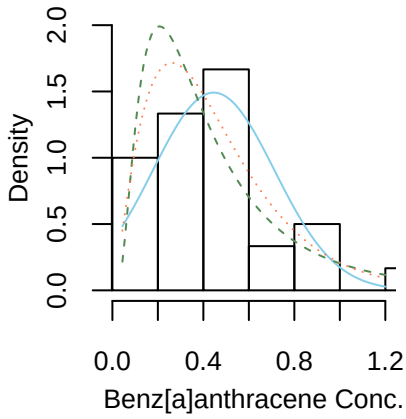


ECDF, Histogram & Q−Q (Detects Only)

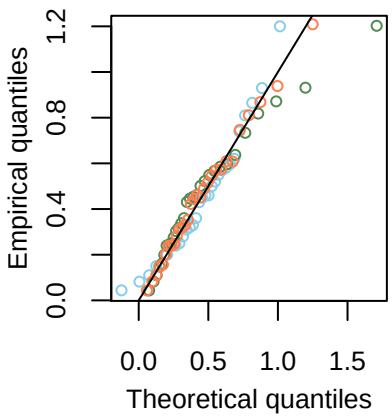
ECDF



Histogram



Q−Q



N = 30	FOD = 100%	Min (detect) = 0.044 J	Arithmetic Mean = 0.45
N (detect) = 30	SD (log detect) = 0.75	Max (detect) = 1 J	Arithmetic SD = 0.27

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.18	0.66	–	–	–	–	10.0144	12.8168
Lognormal	0.15	0.2	–	–	–	–	8.92859	11.731
Gamma	–	–	0.09809	0.162	0.1711	0.758	4.99218	7.79457

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Benz[a]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **184**

Media:
Surface Sediment (0−15 cm)

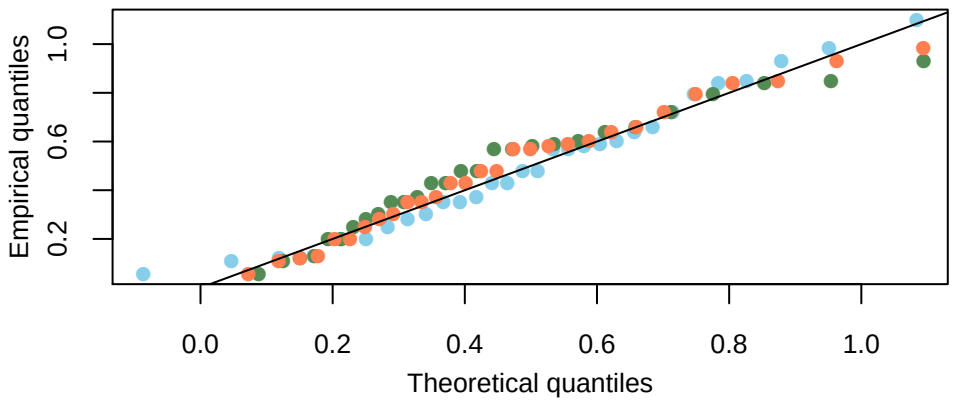
Exposure Unit:
LBC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

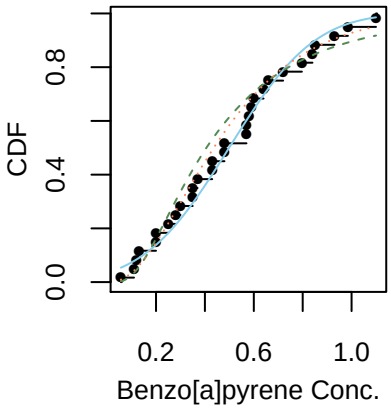
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

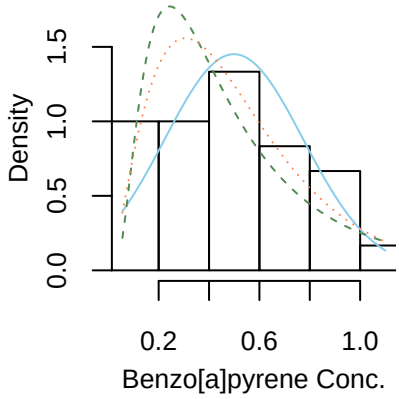


ECDF, Histogram & Q−Q (Detects Only)

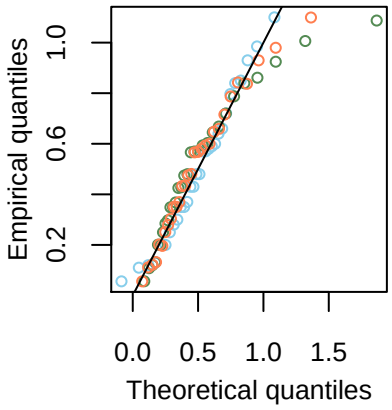
ECDF



Histogram



Q−Q



N = 30	FOD = 100%	Min (detect) = 0.056 J	Arithmetic Mean = 0.5
N (detect) = 30	SD (log detect) = 0.73	Max (detect) = 1 J	Arithmetic SD = 0.28

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.54	0.92	–	–	–	–	11.6678	14.4702
Lognormal	0.038	0.11	–	–	–	–	15.0799	17.8823
Gamma	–	–	0.1315	0.162	0.3492	0.758	10.4329	13.2353

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

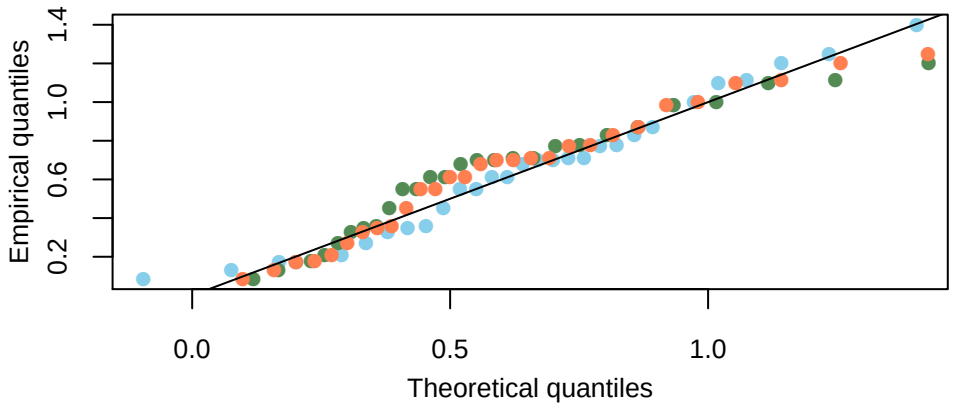
DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Benzo[a]pyrene

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
LBC
Chemical (mg/kg):
Benzo[b]fluoranthene

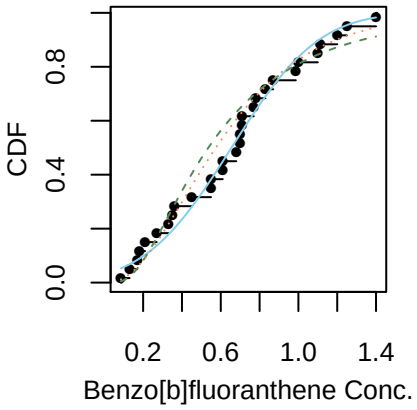
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

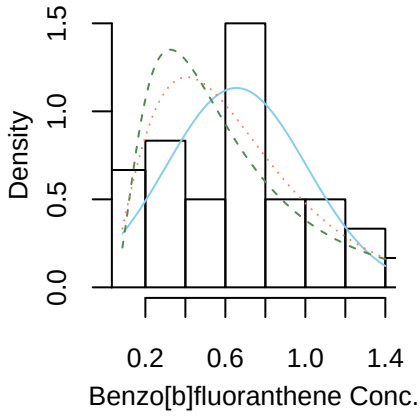


ECDF, Histogram & Q−Q (Detects Only)

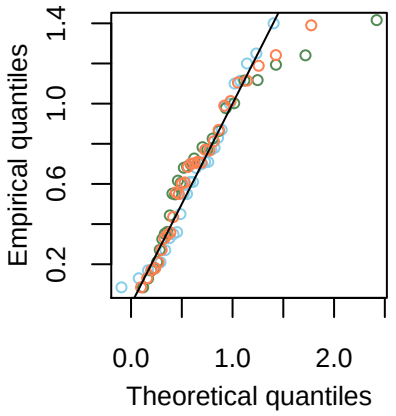
ECDF



Histogram



Q−Q



N = 30	FOD = 100%	Min (detect) = 0.085 J	Arithmetic Mean = 0.66
N (detect) = 30	SD (log detect) = 0.72	Max (detect) = 1 J	Arithmetic SD = 0.36

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.49	0.7	–	–	–	–	26.5205	29.3229
Lognormal	0.019	0.013	–	–	–	–	31.0191	33.8215
Gamma	–	–	0.1399	0.162	0.5473	0.758	26.2955	29.0979

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Benzo[b]fluoranthene

Media:
Surface Sediment (0−15 cm)

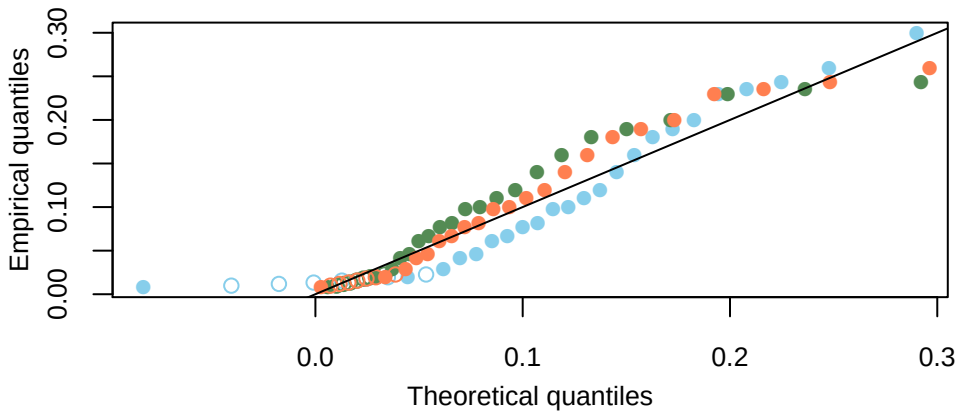
Exposure Unit:
LBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

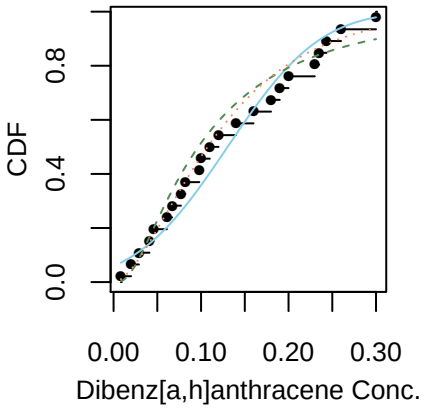
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

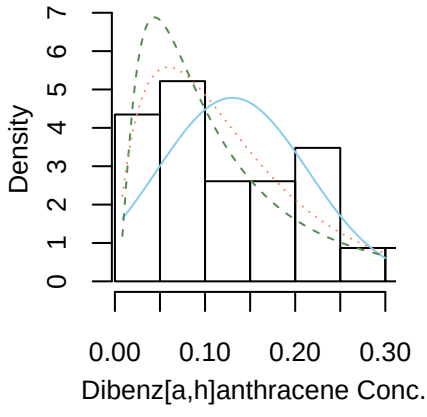


ECDF, Histogram & Q−Q (Detects Only)

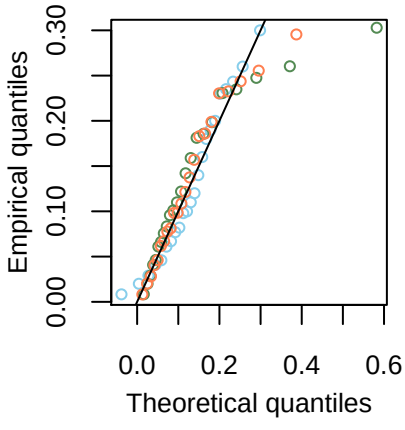
ECDF



Histogram



Q−Q



N = 30	FOD = 77%	Min (detect) = 0.0083 J	Kaplan Meier Mean = 0.1
N (detect) = 23	SD (log detect) = 0.91	Max (detect) = 0.3 J	Kaplan Meier SD = 0.089

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0042	0.12	–	–	–	–	−56.9264	−54.124
Lognormal	0.035	0.34	–	–	–	–	−70.54	−67.7376
Gamma	–	–	0.1311	0.165	0.6054	0.775	−72.3387	−69.5363

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.27	0.57	–	–	–	–	−44.9913	−42.7203
Lognormal	0.064	0.61	–	–	–	–	−43.5739	−41.3029
Gamma	–	–	0.107	0.187	0.2634	0.769	−47.9402	−45.6693

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **187**

Media:
Surface Sediment (0−15 cm)

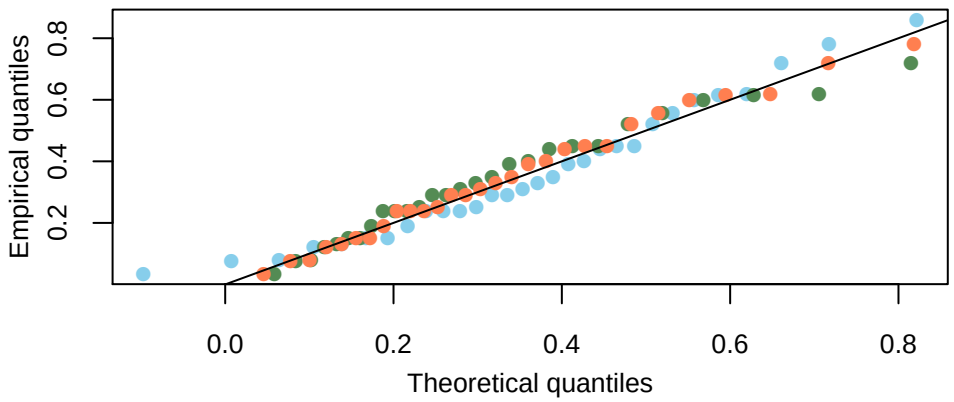
Exposure Unit:
LBC

Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

Legend

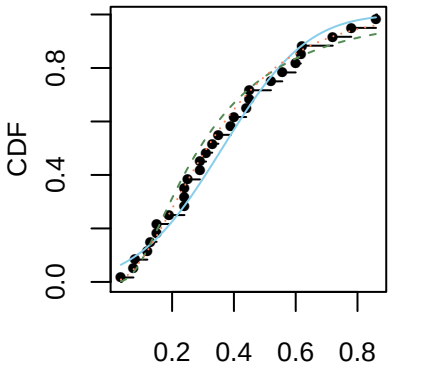
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

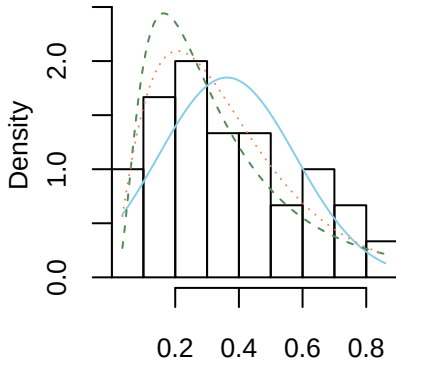


ECDF, Histogram & Q−Q (Detects Only)

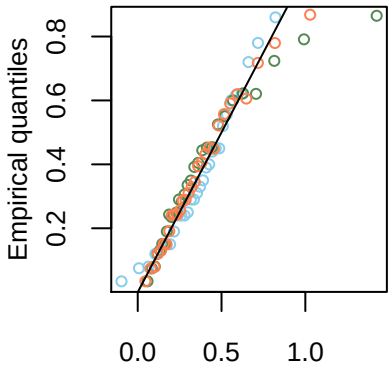
ECDF



Histogram



Q−Q



N = 30	FOD = 100%	Min (detect) = 0.034 J	Arithmetic Mean = 0.36
N (detect) = 30	SD (log detect) = 0.76	Max (detect) = 0.86 J	Arithmetic SD = 0.22

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.26	0.69	–	–	–	–	−2.84013	−0.037733
Lognormal	0.1	0.15	–	–	–	–	−2.65203	0.150363
Gamma	–	–	0.09117	0.162	0.1925	0.758	−6.77825	−3.97585

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

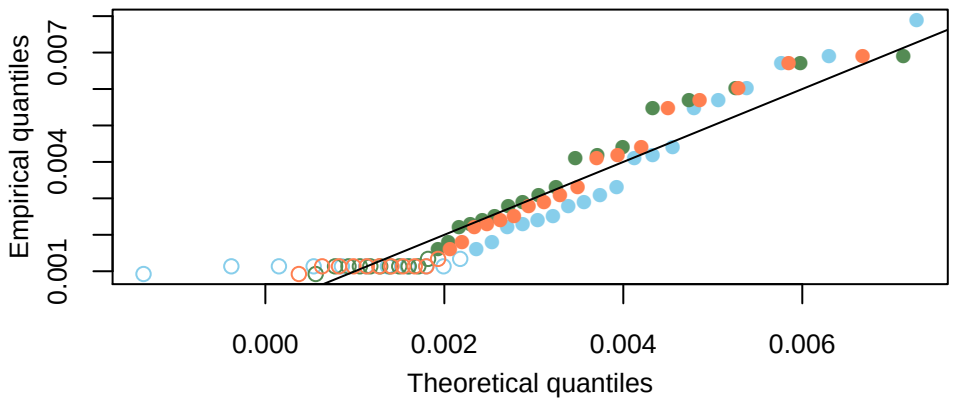
DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Indeno[1,2,3−cd]pyrene

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
LBC
Chemical (mg/kg):
Aldrin

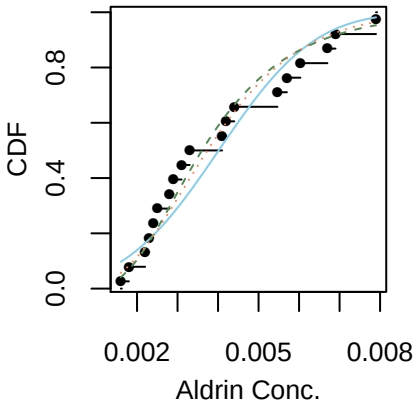
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

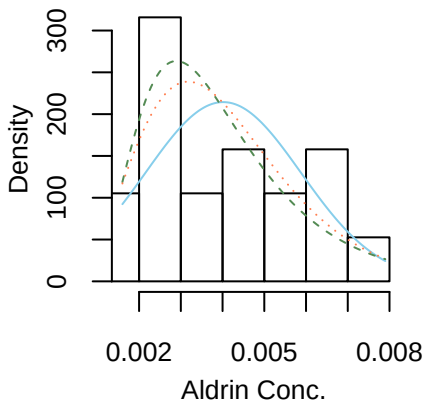


ECDF, Histogram & Q−Q (Detects Only)

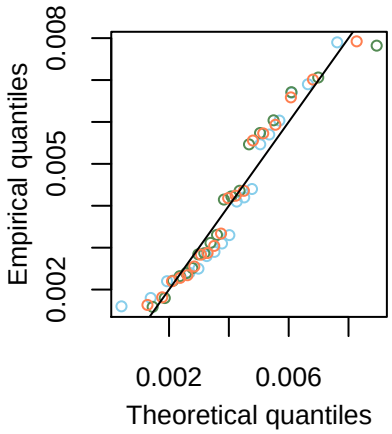
ECDF



Histogram



Q−Q



N = 30	FOD = 63%	Min (detect) = 0.0016 J	Kaplan Meier Mean = 0.0026
N (detect) = 19	SD (log detect) = 0.48	Max (detect) = 0.0079 J	Kaplan Meier SD = 0.0024

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00059	0.043	–	–	–	–	−282.833	−280.03
Lognormal	0.0082	0.0072	–	–	–	–	−297.644	−294.842
Gamma	–	–	0.1828	0.162	1.152	0.758	−295.285	−292.483

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.11	0.14	–	–	–	–	−180.979	−179.09
Lognormal	0.53	0.64	–	–	–	–	−184.64	−182.751
Gamma	–	–	0.1287	0.201	0.3913	0.752	−184.241	−182.352

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Aldrin

Media:
Surface Sediment (0−15 cm)

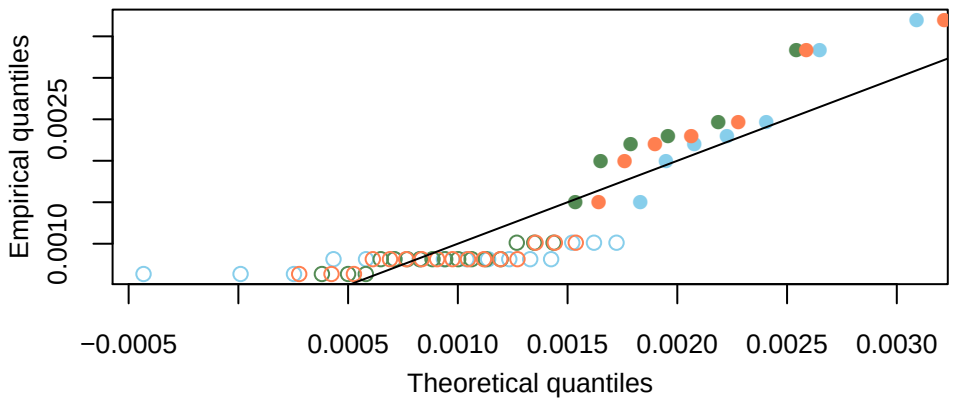
Exposure Unit:
LBC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

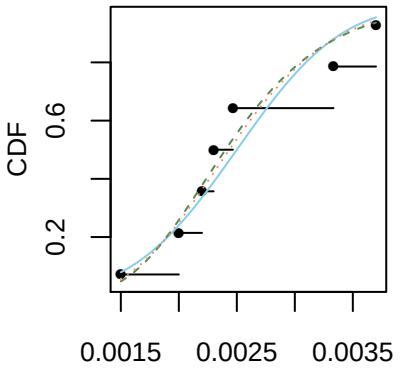
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

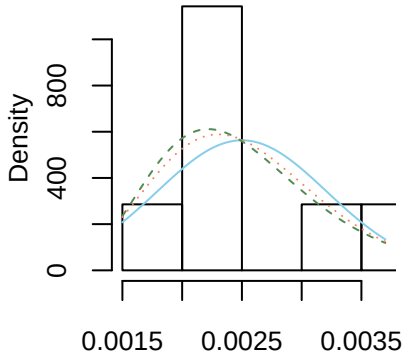


ECDF, Histogram & Q−Q (Detects Only)

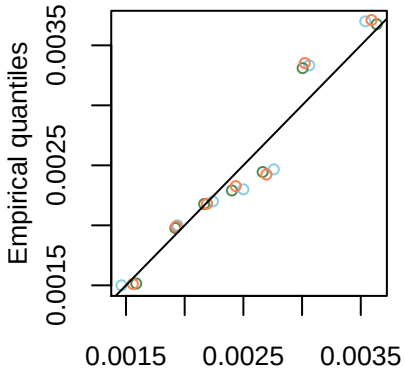
ECDF



Histogram



Q−Q



N = 23	FOD = 30%	Min (detect) = 0.0015 J	Kaplan Meier Mean = 0.00087
N (detect) = 7	SD (log detect) = 0.31	Max (detect) = 0.0037 J	Kaplan Meier SD = 0.0011

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	3e−05	3.1e−07	–	–	–	–	−254.756	−252.485
Lognormal	0.00053	2.8e−05	–	–	–	–	−271.522	−269.251
Gamma	–	–	NA	NA	NA	NA	−267.211	−264.94

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.59	0.31	–	–	–	–	−77.6644	−77.7726
Lognormal	0.83	0.71	–	–	–	–	−78.2588	−78.3669
Gamma	–	–	NA	NA	NA	NA	−78.1889	−78.2971

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−Heptachlor Epoxide

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **190**

Media:
Surface Sediment (0−15 cm)

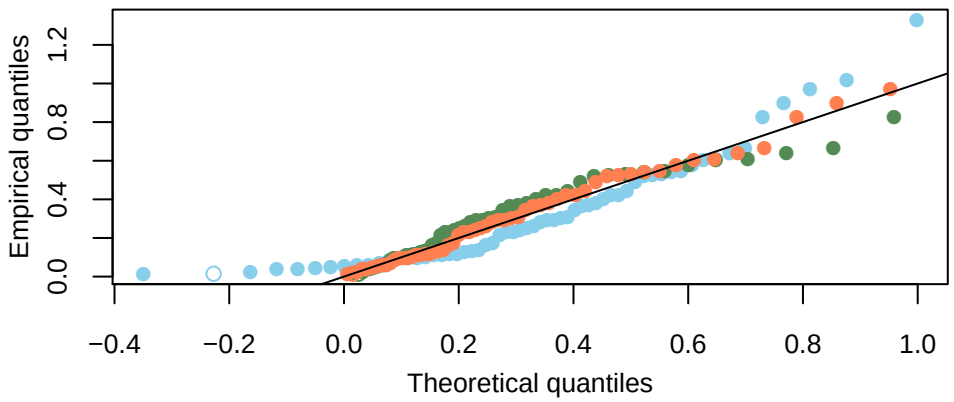
Exposure Unit:
LBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

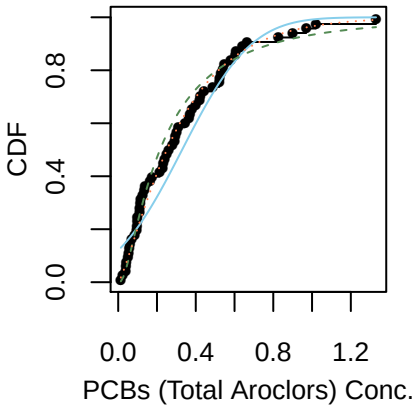
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

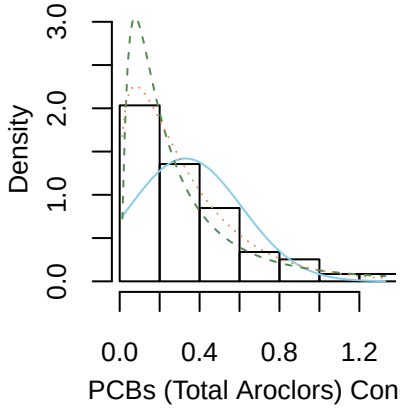


ECDF, Histogram & Q−Q (Detects Only)

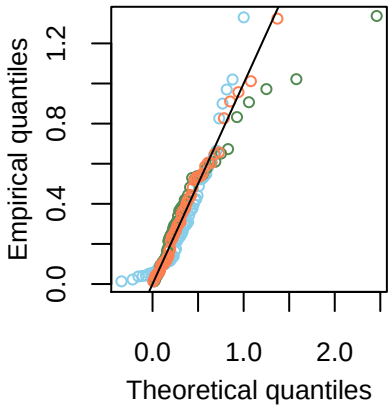
ECDF



Histogram



Q−Q



N = 60	FOD = 98%	Min (detect) = 0.014 J	Kaplan Meier Mean = 0.32
N (detect) = 59	SD (log detect) = 1	Max (detect) = 1 J	Kaplan Meier SD = 0.28

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−05	0.0071	–	–	–	–	22.1667	26.3554
Lognormal	0.052	0.092	–	–	–	–	−7.3928	−3.20411
Gamma	–	–	0.07936	0.118	0.3093	0.779	−12.6677	−8.47902

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−05	0.012	–	–	–	–	21.6319	25.7869
Lognormal	0.11	0.15	–	–	–	–	−7.37229	−3.21722
Gamma	–	–	0.08552	0.129	0.3329	0.78	−11.4341	−7.27899

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in LBC−PCBs (Total Aroclors)

Media:
Surface Sediment (0−15 cm)

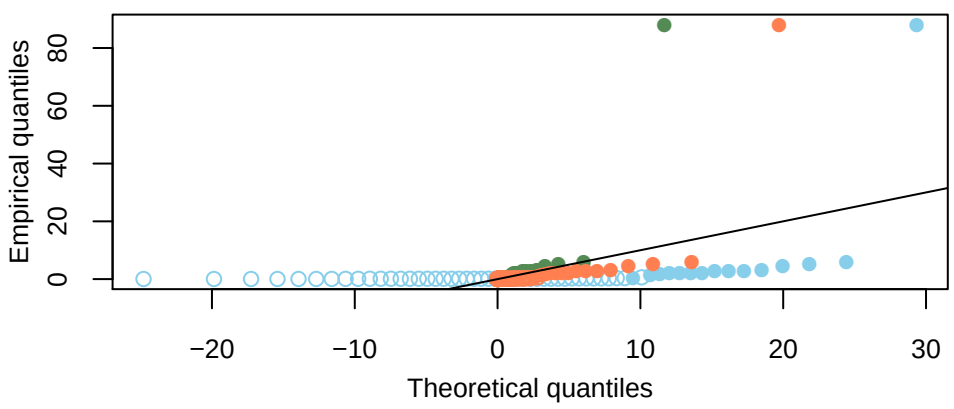
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Antimony

Legend

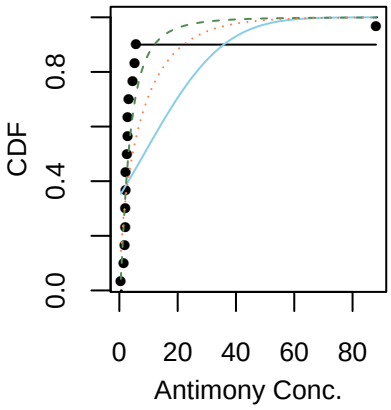
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

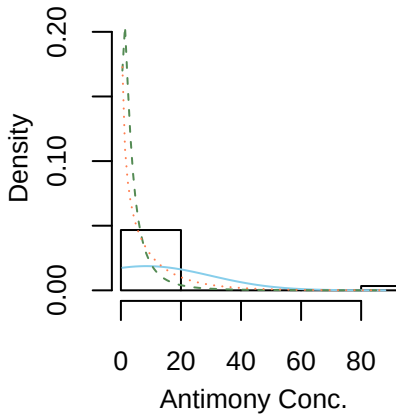


ECDF, Histogram & Q−Q (Detects Only)

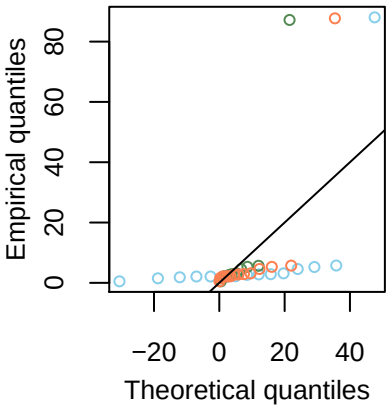
ECDF



Histogram



Q−Q



N = 59	FOD = 25%	Min (detect) = 0.5 J	Kaplan Meier Mean = 2
N (detect) = 15	SD (log detect) = 1.1	Max (detect) = 88 J	Kaplan Meier SD = 11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.9e−30	–	–	–	–	457.965	462.121
Lognormal	0	2.7e−09	–	–	–	–	83.0689	87.224
Gamma	–	–	0.3183	0.139	8.797	0.9121	143.567	147.722

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.3e−10	–	–	–	–	138.335	139.752
Lognormal	0.0019	0.036	–	–	–	–	82.1514	83.5675
Gamma	–	–	0.3721	0.234	2.78	0.793	95.2323	96.6484

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

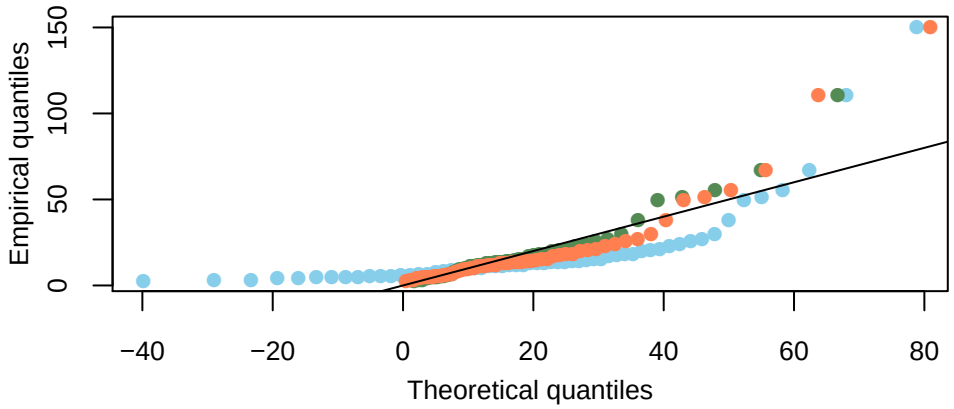
Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Antimony

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Arsenic

Legend

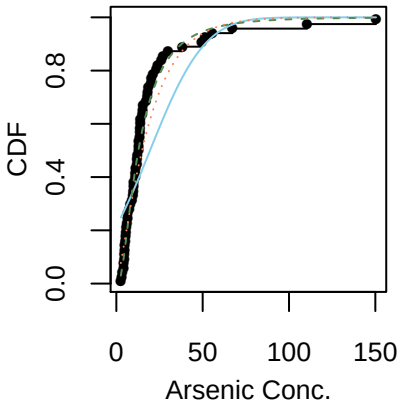
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

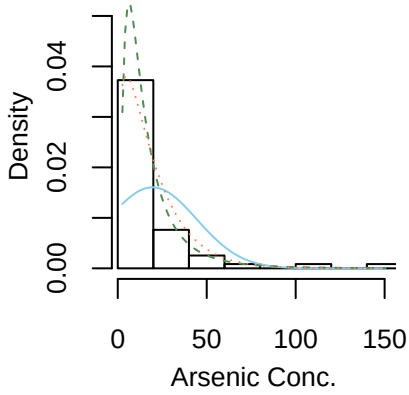


ECDF, Histogram & Q−Q (Detects Only)

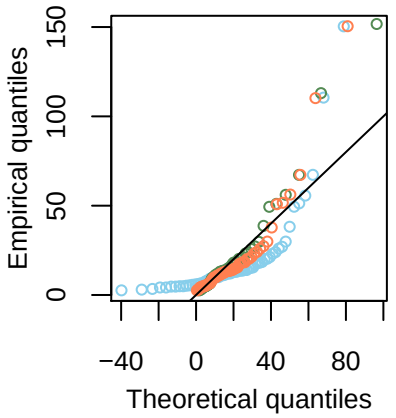
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 20
N (detect) = 59	SD (log detect) = 0.85	Max (detect) = 150 J	Arithmetic SD = 25

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−11	–	–	–	–	550.552	554.707
Lognormal	0.1	0.28	–	–	–	–	452.358	456.513
Gamma	–	–	0.1622	0.129	2.157	0.78	469.967	474.122

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Arsenic

Media:
Surface Sediment (0−15 cm)

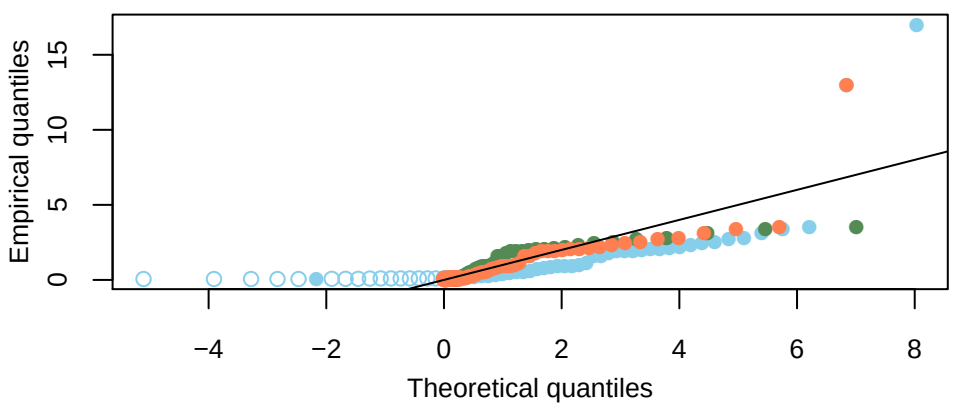
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Cadmium

Legend

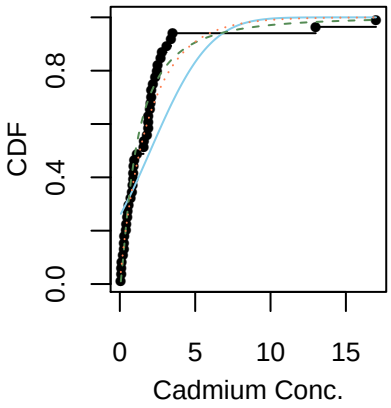
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

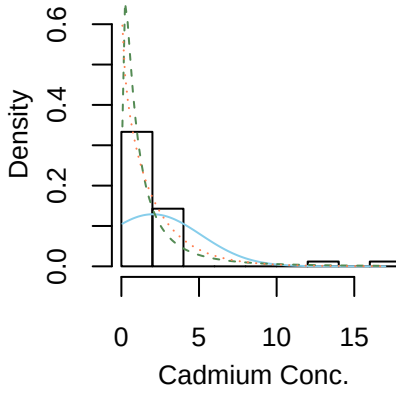


ECDF, Histogram & Q−Q (Detects Only)

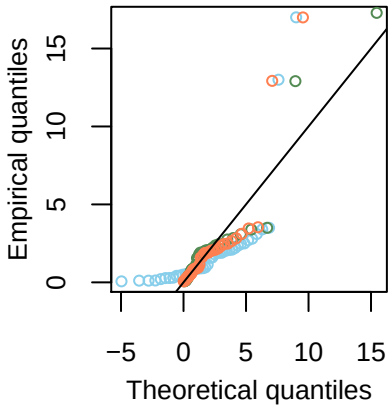
ECDF



Histogram



Q−Q



N = 59	FOD = 71%	Min (detect) = 0.065 J	Kaplan Meier Mean = 1
N (detect) = 42	SD (log detect) = 1.2	Max (detect) = 17 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.9e−15	–	–	–	–	290.89	295.045
Lognormal	4e−04	6.4e−05	–	–	–	–	140.258	144.413
Gamma	–	–	0.1674	0.132	2.01	0.814	152.427	156.582

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.7e−09	–	–	–	–	217.99	221.465
Lognormal	0.13	0.055	–	–	–	–	141.382	144.858
Gamma	–	–	0.1339	0.148	1.009	0.813	146.761	150.237

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Cadmium

Media:
Surface Sediment (0−15 cm)

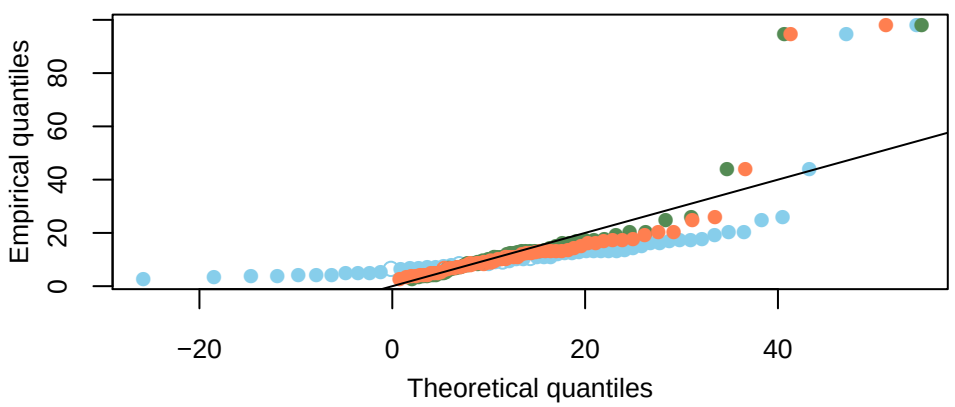
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Cobalt

Legend

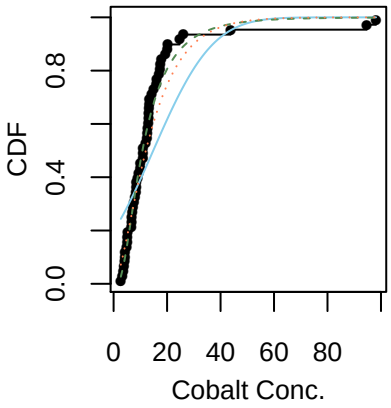
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

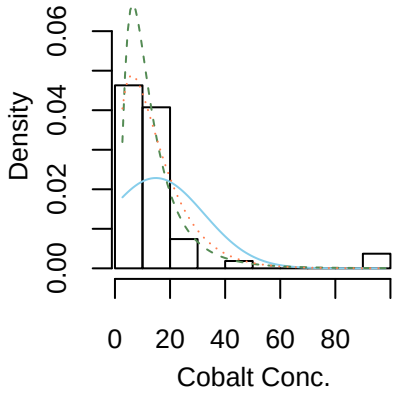


ECDF, Histogram & Q−Q (Detects Only)

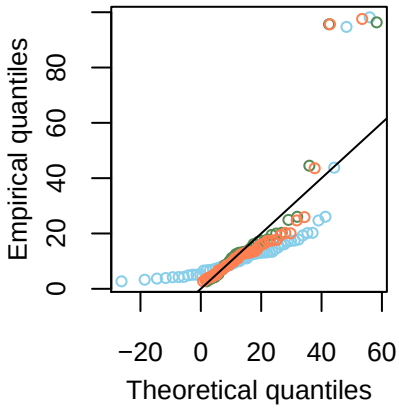
ECDF



Histogram



Q−Q



N = 59	FOD = 92%	Min (detect) = 2 J	Kaplan Meier Mean = 14
N (detect) = 54	SD (log detect) = 0.72	Max (detect) = 98 J	Kaplan Meier SD = 17

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.5e−13	–	–	–	–	504.323	508.478
Lognormal	0.0066	0.2	–	–	–	–	405.881	410.037
Gamma	–	–	0.1631	0.129	2.454	0.78	425.706	429.861

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.3e−12	–	–	–	–	466.109	470.087
Lognormal	0.014	0.21	–	–	–	–	377.994	381.972
Gamma	–	–	0.1603	0.129	2.149	0.78	395.173	399.151

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Cobalt

Media:
Surface Sediment (0−15 cm)

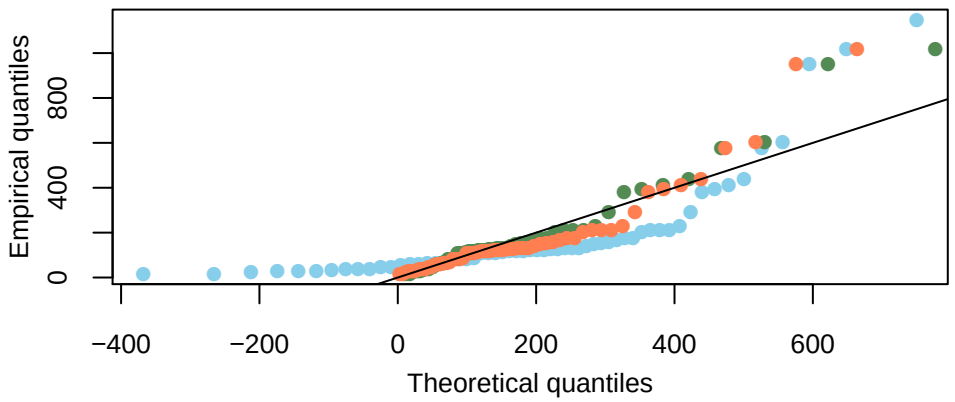
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Copper

Legend

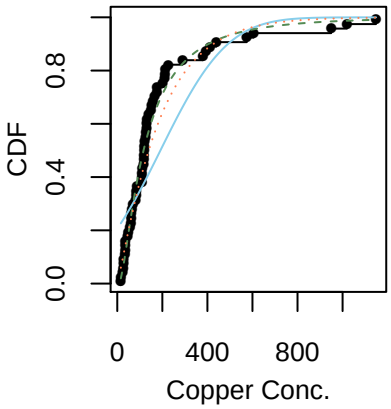
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

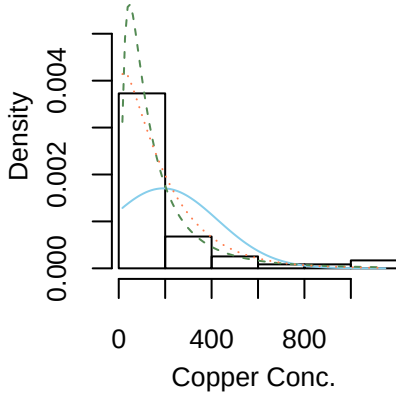


ECDF, Histogram & Q−Q (Detects Only)

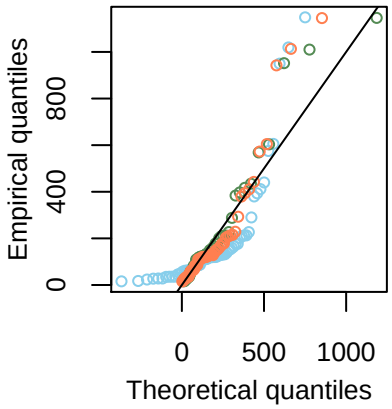
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 16	Arithmetic Mean = 190
N (detect) = 59	SD (log detect) = 0.98	Max (detect) = 1,100 J	Arithmetic SD = 240

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.5e−12	–	–	–	–	815.205	819.36
Lognormal	0.29	0.12	–	–	–	–	729.455	733.61
Gamma	–	–	0.1538	0.129	1.719	0.78	741.366	745.521

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Copper

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **196**

Media:
Surface Sediment (0−15 cm)

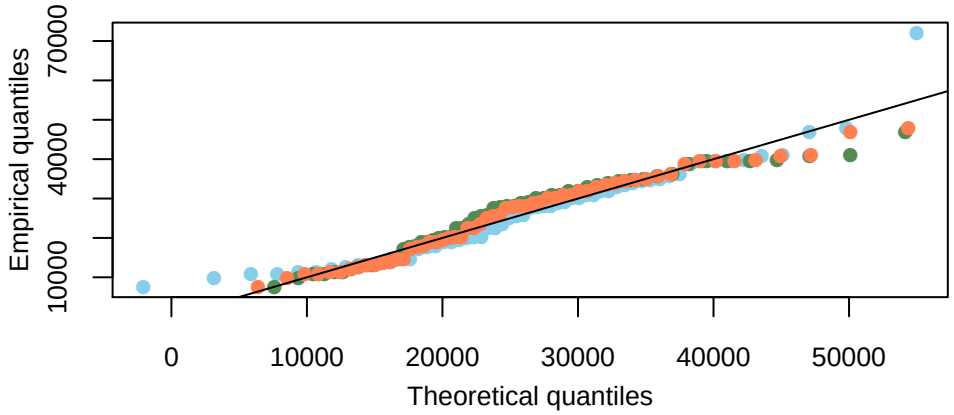
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Iron

Legend

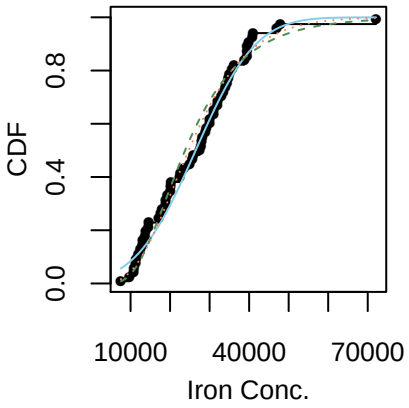
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

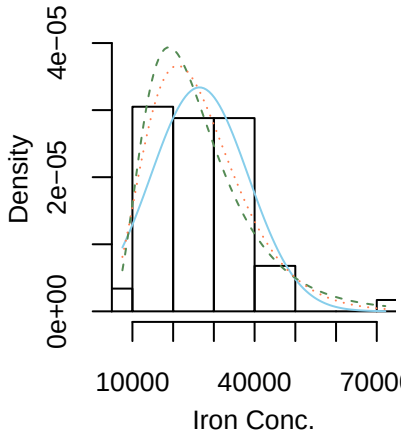


ECDF, Histogram & Q−Q (Detects Only)

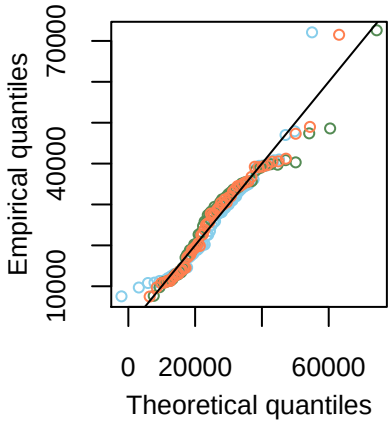
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 7,500 J	Arithmetic Mean = 26,000
N (detect) = 59	SD (log detect) = 0.48	Max (detect) = 72,000 J	Arithmetic SD = 12,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0041	0.3	–	–	–	–	1279.26	1283.41
Lognormal	0.076	0.019	–	–	–	–	1273.25	1277.4
Gamma	–	–	0.1015	0.127	0.6674	0.763	1271.58	1275.73

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Iron

Media:
Surface Sediment (0−15 cm)

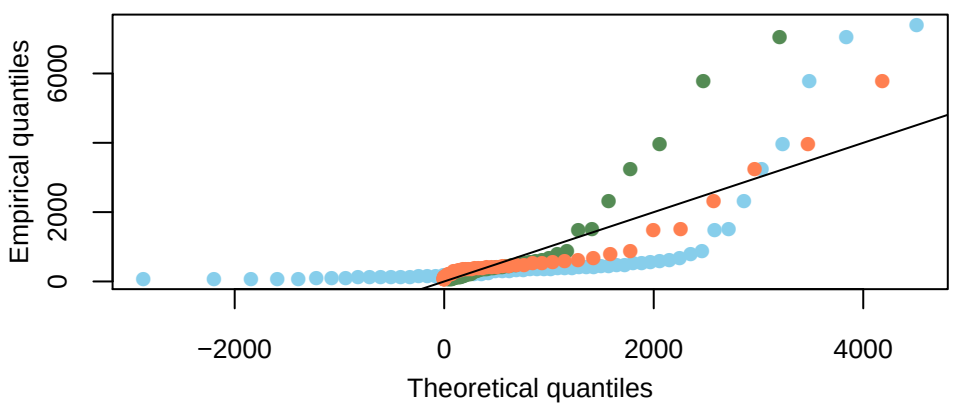
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Manganese

Legend

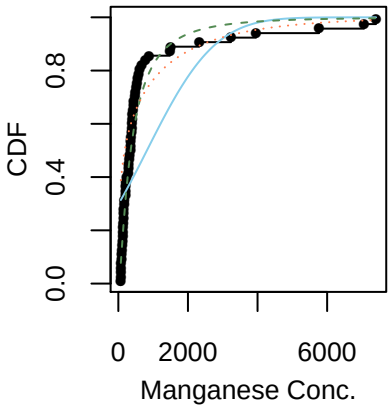
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

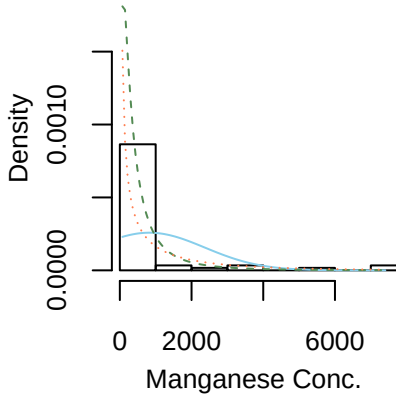


ECDF, Histogram & Q−Q (Detects Only)

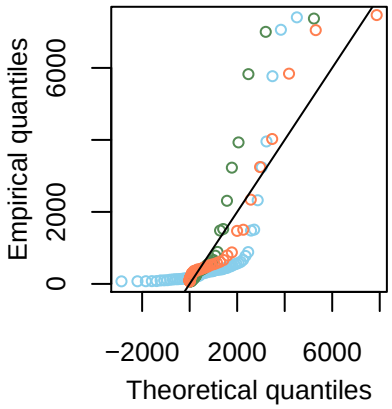
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 71 J	Arithmetic Mean = 820
N (detect) = 59	SD (log detect) = 1.1	Max (detect) = 7,400 J	Arithmetic SD = 1,600

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.3e−22	–	–	–	–	1037.94	1042.1
Lognormal	0.00053	0.017	–	–	–	–	878.132	882.287
Gamma	–	–	0.3881	0.139	9.421	0.9121	936.879	941.035

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Manganese

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **198**

Media:
Surface Sediment (0−15 cm)

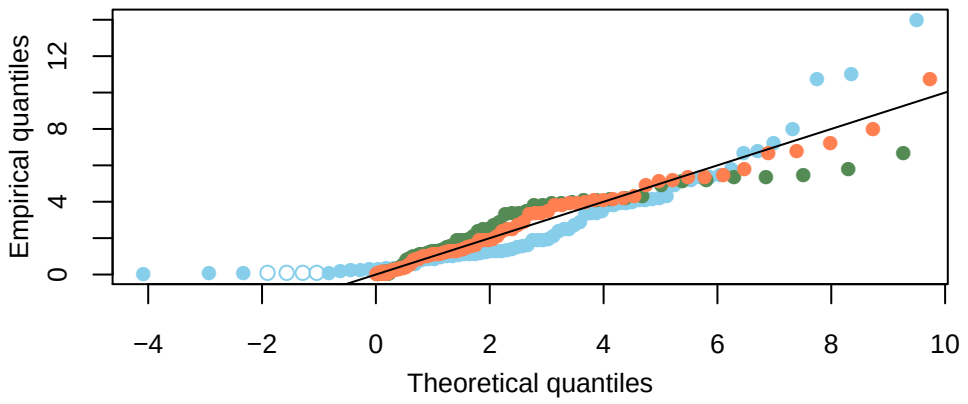
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Mercury

Legend

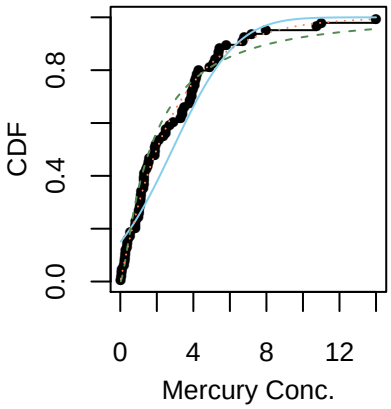
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

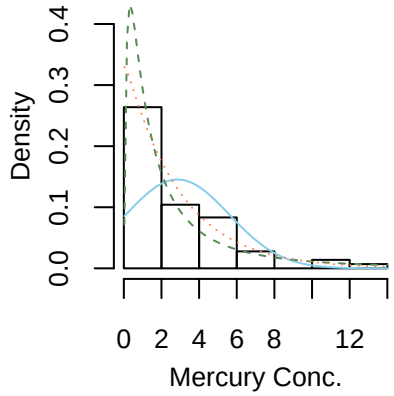


ECDF, Histogram & Q−Q (Detects Only)

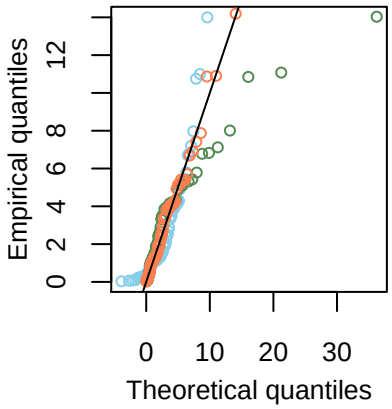
ECDF



Histogram



Q−Q



N = 76	FOD = 95%	Min (detect) = 0.03 J	Kaplan Meier Mean = 2
N (detect) = 72	SD (log detect) = 1.3	Max (detect) = 14 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.2e−05	−	−	−	−	372.867	377.528
Lognormal	6e−04	0.006	−	−	−	−	319.656	324.317
Gamma	−	−	0.07563	0.113	0.4203	0.817	306.766	311.428

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00016	−	−	−	−	353.603	358.157
Lognormal	0.0016	0.03	−	−	−	−	311.476	316.029
Gamma	−	−	0.07347	0.11	0.2953	0.78	299.102	303.655

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **199**

Media:
Surface Sediment (0−15 cm)

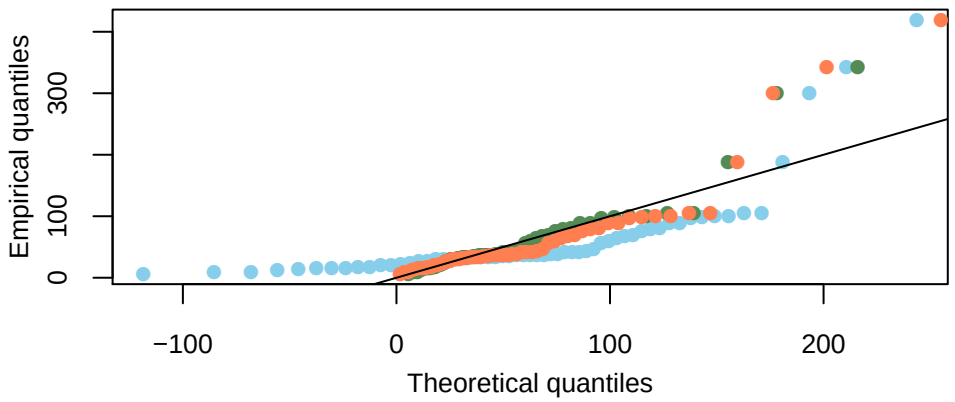
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Nickel

Legend

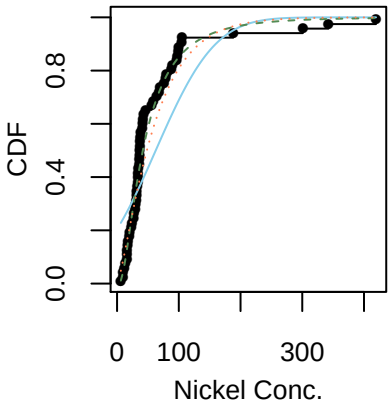
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

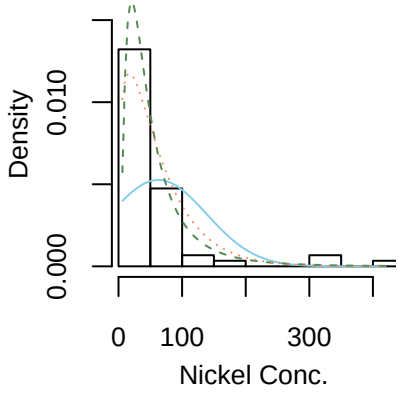


ECDF, Histogram & Q−Q (Detects Only)

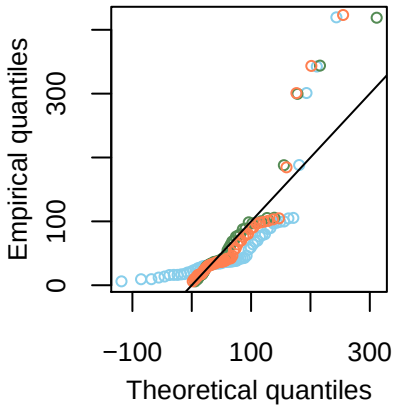
ECDF



Histogram



Q−Q



N = 59	FOD = 100%	Min (detect) = 6 J	Arithmetic Mean = 63
N (detect) = 59	SD (log detect) = 0.85	Max (detect) = 420 J	Arithmetic SD = 76

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−09	–	–	–	–	682.186	686.341
Lognormal	0.11	0.014	–	–	–	–	591.386	595.541
Gamma	–	–	0.1927	0.129	2.208	0.78	606.868	611.023

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Nickel

Media:
Surface Sediment (0−15 cm)

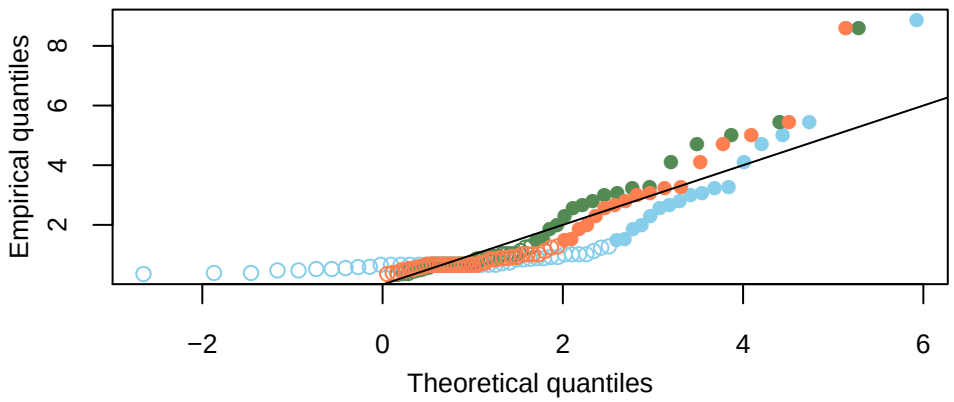
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Thallium

Legend

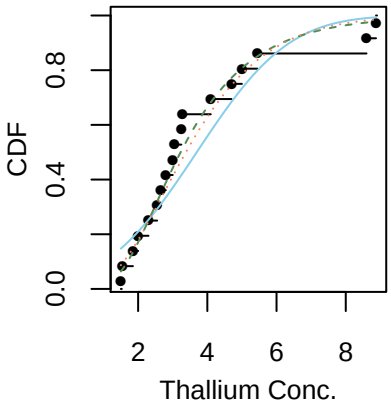
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

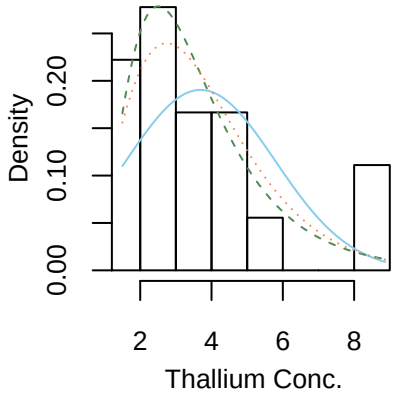


ECDF, Histogram & Q−Q (Detects Only)

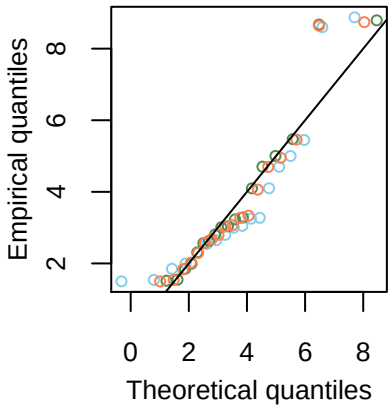
ECDF



Histogram



Q−Q



N = 59	FOD = 31%	Min (detect) = 1	Kaplan Meier Mean = 1
N (detect) = 18	SD (log detect) = 0.52	Max (detect) = 8 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2e−12	–	–	–	–	240.574	244.729
Lognormal	7e−05	1.1e−05	–	–	–	–	157.657	161.812
Gamma	–	–	0.2414	0.129	4.046	0.78	175.591	179.746

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0034	0.0059	–	–	–	–	81.7077	83.4884
Lognormal	0.49	0.3	–	–	–	–	72.5584	74.3391
Gamma	–	–	0.1906	0.206	0.4962	0.753	74.4518	76.2325

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Thallium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **201**

Media:
Surface Sediment (0−15 cm)

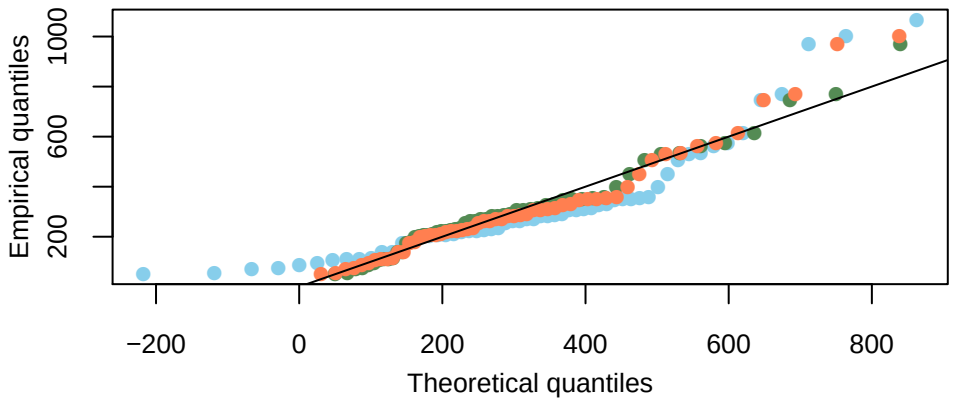
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Zinc

Legend

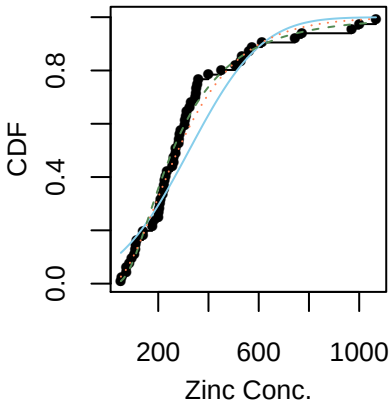
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

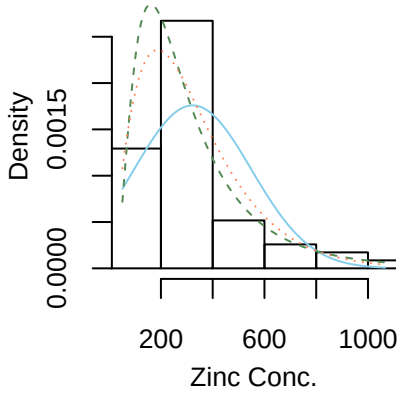


ECDF, Histogram & Q−Q (Detects Only)

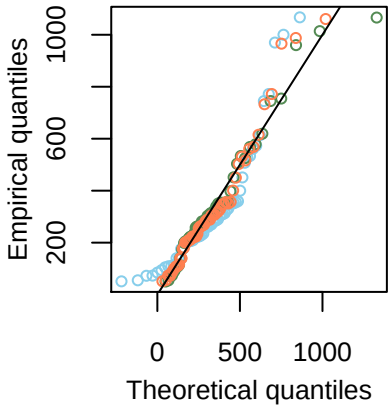
ECDF



Histogram



Q−Q



N = 58	FOD = 100%	Min (detect) = 51 J	Arithmetic Mean = 320
N (detect) = 58	SD (log detect) = 0.69	Max (detect) = 1,100 J	Arithmetic SD = 230

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7e−07	–	–	–	–	797.796	801.917
Lognormal	0.28	0.049	–	–	–	–	769.302	773.423
Gamma	–	–	0.1258	0.127	0.6447	0.763	770.527	774.648

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Zinc

Media:
Surface Sediment (0−15 cm)

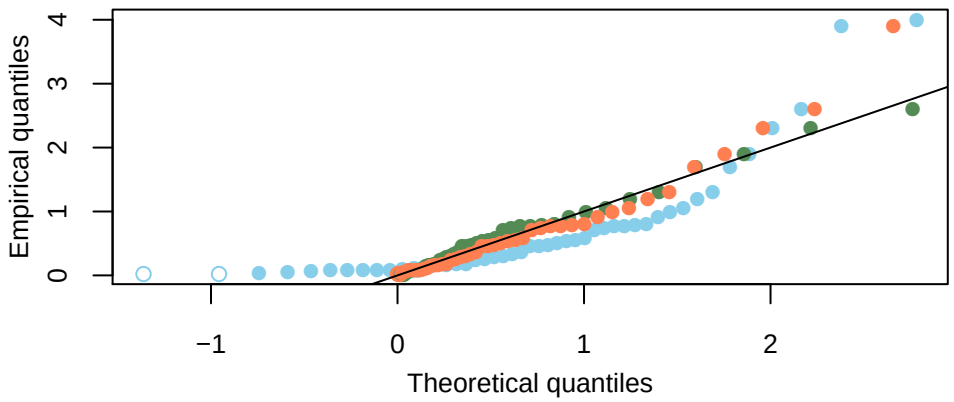
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Benz[a]anthracene

Legend

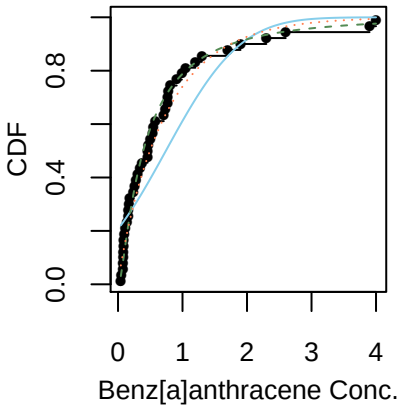
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

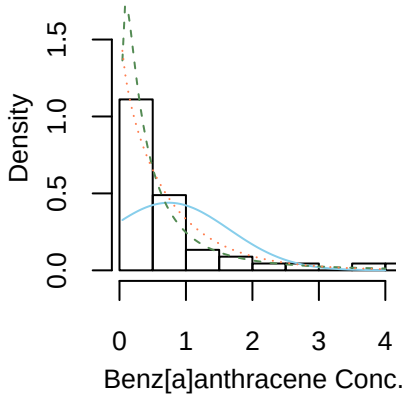


ECDF, Histogram & Q−Q (Detects Only)

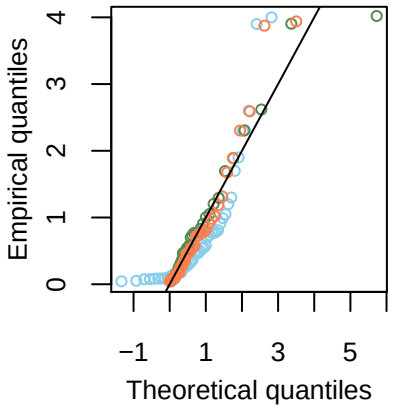
ECDF



Histogram



Q−Q



N = 47	FOD = 96%	Min (detect) = 0.044 J	Kaplan Meier Mean = 0.71
N (detect) = 45	SD (log detect) = 1.2	Max (detect) = 4	Kaplan Meier SD = 0.9

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.8e−06	–	–	–	–	127.495	131.195
Lognormal	0.56	0.32	–	–	–	–	61.2496	64.9499
Gamma	–	–	0.09334	0.139	0.5443	0.813	64.6709	68.3712

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.2e−06	–	–	–	–	123.008	126.621
Lognormal	0.35	0.51	–	–	–	–	61.5574	65.1707
Gamma	–	–	0.09687	0.139	0.6878	0.813	66.8747	70.488

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Benz[a]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **203**

Media:
Surface Sediment (0−15 cm)

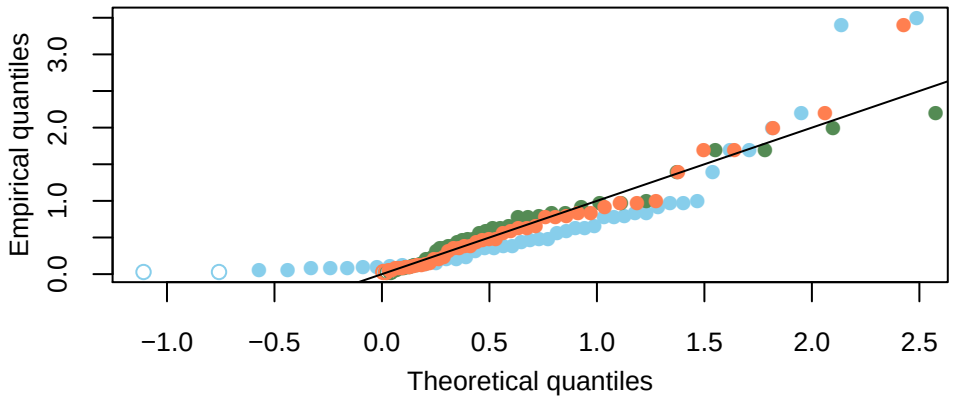
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Benzo[a]pyrene

Legend

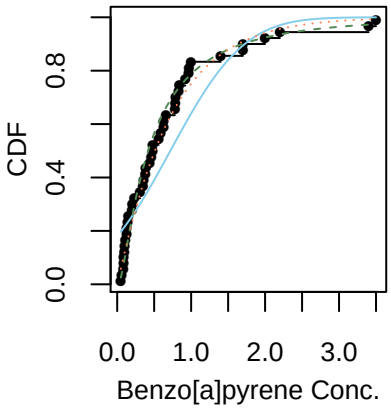
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

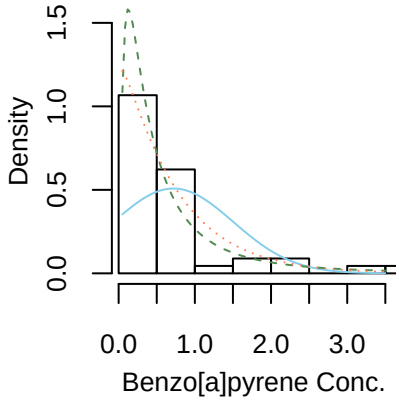


ECDF, Histogram & Q−Q (Detects Only)

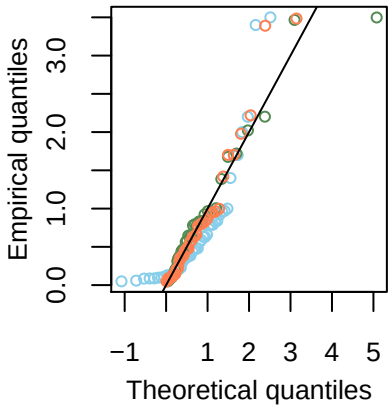
ECDF



Histogram



Q−Q



N = 47	FOD = 96%	Min (detect) = 0.049 J	Kaplan Meier Mean = 0.69
N (detect) = 45	SD (log detect) = 1.1	Max (detect) = 3 J	Kaplan Meier SD = 0.78

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.3e−05	–	–	–	–	114.147	117.848
Lognormal	0.34	0.35	–	–	–	–	61.6545	65.3548
Gamma	–	–	0.09071	0.139	0.4344	0.813	62.9808	66.6811

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.9e−05	–	–	–	–	109.964	113.577
Lognormal	0.3	0.47	–	–	–	–	61.1988	64.8121
Gamma	–	–	0.09307	0.136	0.5353	0.777	64.2122	67.8255

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Benzo[a]pyrene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **204**

Media:
Surface Sediment (0−15 cm)

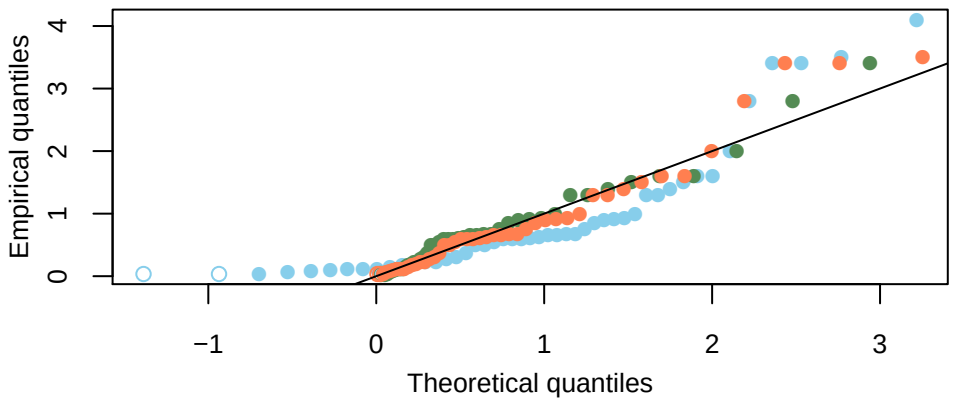
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Benzo[b]fluoranthene

Legend

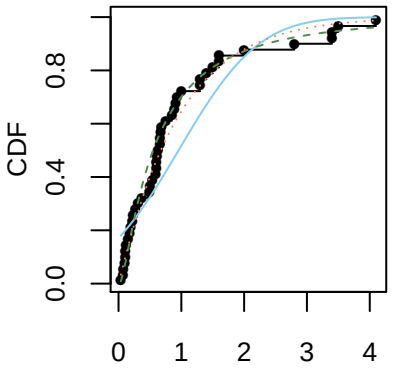
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

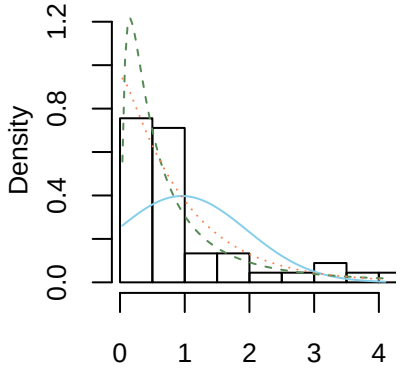


ECDF, Histogram & Q−Q (Detects Only)

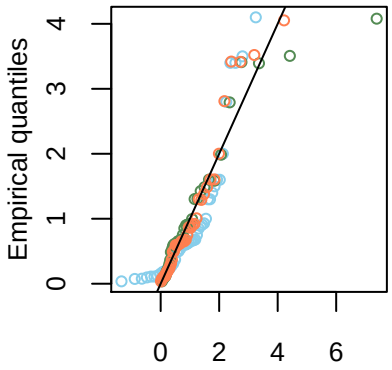
ECDF



Histogram



Q−Q



N = 47	FOD = 96%	Min (detect) = 0.037 J	Kaplan Meier Mean = 0.92
N (detect) = 45	SD (log detect) = 1.1	Max (detect) = 4	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.5e−06	–	–	–	–	137.356	141.057
Lognormal	0.11	0.024	–	–	–	–	90.6067	94.307
Gamma	–	–	0.08395	0.139	0.4509	0.813	89.6484	93.3487

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.8e−06	–	–	–	–	132.056	135.669
Lognormal	0.3	0.069	–	–	–	–	89.3838	92.9972
Gamma	–	–	0.09619	0.136	0.5107	0.777	89.8923	93.5056

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Benzo[b]fluoranthene

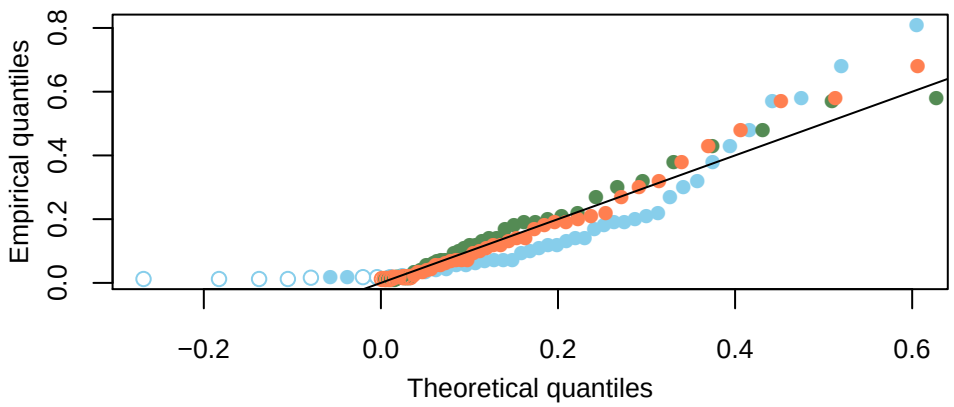
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **205**

Media:
Surface Sediment (0−15 cm)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Dibenz[a,h]anthracene

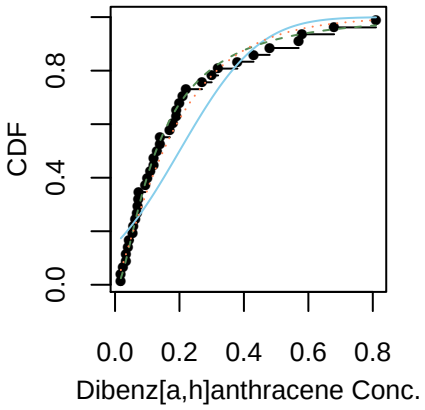
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

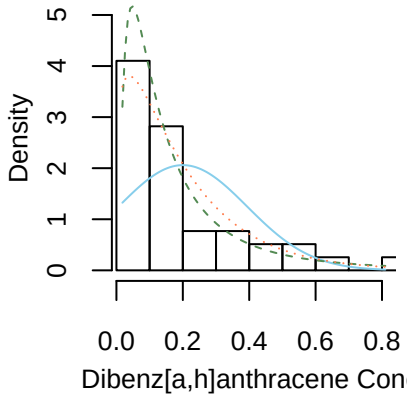


ECDF, Histogram & Q−Q (Detects Only)

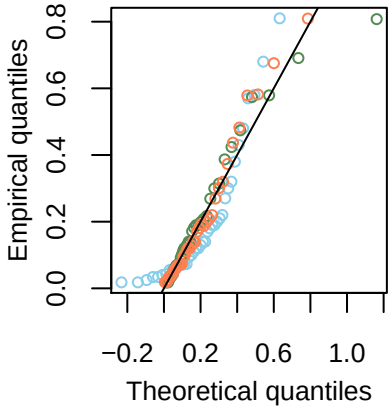
ECDF



Histogram



Q−Q



N = 47	FOD = 83%	Min (detect) = 0.018 J	Kaplan Meier Mean = 0.17
N (detect) = 39	SD (log detect) = 1	Max (detect) = 0.81 J	Kaplan Meier SD = 0.19

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.6e−05	–	–	–	–	−18.9216	−15.2213
Lognormal	0.071	0.14	–	–	–	–	−72.6235	−68.9232
Gamma	–	–	0.09547	0.139	0.6227	0.813	−69.6891	−65.9888

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.00031	–	–	–	–	−13.3868	−10.0597
Lognormal	0.74	0.92	–	–	–	–	−46.8657	−43.5385
Gamma	–	–	0.09889	0.153	0.4264	0.776	−44.5611	−41.234

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **206**

Media:
Surface Sediment (0−15 cm)

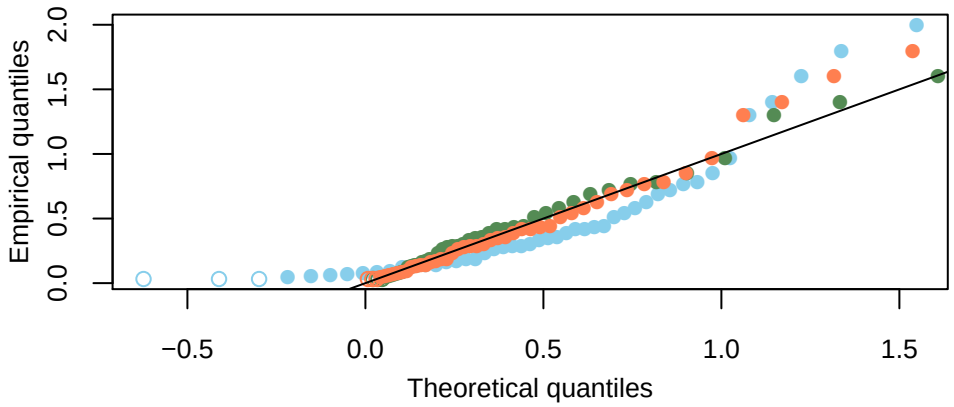
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Indeno[1,2,3−cd]pyrene

Legend

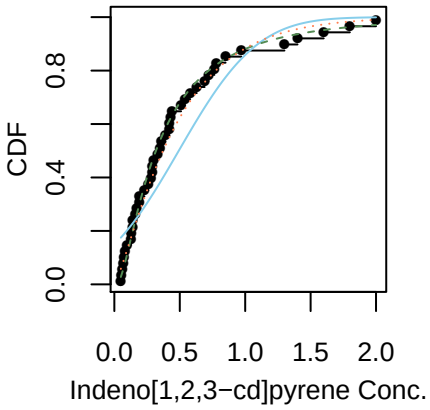
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

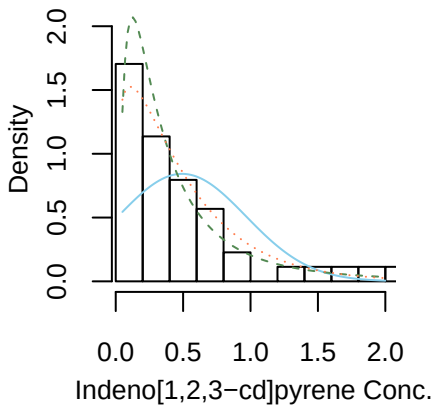


ECDF, Histogram & Q−Q (Detects Only)

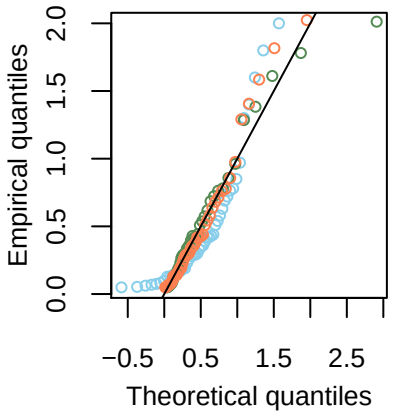
ECDF



Histogram



Q−Q



N = 47	FOD = 94%	Min (detect) = 0.049 J	Kaplan Meier Mean = 0.46
N (detect) = 44	SD (log detect) = 0.98	Max (detect) = 2 J	Kaplan Meier SD = 0.47

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.2e−05	–	–	–	–	66.7352	70.4355
Lognormal	0.36	0.61	–	–	–	–	24.4047	28.105
Gamma	–	–	0.07399	0.136	0.3138	0.777	25.3628	29.0631

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	9.6e−05	–	–	–	–	63.0553	66.6237
Lognormal	0.58	0.94	–	–	–	–	25.4987	29.0671
Gamma	–	–	0.08963	0.144	0.4002	0.779	28.0414	31.6098

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Indeno[1,2,3−cd]pyrene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **207**

Media:
Surface Sediment (0−15 cm)

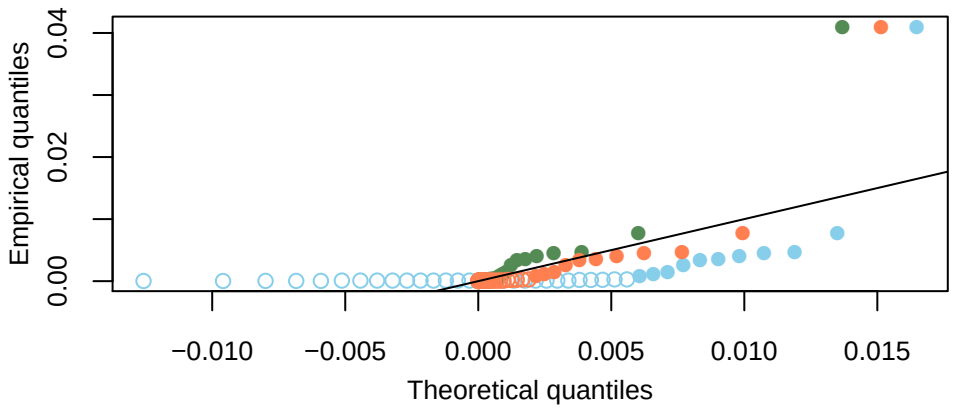
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Aldrin

Legend

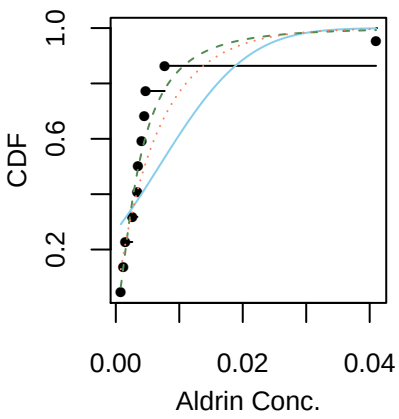
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

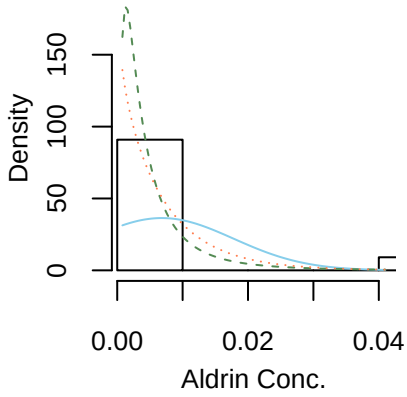


ECDF, Histogram & Q−Q (Detects Only)

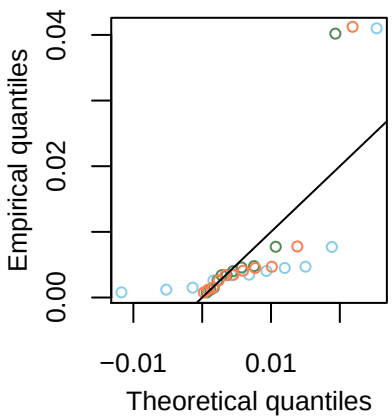
ECDF



Histogram



Q−Q



N = 40	FOD = 28%	Min (detect) = 0.00079 J	Kaplan Meier Mean = 0.0019
N (detect) = 11	SD (log detect) = 1	Max (detect) = 0.041 J	Kaplan Meier SD = 0.0065

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.1e−16	–	–	–	–	−285.555	−282.177
Lognormal	2e−05	2.2e−10	–	–	–	–	−498.842	−495.465
Gamma	–	–	0.3213	0.1547	5.217	0.9096	−469.232	−465.854

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.1e−05	–	–	–	–	−64.0624	−63.2666
Lognormal	0.29	0.17	–	–	–	–	−88.7735	−87.9777
Gamma	–	–	0.3056	0.281	1.016	0.777	−83.8408	−83.045

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Aldrin

Media:
Surface Sediment (0−15 cm)

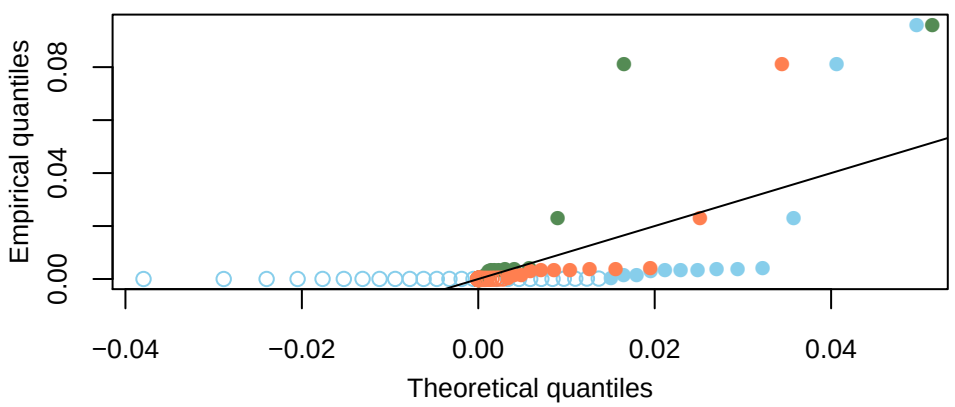
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Heptachlor Epoxide

Legend

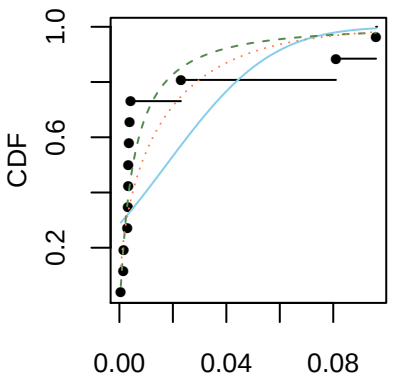
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

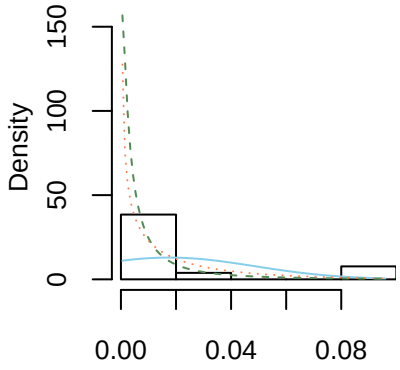


ECDF, Histogram & Q−Q (Detects Only)

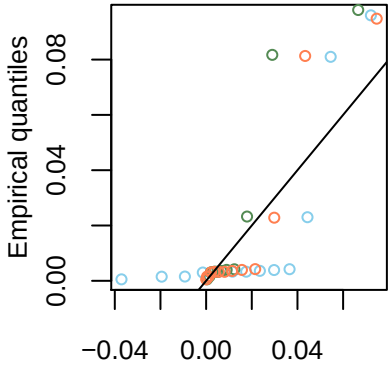
ECDF



Histogram



Q−Q



N = 39	FOD = 33%	Min (detect) = 0.00053 J	Kaplan Meier Mean = 0.0059
N (detect) = 13	SD (log detect) = 1.5	Max (detect) = 0.096 J	Kaplan Meier SD = 0.02

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.1e−23	–	–	–	–	−191.869	−188.542
Lognormal	6e−05	2.1e−08	–	–	–	–	−473.843	−470.516
Gamma	–	–	0.3039	0.1651	5.21	0.9073	−443.63	−440.303

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	3e−05	2.8e−07	–	–	–	–	−49.5265	−48.3966
Lognormal	0.027	0.00085	–	–	–	–	−86.828	−85.6981
Gamma	–	–	0.3977	0.281	1.718	0.777	−80.4437	−79.3138

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−Heptachlor Epoxide

Media:
Surface Sediment (0−15 cm)

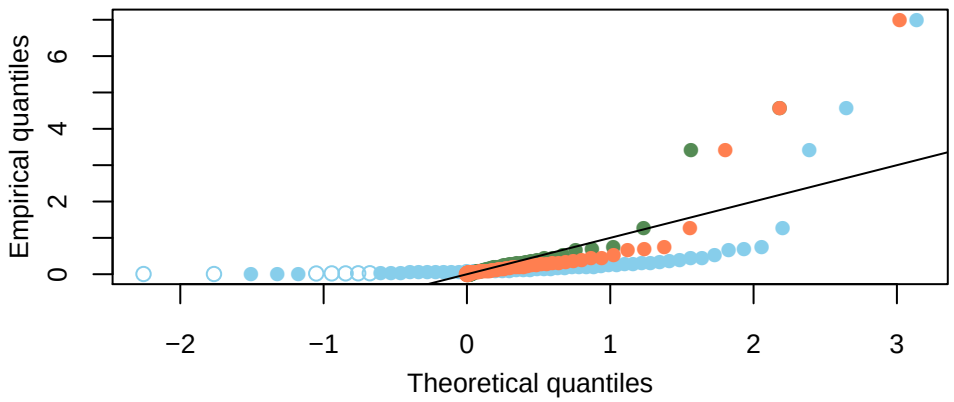
Exposure Unit:
Reference Sites

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

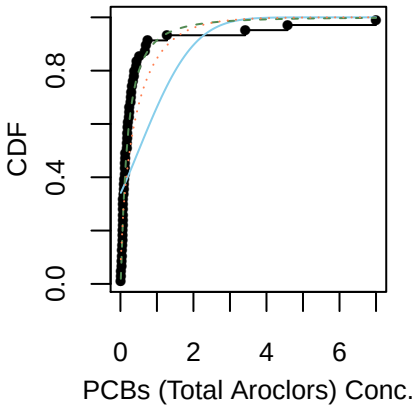
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

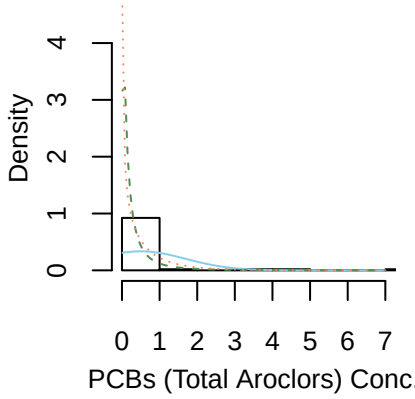


ECDF, Histogram & Q−Q (Detects Only)

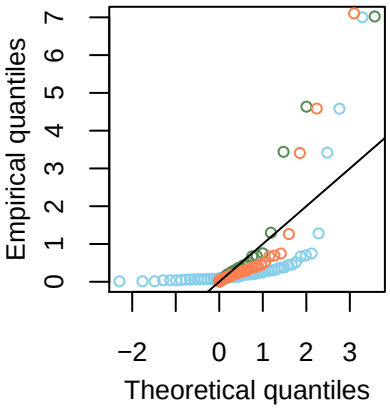
ECDF



Histogram



Q−Q



N = 59	FOD = 88%	Min (detect) = 0.011 J	Kaplan Meier Mean = 0.44
N (detect) = 52	SD (log detect) = 1.3	Max (detect) = 7 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−21	–	–	–	–	185.842	189.997
Lognormal	0.41	0.86	–	–	–	–	−27.0813	−22.9263
Gamma	–	–	0.1863	0.132	3.513	0.814	1.89904	6.05411

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.3e−19	–	–	–	–	169.848	173.75
Lognormal	0.082	0.63	–	–	–	–	−5.91866	−2.01617
Gamma	–	–	0.2071	0.132	3.763	0.814	22.1117	26.0142

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Surface Sediment (0−15 cm) All Marsh and Mudflat in Reference Sites−PCBs (Total Aroclors)

Media:
Waterway Sediment (All Samples)

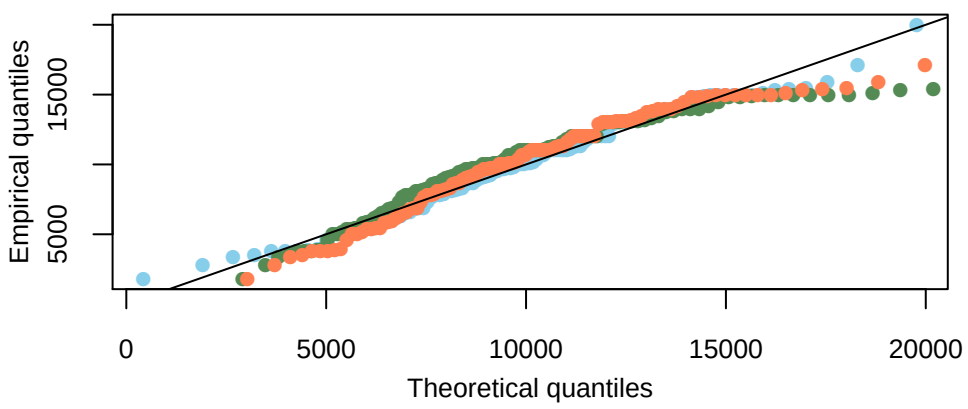
Exposure Unit:
UBC

Chemical (mg/kg):
Aluminum

Legend

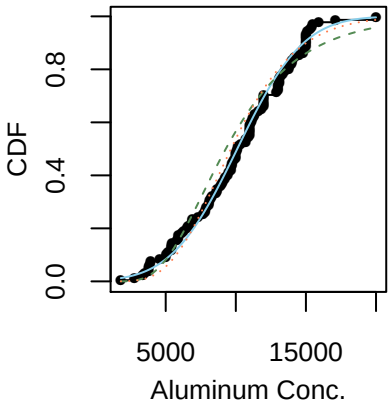
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

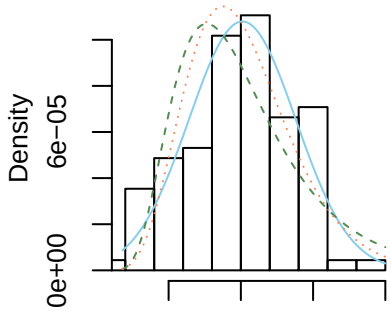


ECDF, Histogram & Q−Q (Detects Only)

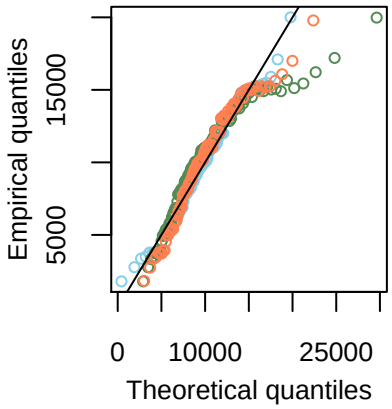
ECDF



Histogram



Q−Q



N = 113	FOD = 100%	Min (detect) = 1,800	Arithmetic Mean = 10,000
N (detect) = 113	SD (log detect) = 0.45	Max (detect) = 20,000 J	Arithmetic SD = 3,700

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.13	0.26	–	–	–	–	2181.22	2186.68
Lognormal	0	0.00044	–	–	–	–	2205.56	2211.02
Gamma	–	–	0.09082	0.09	2.059	0.754	2194.2	2199.65

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in UBC−Aluminum

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **211**

Media:
Waterway Sediment (All Samples)

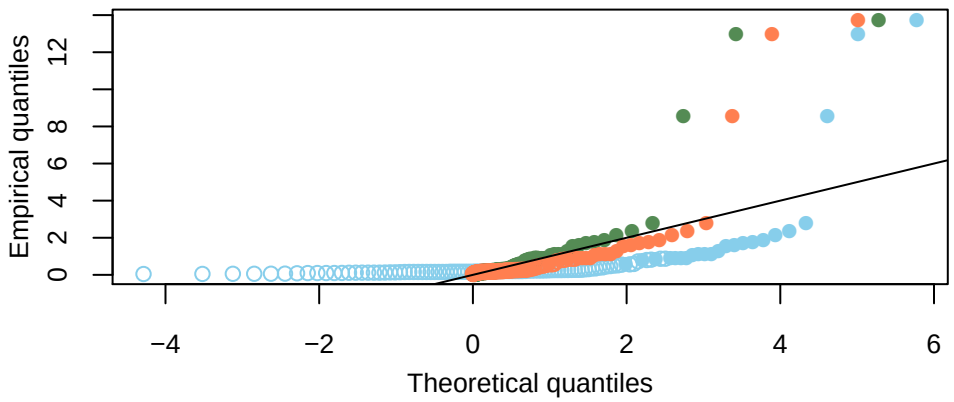
Exposure Unit:
UBC

Chemical (mg/kg):
Antimony

Legend

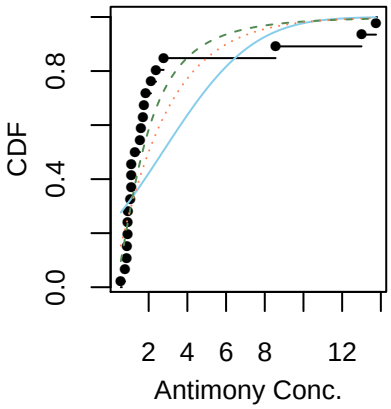
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

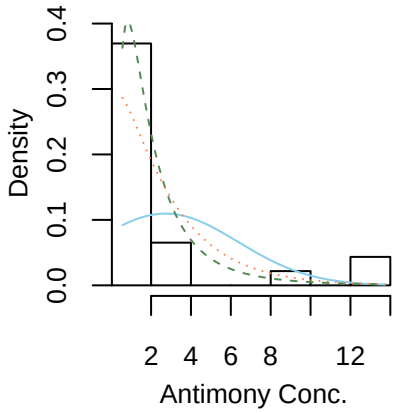


ECDF, Histogram & Q−Q (Detects Only)

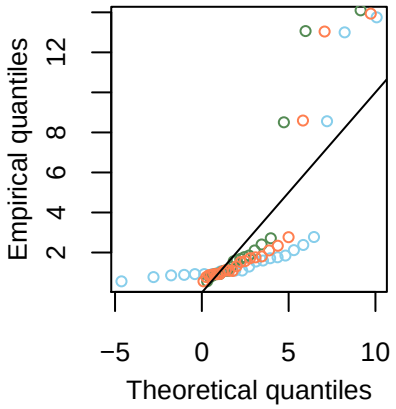
ECDF



Histogram



Q−Q



N = 114	FOD = 20%	Min (detect) = 0.56 J	Kaplan Meier Mean = 1
N (detect) = 23	SD (log detect) = 0.86	Max (detect) = 14 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2e−41	–	–	–	–	476.224	481.696
Lognormal	0	1.1e−09	–	–	–	–	77.6193	83.0917
Gamma	–	–	0.2497	0.095	9.845	0.818	152.649	158.121

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.2e−08	–	–	–	–	128.709	130.98
Lognormal	0.00079	0.026	–	–	–	–	85.0203	87.2913
Gamma	–	–	0.2678	0.187	2.718	0.769	95.7011	97.9721

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in UBC−Antimony

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **212**

Media:
Waterway Sediment (All Samples)

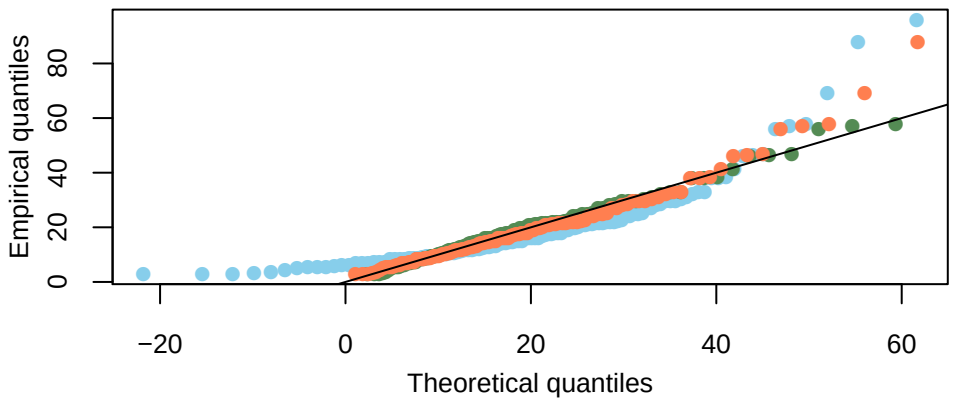
Exposure Unit:
UBC

Chemical (mg/kg):
Arsenic

Legend

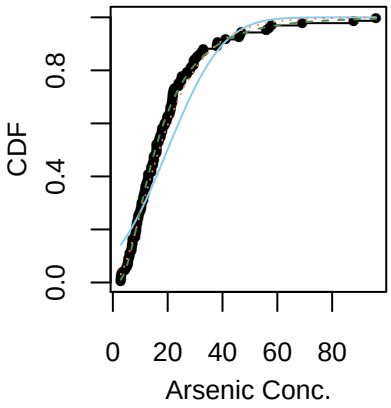
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

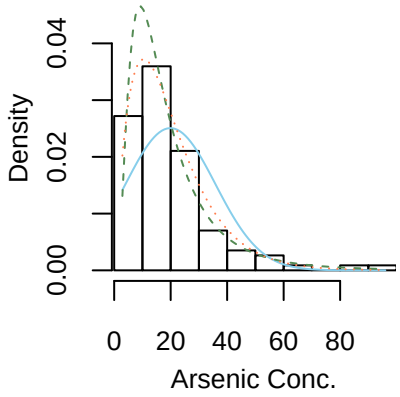


ECDF, Histogram & Q−Q (Detects Only)

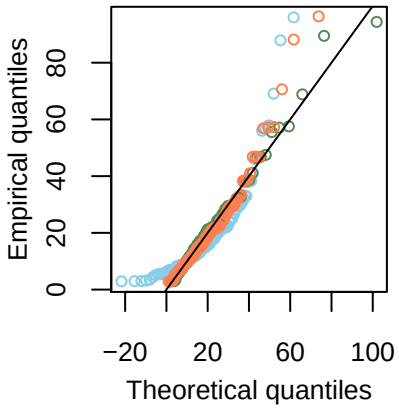
ECDF



Histogram



Q−Q



N = 114	FOD = 100%	Min (detect) = 2	Arithmetic Mean = 20
N (detect) = 114	SD (log detect) = 0.72	Max (detect) = 96 J	Arithmetic SD = 16

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.3e−09	–	–	–	–	958.453	963.926
Lognormal	0.81	0.97	–	–	–	–	876.464	881.936
Gamma	–	–	0.07781	0.091	0.7094	0.765	884.472	889.944

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

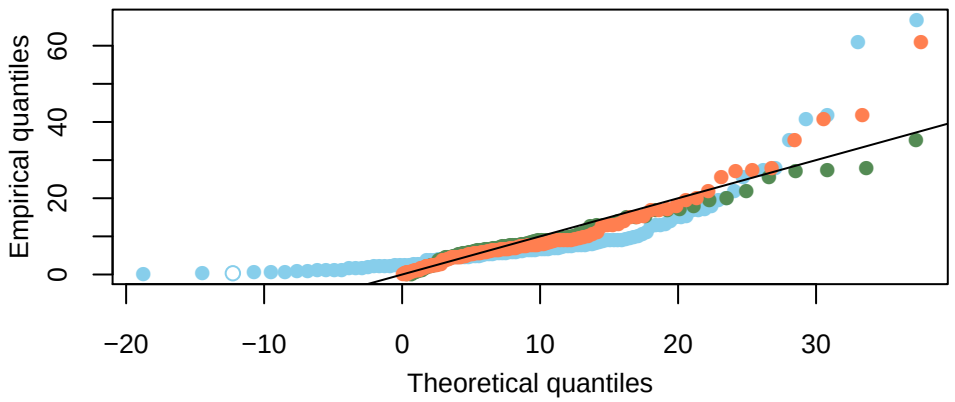
DRAFT

Distribution: Waterway Sediment (All Samples) in UBC−Arsenic

Media:
Waterway Sediment (All Samples)
Exposure Unit:
UBC
Chemical (mg/kg):
Cadmium

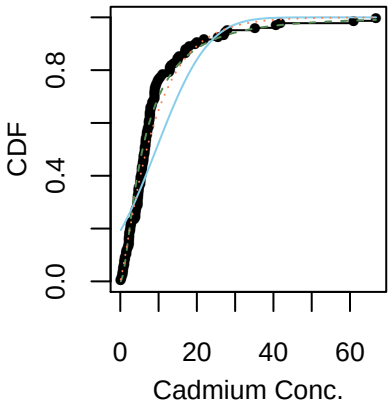
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

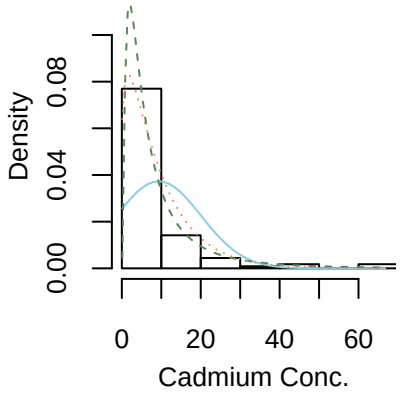


ECDF, Histogram & Q−Q (Detects Only)

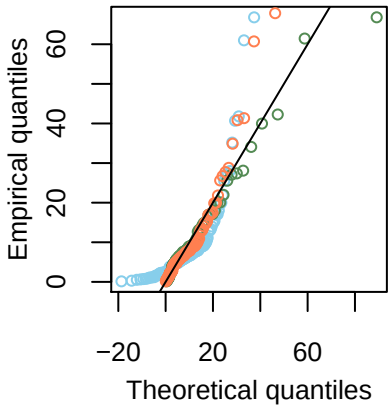
ECDF



Histogram



Q−Q



N = 114	FOD = 99%	Min (detect) = 0.14 J	Kaplan Meier Mean = 9
N (detect) = 113	SD (log detect) = 1	Max (detect) = 67 J	Kaplan Meier SD = 11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.1e−19	–	–	–	–	867.764	873.236
Lognormal	0.0026	0.00012	–	–	–	–	738.697	744.17
Gamma	–	–	0.1255	0.092	1.529	0.783	738.673	744.145

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.6e−19	–	–	–	–	860.48	865.935
Lognormal	0.0052	0.00033	–	–	–	–	731.734	737.188
Gamma	–	–	0.1287	0.092	1.603	0.783	733.527	738.982

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in UBC−Cadmium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **214**

Media:
Waterway Sediment (All Samples)

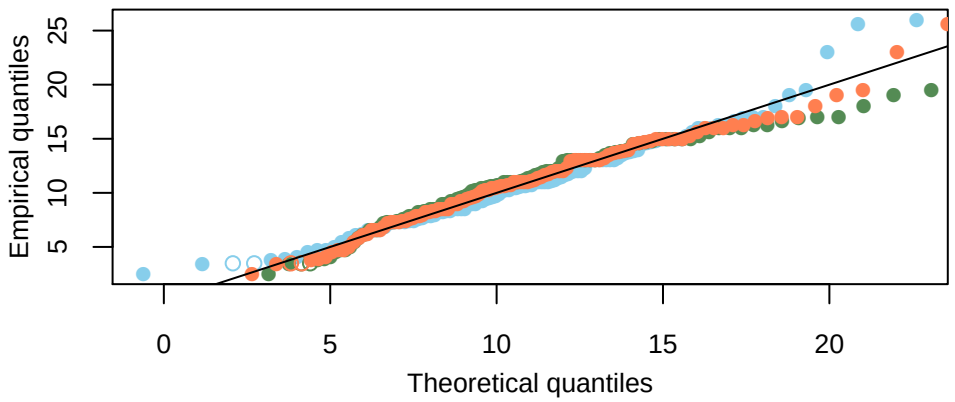
Exposure Unit:
UBC

Chemical (mg/kg):
Cobalt

Legend

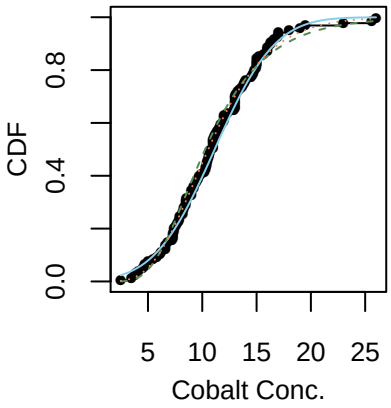
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

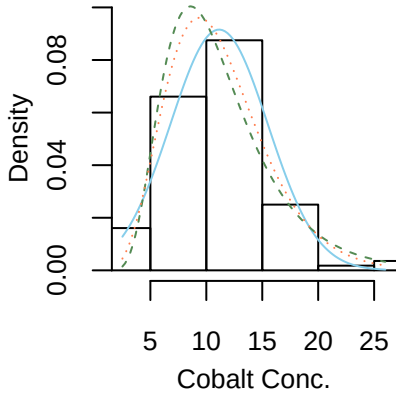


ECDF, Histogram & Q−Q (Detects Only)

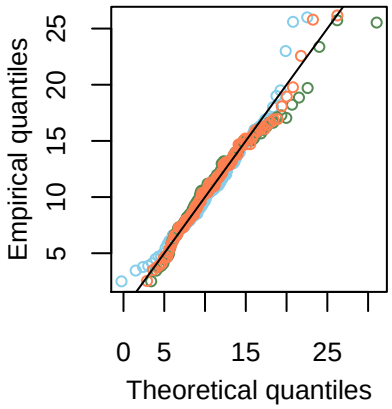
ECDF



Histogram



Q−Q



N = 114	FOD = 98%	Min (detect) = 2 J	Kaplan Meier Mean = 11
N (detect) = 112	SD (log detect) = 0.43	Max (detect) = 26 J	Kaplan Meier SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0078	0.59	–	–	–	–	667.061	672.534
Lognormal	0.0034	0.023	–	–	–	–	668.449	673.921
Gamma	–	–	0.06296	0.09	0.523	0.754	660.815	666.288

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0066	0.48	–	–	–	–	651.502	656.939
Lognormal	0.013	0.052	–	–	–	–	650.924	656.361
Gamma	–	–	0.05684	0.09	0.38	0.754	644.384	649.821

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in UBC−Cobalt

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **215**

Media:
Waterway Sediment (All Samples)

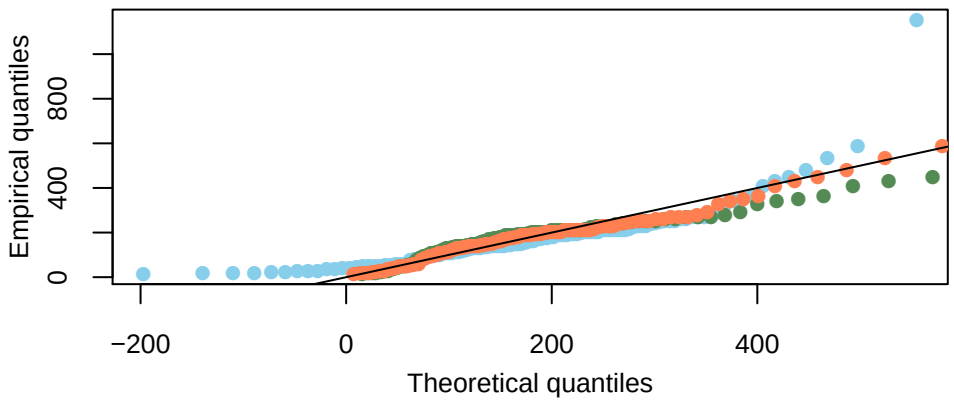
Exposure Unit:
UBC

Chemical (mg/kg):
Copper

Legend

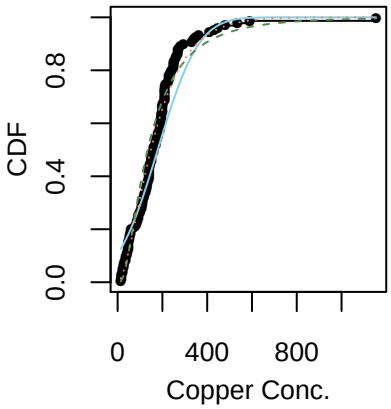
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

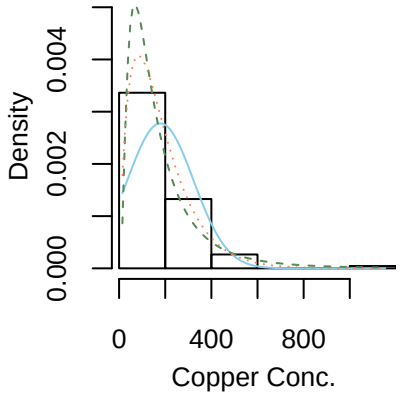


ECDF, Histogram & Q−Q (Detects Only)

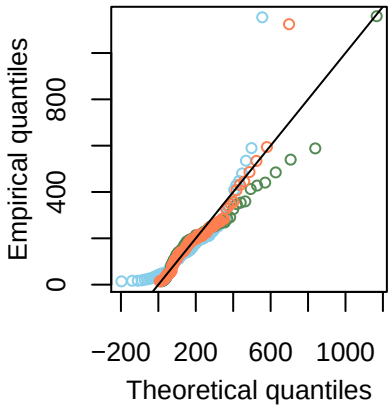
ECDF



Histogram



Q−Q



N = 113	FOD = 100%	Min (detect) = 14	Arithmetic Mean = 180
N (detect) = 113	SD (log detect) = 0.83	Max (detect) = 1,200 J	Arithmetic SD = 140

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.3e−07	–	–	–	–	1447.37	1452.82
Lognormal	1e−04	2.2e−05	–	–	–	–	1388.64	1394.1
Gamma	–	–	0.08546	0.092	1.239	0.783	1380.18	1385.63

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in UBC−Copper

Media:
Waterway Sediment (All Samples)

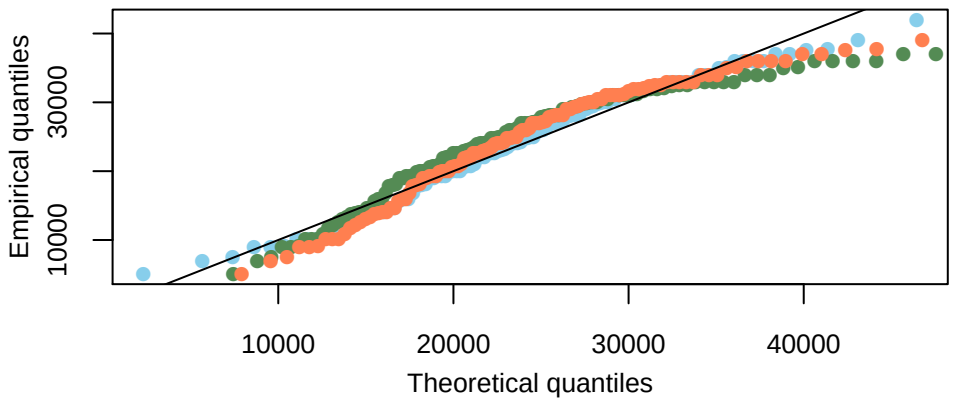
Exposure Unit:
UBC

Chemical (mg/kg):
Iron

Legend

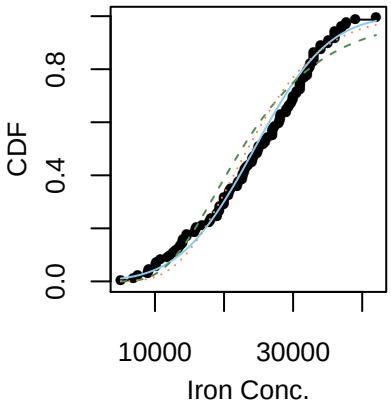
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

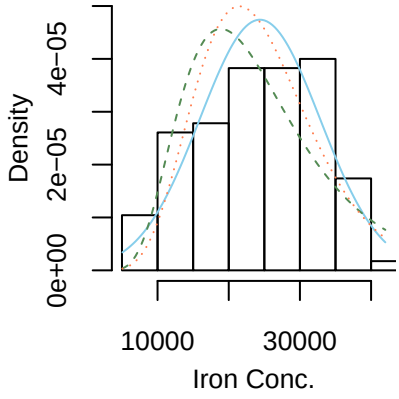


ECDF, Histogram & Q−Q (Detects Only)

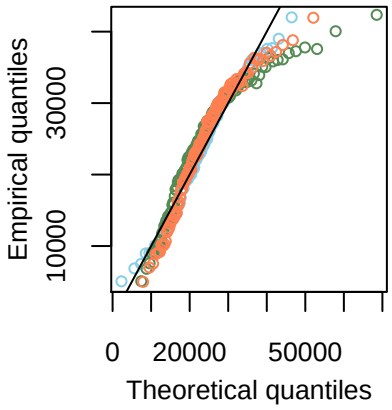
ECDF



Histogram



Q−Q



N = 115	FOD = 100%	Min (detect) = 5,100	Arithmetic Mean = 24,000
N (detect) = 115	SD (log detect) = 0.42	Max (detect) = 42,000 J	Arithmetic SD = 8,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.031	0.13	–	–	–	–	2409.01	2414.5
Lognormal	0	0.00046	–	–	–	–	2438.19	2443.68
Gamma	–	–	0.1131	0.09	2.745	0.754	2426.66	2432.15

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in UBC−Iron

Media:
Waterway Sediment (All Samples)

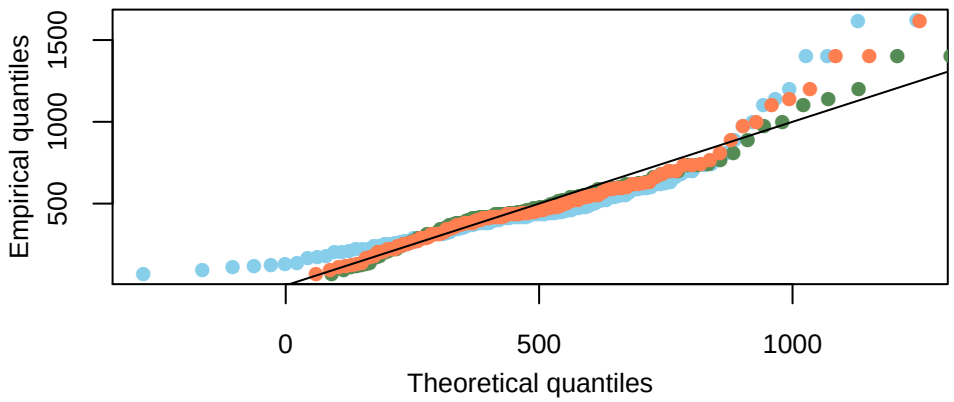
Exposure Unit:
UBC

Chemical (mg/kg):
Manganese

Legend

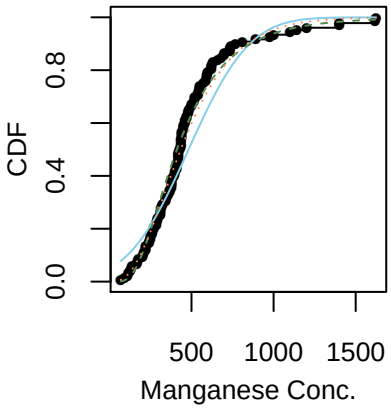
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

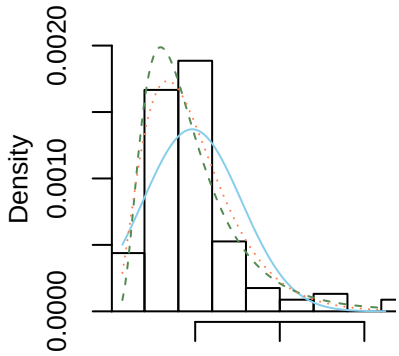


ECDF, Histogram & Q−Q (Detects Only)

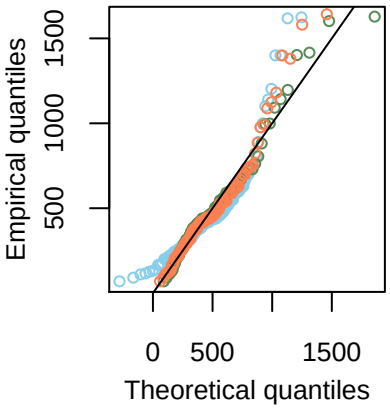
ECDF



Histogram



Q−Q



N = 114	FOD = 100%	Min (detect) = 70 J	Arithmetic Mean = 480
N (detect) = 114	SD (log detect) = 0.58	Max (detect) = 1,600 J	Arithmetic SD = 290

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.1e−07	–	–	–	–	1621.12	1626.59
Lognormal	0.041	0.029	–	–	–	–	1574	1579.47
Gamma	–	–	0.08066	0.091	1.147	0.765	1575.55	1581.02

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in UBC−Manganese

Media:
Waterway Sediment (All Samples)

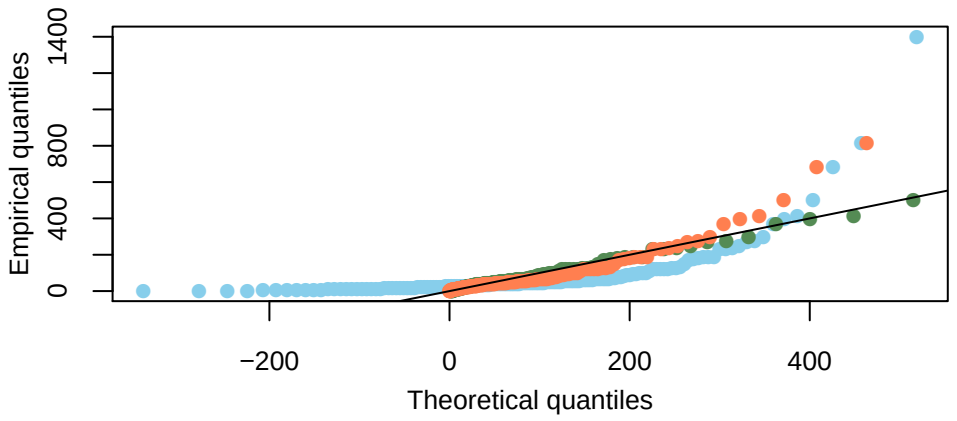
Exposure Unit:
UBC

Chemical (mg/kg):
Mercury

Legend

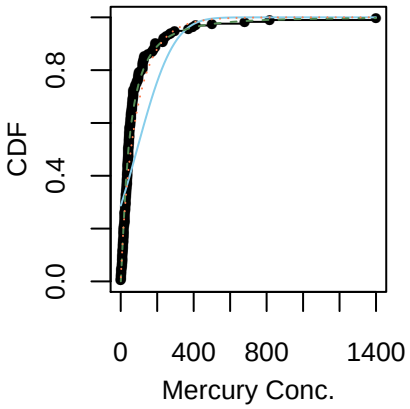
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

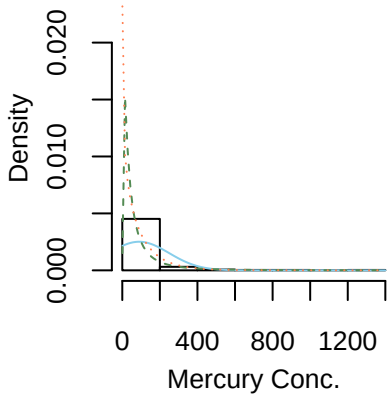


ECDF, Histogram & Q−Q (Detects Only)

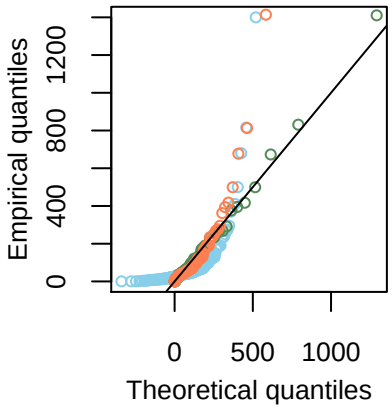
ECDF



Histogram



Q−Q



N = 146	FOD = 100%	Min (detect) = 0.53 J	Arithmetic Mean = 90
N (detect) = 146	SD (log detect) = 1.3	Max (detect) = 1,400 J	Arithmetic SD = 160

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	8.3e−34	–	–	–	–	1898.05	1904.02
Lognormal	0.0032	0.057	–	–	–	–	1579.43	1585.4
Gamma	–	–	0.1563	0.095	3.768	0.818	1602.62	1608.58

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in UBC−Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **219**

Media:
Waterway Sediment (All Samples)

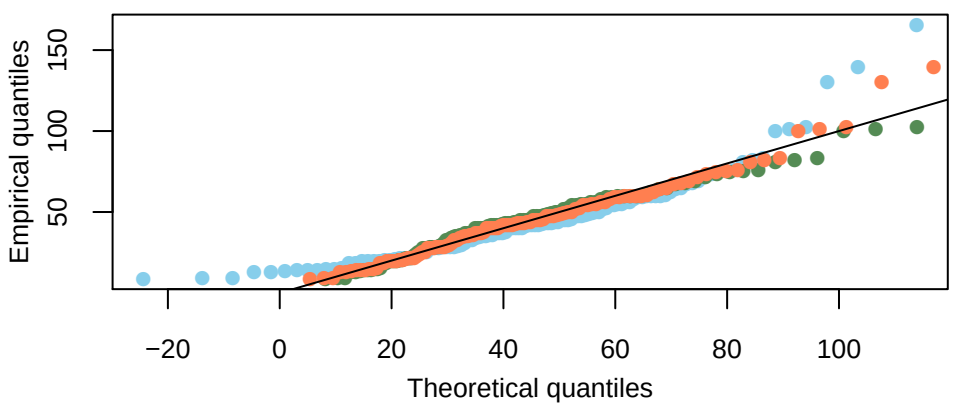
Exposure Unit:
UBC

Chemical (mg/kg):
Nickel

Legend

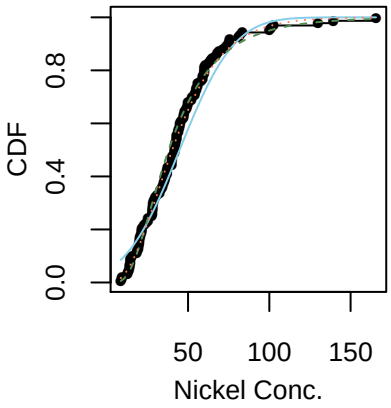
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

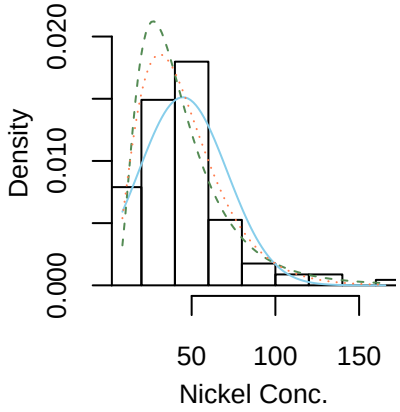


ECDF, Histogram & Q−Q (Detects Only)

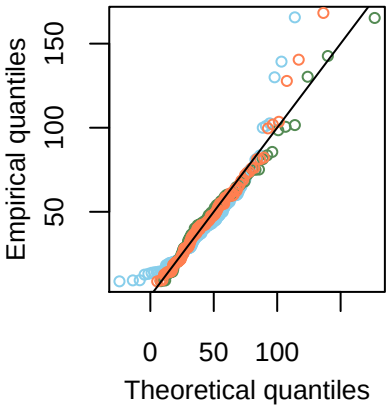
ECDF



Histogram



Q−Q



N = 114	FOD = 100%	Min (detect) = 8	Arithmetic Mean = 45
N (detect) = 114	SD (log detect) = 0.59	Max (detect) = 170 J	Arithmetic SD = 26

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.003	–	–	–	–	1073.68	1079.15
Lognormal	0.17	0.014	–	–	–	–	1035.46	1040.93
Gamma	–	–	0.05679	0.091	0.3866	0.765	1035.26	1040.73

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in UBC−Nickel

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **220**

Media:
Waterway Sediment (All Samples)

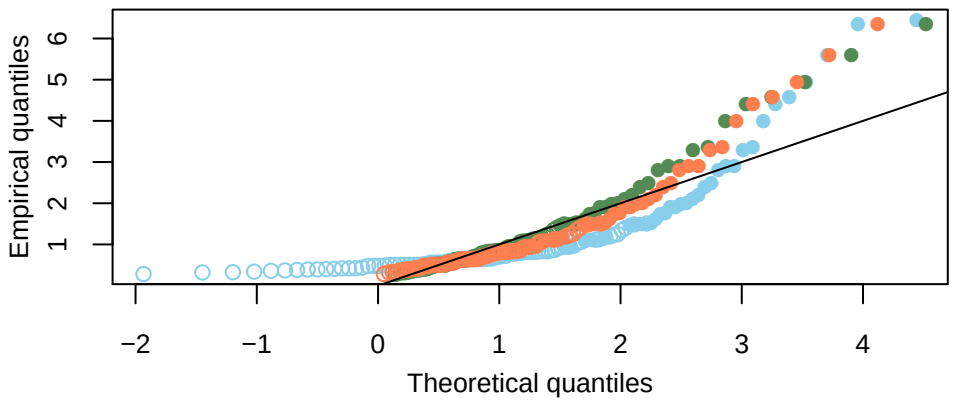
Exposure Unit:
UBC

Chemical (mg/kg):
Thallium

Legend

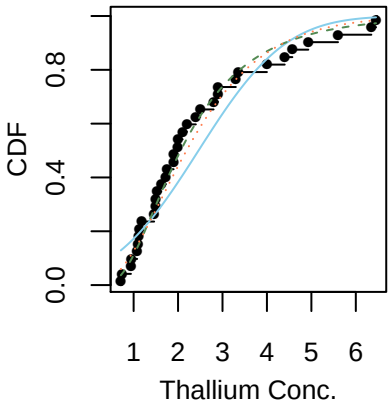
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

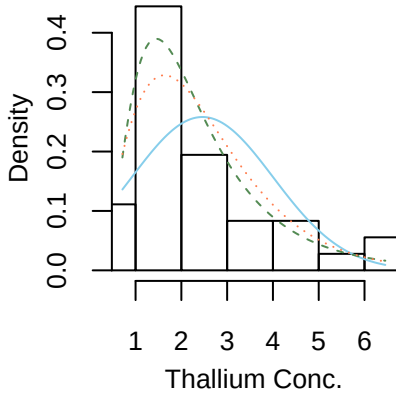


ECDF, Histogram & Q−Q (Detects Only)

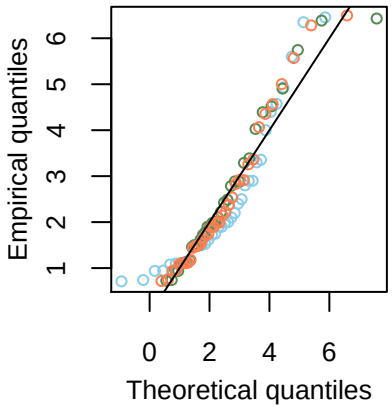
ECDF



Histogram



Q−Q



N = 114	FOD = 32%	Min (detect) = 0.71 J	Kaplan Meier Mean = 1
N (detect) = 36	SD (log detect) = 0.6	Max (detect) = 6 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7e−17	–	–	–	–	372.271	377.743
Lognormal	9e−05	0.0013	–	–	–	–	233.566	239.038
Gamma	–	–	0.1583	0.092	4.626	0.783	263.04	268.512

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00037	0.0058	–	–	–	–	137.502	140.669
Lognormal	0.47	0.88	–	–	–	–	120.441	123.609
Gamma	–	–	0.1137	0.151	0.5792	0.76	123.162	126.329

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in UBC−Thallium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **221**

Media:
Waterway Sediment (All Samples)

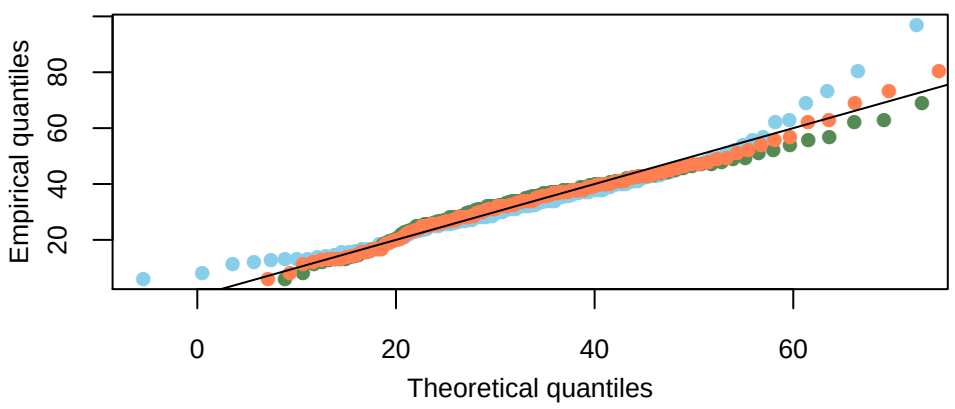
Exposure Unit:
UBC

Chemical (mg/kg):
Vanadium

Legend

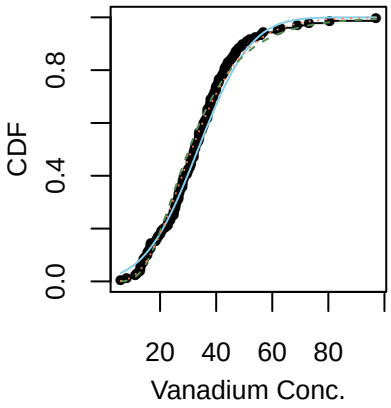
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

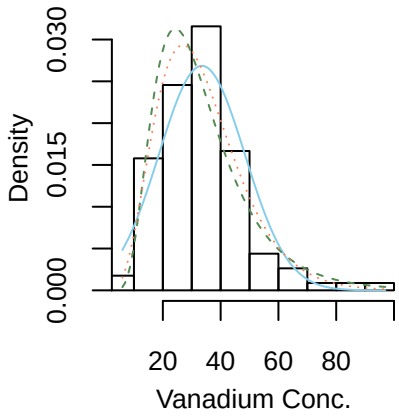


ECDF, Histogram & Q−Q (Detects Only)

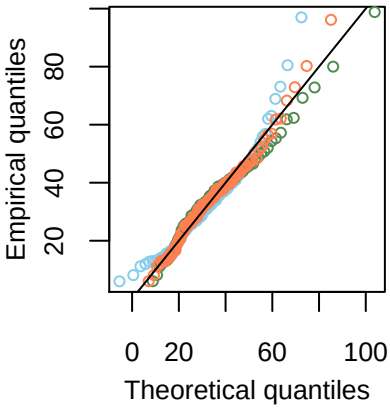
ECDF



Histogram



Q−Q



N = 114	FOD = 100%	Min (detect) = 6 J	Arithmetic Mean = 34
N (detect) = 114	SD (log detect) = 0.47	Max (detect) = 97 J	Arithmetic SD = 15

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	5e−05	0.071	–	–	–	–	942.715	948.188
Lognormal	0.012	0.022	–	–	–	–	933.014	938.487
Gamma	–	–	0.06474	0.09	0.5819	0.754	927.138	932.611

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in UBC−Vanadium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **222**

Media:
Waterway Sediment (All Samples)

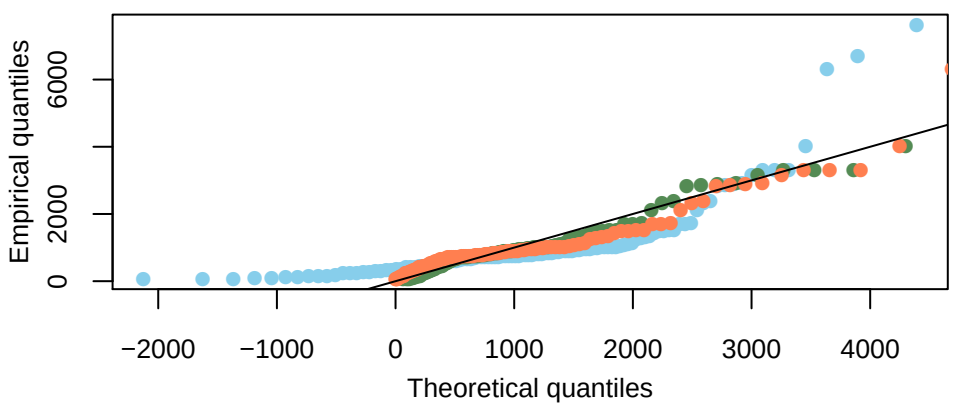
Exposure Unit:
UBC

Chemical (mg/kg):
Zinc

Legend

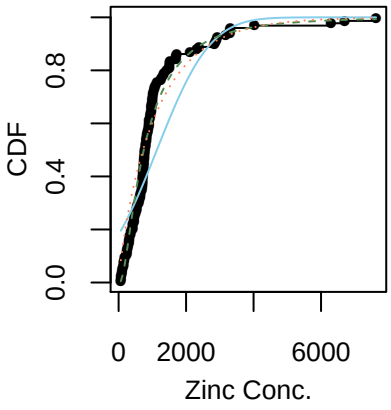
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

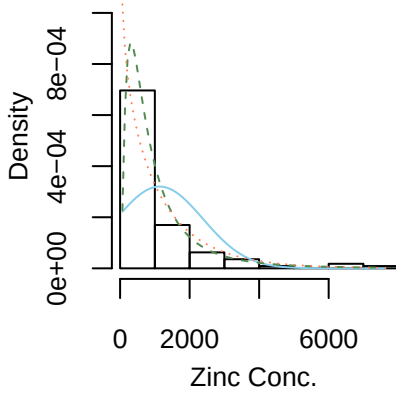


ECDF, Histogram & Q−Q (Detects Only)

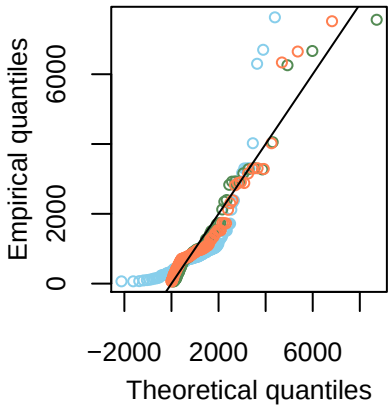
ECDF



Histogram



Q−Q



N = 112	FOD = 100%	Min (detect) = 66 J	Arithmetic Mean = 1,100
N (detect) = 112	SD (log detect) = 0.94	Max (detect) = 7,600 J	Arithmetic SD = 1,300

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.8e−21	–	–	–	–	1918.49	1923.92
Lognormal	0.0048	0.00026	–	–	–	–	1789.71	1795.15
Gamma	–	–	0.1494	0.095	4.874	0.818	1812.1	1817.54

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in UBC−Zinc

Media:
Waterway Sediment (All Samples)

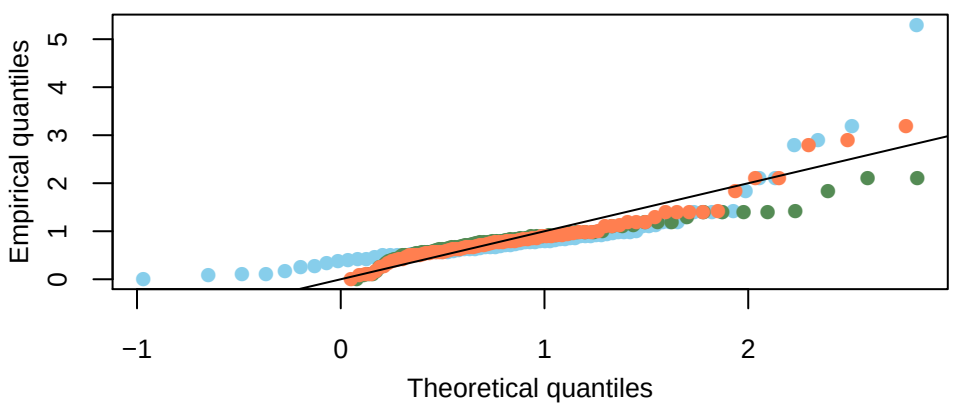
Exposure Unit:
UBC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

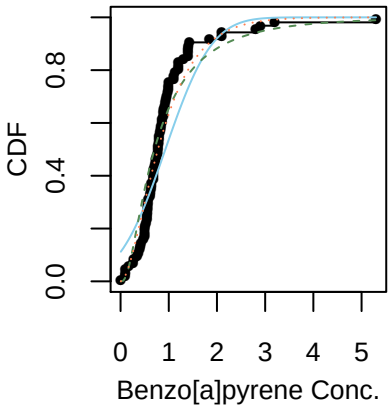
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

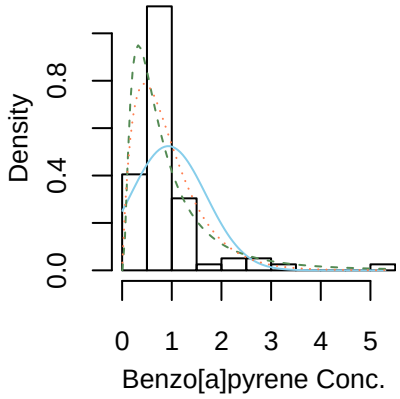


ECDF, Histogram & Q−Q (Detects Only)

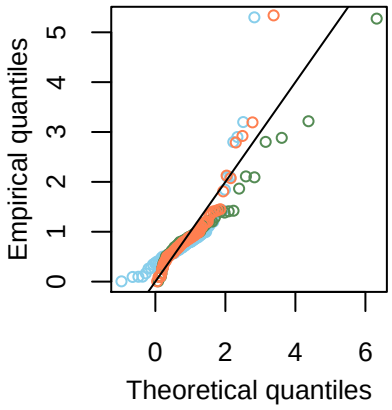
ECDF



Histogram



Q−Q



N = 79	FOD = 100%	Min (detect) = 0.0055 J	Arithmetic Mean = 0.93
N (detect) = 79	SD (log detect) = 0.89	Max (detect) = 5 J	Arithmetic SD = 0.77

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.7e−10	–	–	–	–	185.077	189.816
Lognormal	0	4.7e−07	–	–	–	–	152.5	157.239
Gamma	–	–	0.1321	0.11	2.052	0.78	133.589	138.328

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in UBC−Benzo[a]pyrene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **224**

Media:
Waterway Sediment (All Samples)

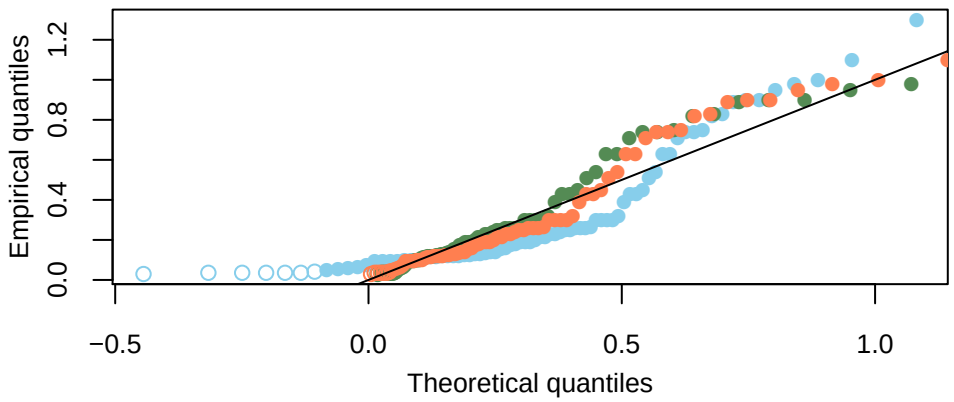
Exposure Unit:
UBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

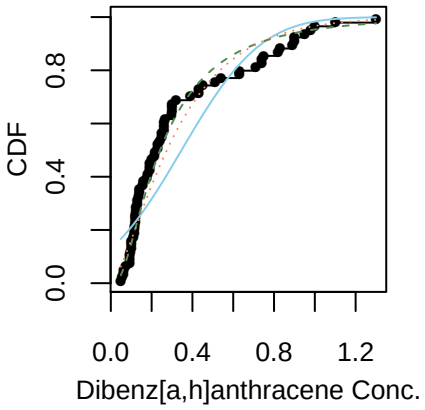
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

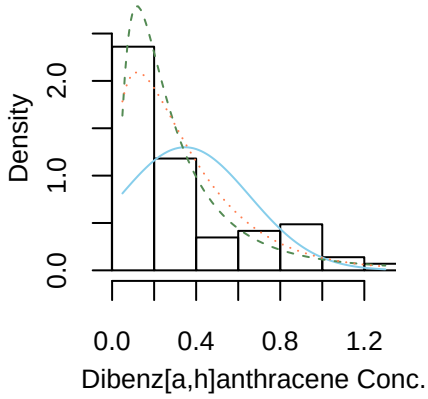


ECDF, Histogram & Q−Q (Detects Only)

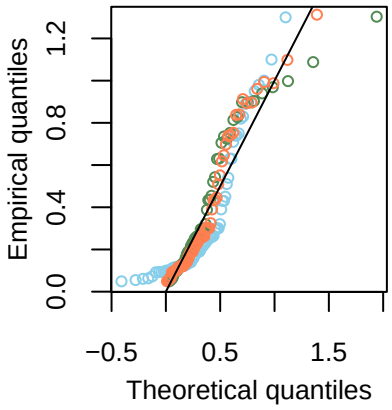
ECDF



Histogram



Q−Q



N = 79	FOD = 91%	Min (detect) = 0.049 J	Kaplan Meier Mean = 0.32
N (detect) = 72	SD (log detect) = 0.85	Max (detect) = 1 J	Kaplan Meier SD = 0.31

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−11	–	–	–	–	41.1642	45.9031
Lognormal	0.04	0.28	–	–	–	–	−27.1781	−22.4392
Gamma	–	–	0.1171	0.11	1.592	0.78	−20.8103	−16.0714

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.4e−11	–	–	–	–	38.2892	42.8425
Lognormal	0.011	0.073	–	–	–	–	−20.2135	−15.6602
Gamma	–	–	0.1407	0.11	2.172	0.78	−11.4487	−6.89537

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in UBC−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **225**

Media:
Waterway Sediment (All Samples)

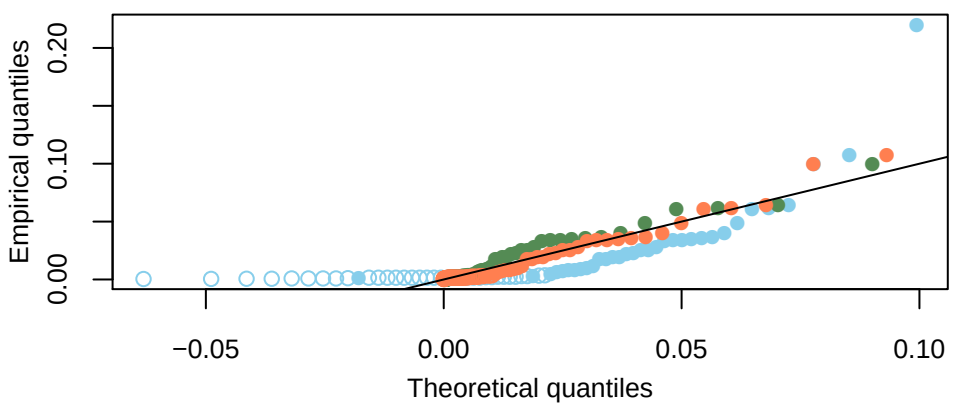
Exposure Unit:
UBC

Chemical (mg/kg):
Aldrin

Legend

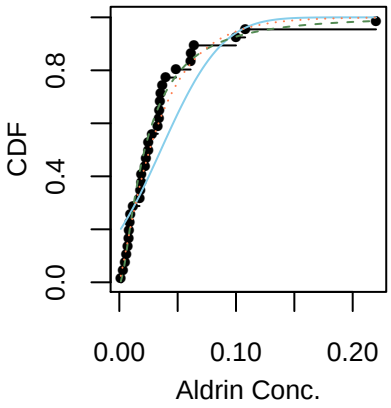
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

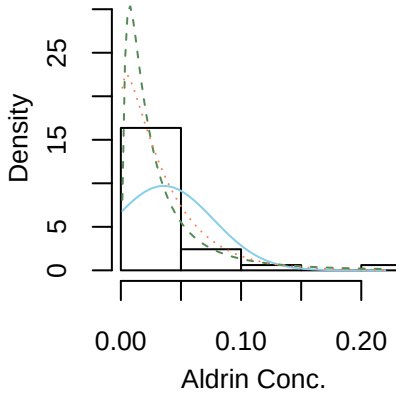


ECDF, Histogram & Q−Q (Detects Only)

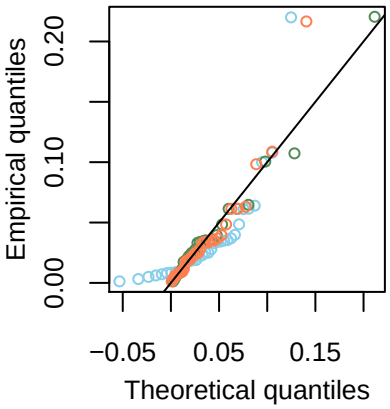
ECDF



Histogram



Q−Q



N = 68	FOD = 49%	Min (detect) = 0.0013 J	Kaplan Meier Mean = 0.017
N (detect) = 33	SD (log detect) = 1.1	Max (detect) = 0.22 J	Kaplan Meier SD = 0.034

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.2e−16	–	–	–	–	−265.65	−261.211
Lognormal	0.00046	5.5e−05	–	–	–	–	−450.407	−445.968
Gamma	–	–	0.2117	0.121	3.483	0.816	−429.82	−425.381

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.8e−05	–	–	–	–	−112.959	−109.966
Lognormal	0.82	0.34	–	–	–	–	−151.928	−148.935
Gamma	–	–	0.1203	0.165	0.3954	0.775	−150.33	−147.337

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in UBC−Aldrin

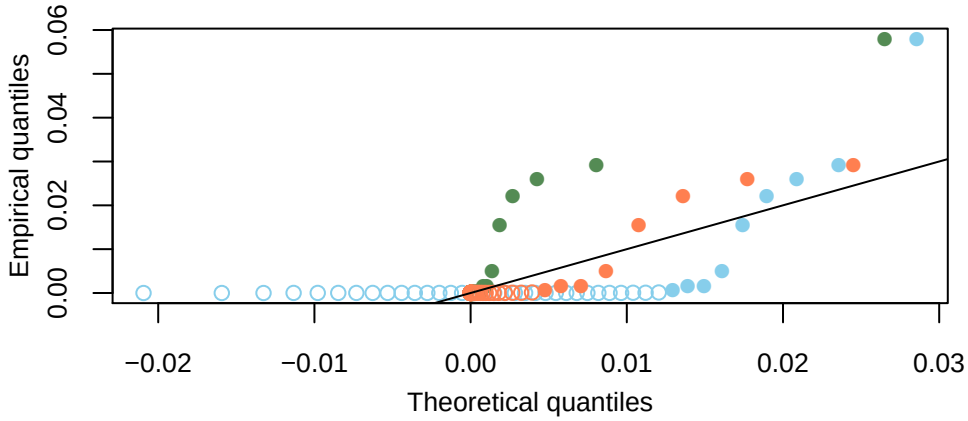
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **226**

Media:
Waterway Sediment (All Samples)
Exposure Unit:
UBC
Chemical (mg/kg):
Heptachlor

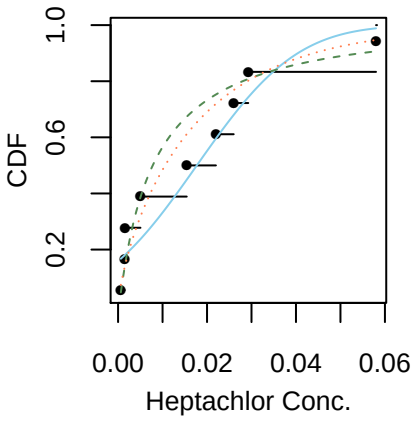
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

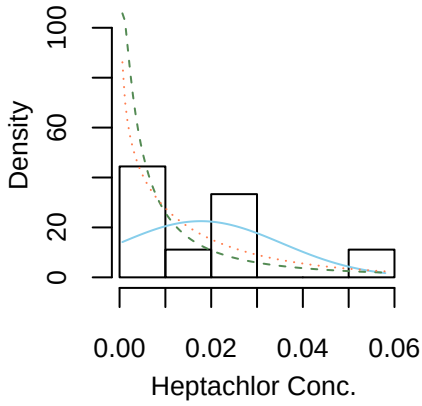


ECDF, Histogram & Q−Q (Detects Only)

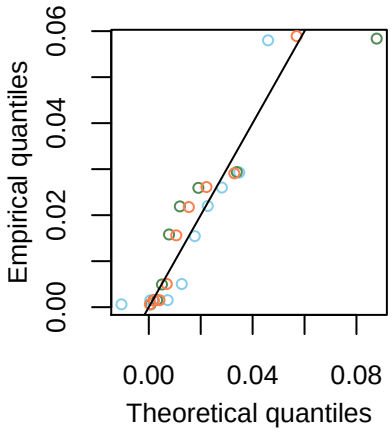
ECDF



Histogram



Q−Q



N = 42	FOD = 21%	Min (detect) = 0.00062 J	Kaplan Meier Mean = 0.0039
N (detect) = 9	SD (log detect) = 1.6	Max (detect) = 0.058 J	Kaplan Meier SD = 0.011

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.9e−23	–	–	–	–	−256.001	−252.526
Lognormal	0	2.3e−14	–	–	–	–	−596.118	−592.642
Gamma	–	–	0.397	0.1597	8.195	1.005	−557.66	−554.185

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.091	0.42	–	–	–	–	−43.0508	−42.6563
Lognormal	0.29	0.24	–	–	–	–	−50.3058	−49.9114
Gamma	–	–	0.1923	0.294	0.367	0.771	−51.2625	−50.868

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in UBC−Heptachlor

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **227**

Media:
Waterway Sediment (All Samples)

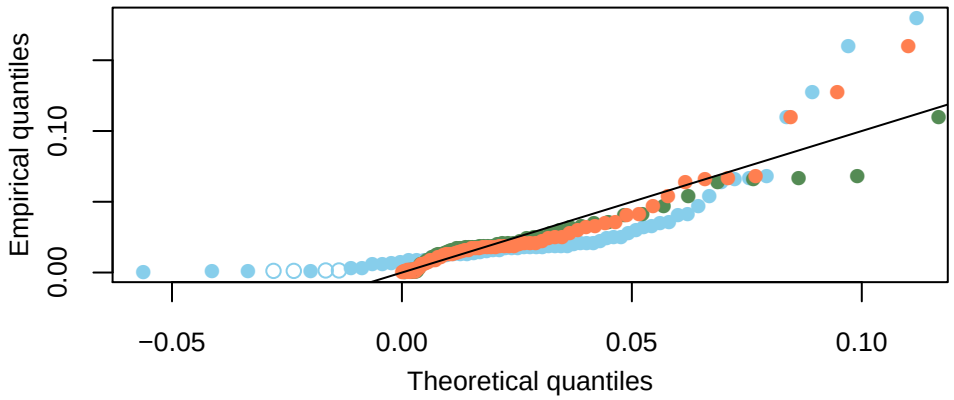
Exposure Unit:
UBC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

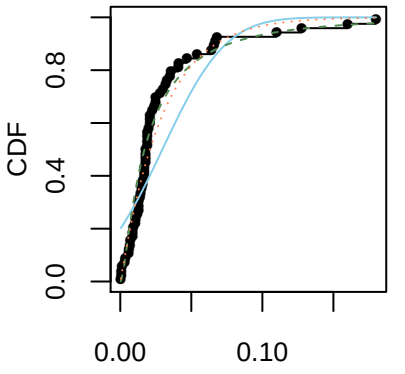
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

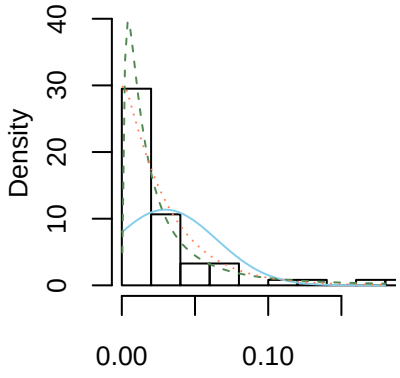


ECDF, Histogram & Q−Q (Detects Only)

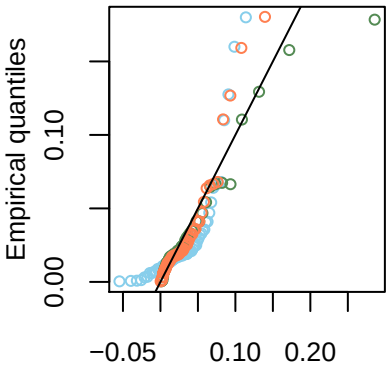
ECDF



Histogram



Q−Q



N = 65	FOD = 94%	Min (detect) = 0.00039 J	Kaplan Meier Mean = 0.028
N (detect) = 61	SD (log detect) = 1.2	Max (detect) = 0.18 J	Kaplan Meier SD = 0.035

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.7e−11	–	–	–	–	−248.471	−244.122
Lognormal	0.0015	0.00038	–	–	–	–	−327.808	−323.459
Gamma	–	–	0.122	0.121	1.144	0.816	−331.804	−327.456

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.2e−11	–	–	–	–	−231.45	−227.229
Lognormal	0.00079	0.0022	–	–	–	–	−299.964	−295.742
Gamma	–	–	0.1389	0.118	1.386	0.779	−303.353	−299.132

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in UBC−Heptachlor Epoxide

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **228**

Media:
Waterway Sediment (All Samples)

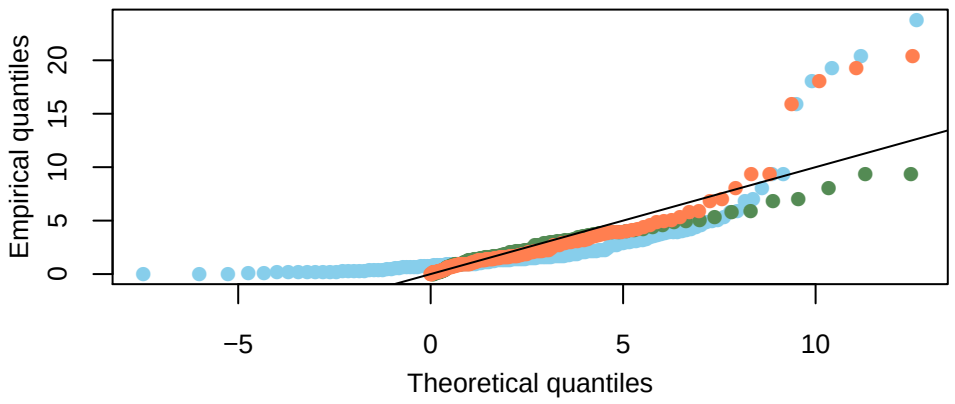
Exposure Unit:
UBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

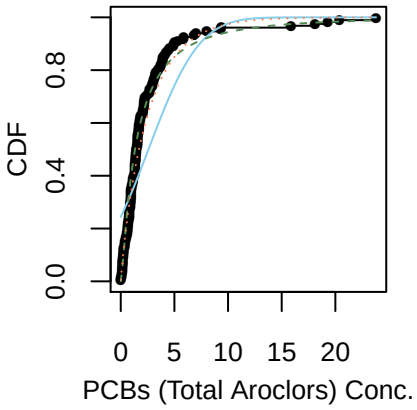
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

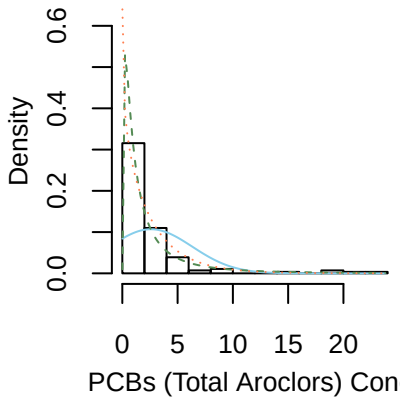


ECDF, Histogram & Q−Q (Detects Only)

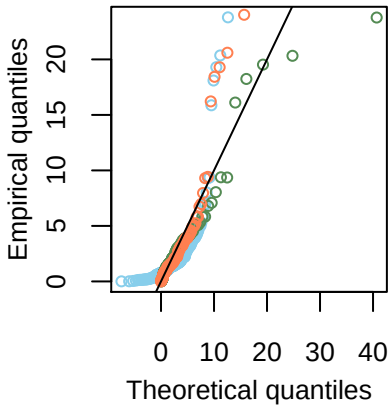
ECDF



Histogram



Q−Q



N = 141	FOD = 100%	Min (detect) = 0.0073	Arithmetic Mean = 2
N (detect) = 141	SD (log detect) = 1.3	Max (detect) = 24 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.6e−23	–	–	–	–	775.431	781.328
Lognormal	4e−05	0.0011	–	–	–	–	551.946	557.843
Gamma	–	–	0.1073	0.095	2.114	0.818	552.36	558.257

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in UBC−PCBs (Total Aroclors)

Media:
Waterway Sediment (All Samples)

Exposure Unit:
UBC

Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 57	FOD = 2%	Min (detect) = 0.0015 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0015 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in UBC−Trichloroethene

Media:
Waterway Sediment (All Samples)

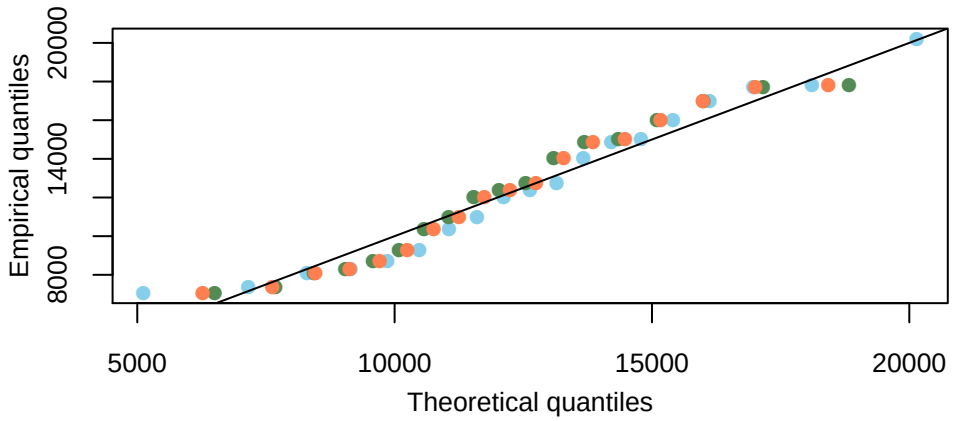
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Aluminum

Legend

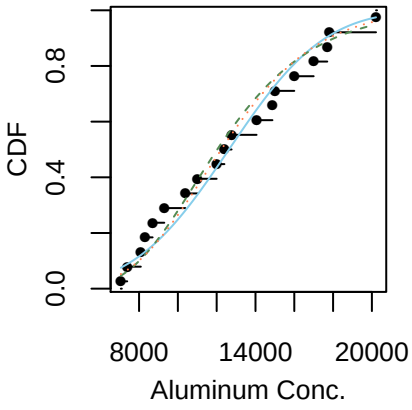
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

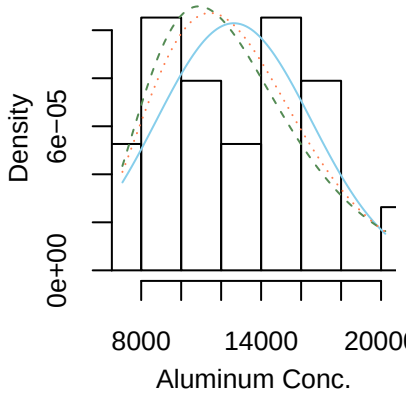


ECDF, Histogram & Q−Q (Detects Only)

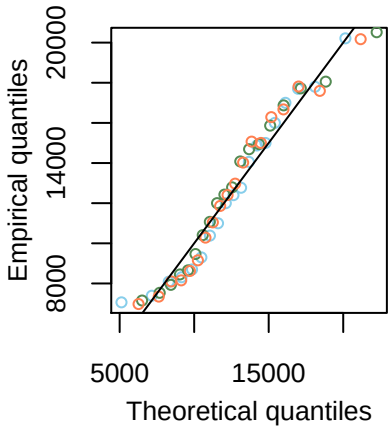
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 7,100 J	Arithmetic Mean = 13,000
N (detect) = 19	SD (log detect) = 0.33	Max (detect) = 20,000 J	Arithmetic SD = 4,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.43	0.74	–	–	–	–	371.903	373.792
Lognormal	0.42	0.78	–	–	–	–	371.304	373.193
Gamma	–	–	0.1168	0.199	0.3399	0.741	371.137	373.026

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Aluminum

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **231**

Media:
Waterway Sediment (All Samples)

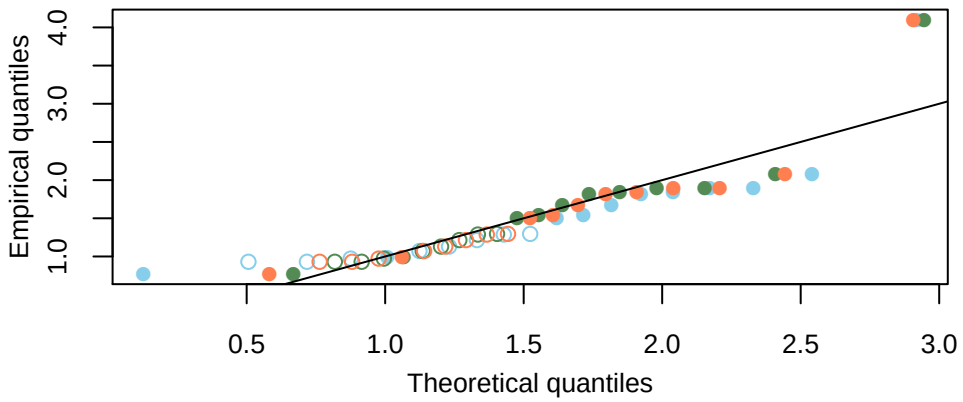
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Antimony

Legend

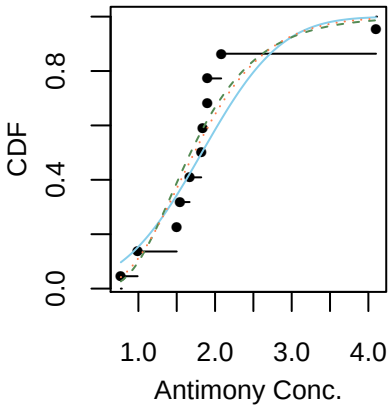
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

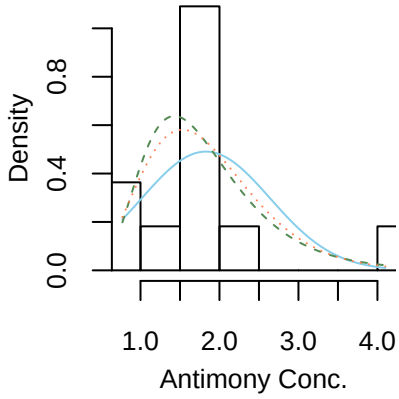


ECDF, Histogram & Q−Q (Detects Only)

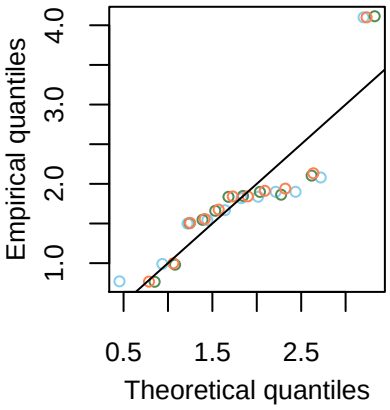
ECDF



Histogram



Q−Q



N = 19	FOD = 58%	Min (detect) = 0.77 J	Kaplan Meier Mean = 1
N (detect) = 11	SD (log detect) = 0.42	Max (detect) = 4 J	Kaplan Meier SD = 0.75

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00024	0.044	–	–	–	–	45.451	47.3399
Lognormal	0.18	0.73	–	–	–	–	34.27	36.1589
Gamma	–	–	0.1351	0.199	0.5697	0.742	36.9339	38.8228

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0049	0.009	–	–	–	–	30.6611	31.4569
Lognormal	0.2	0.16	–	–	–	–	26.6946	27.4904
Gamma	–	–	0.2317	0.267	0.6784	0.729	27.297	28.0928

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Antimony

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **232**

Media:
Waterway Sediment (All Samples)

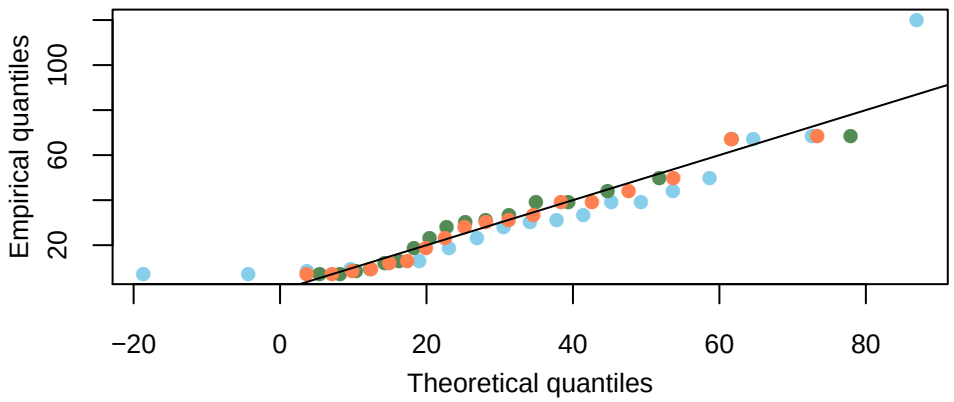
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Arsenic

Legend

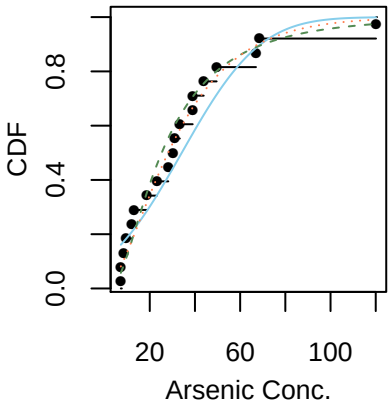
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

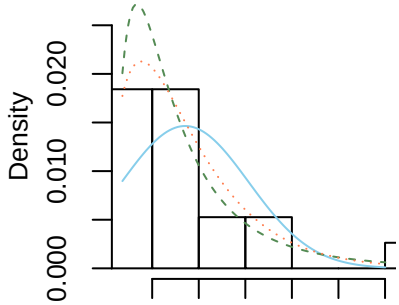


ECDF, Histogram & Q−Q (Detects Only)

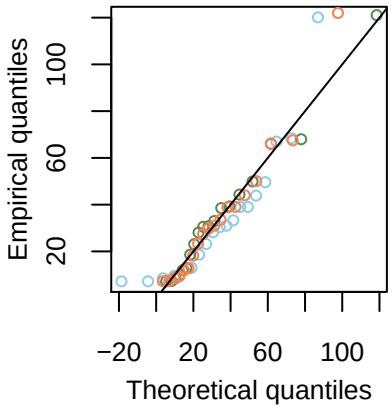
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 7 J	Arithmetic Mean = 34
N (detect) = 19	SD (log detect) = 0.82	Max (detect) = 120 J	Arithmetic SD = 28

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0037	0.17	–	–	–	–	183.51	185.399
Lognormal	0.49	0.52	–	–	–	–	172.052	173.941
Gamma	–	–	0.1199	0.204	0.291	0.769	172.814	174.703

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Arsenic

Media:
Waterway Sediment (All Samples)

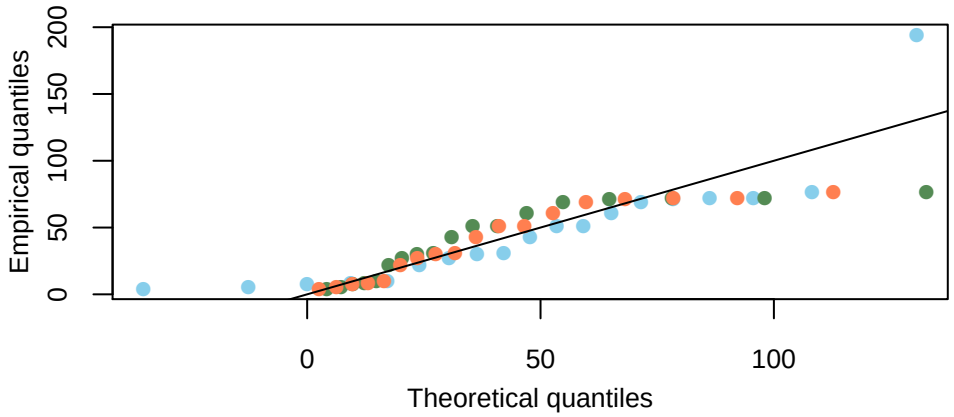
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Cadmium

Legend

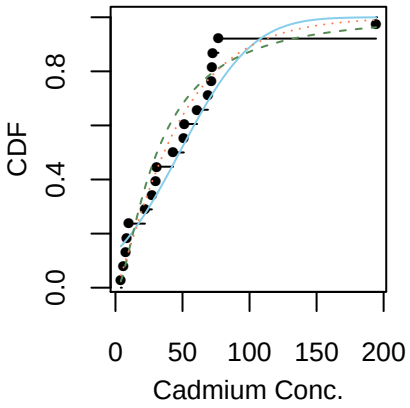
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

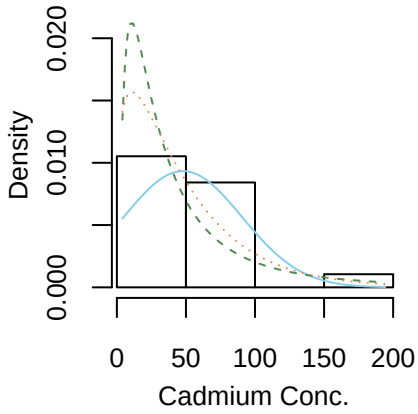


ECDF, Histogram & Q−Q (Detects Only)

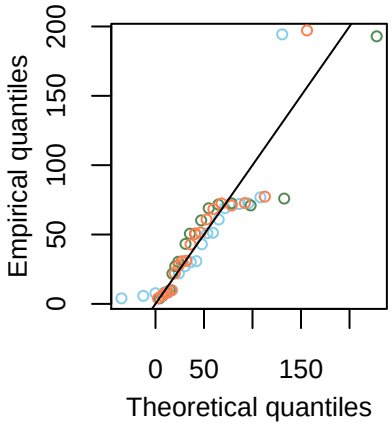
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 4 J	Arithmetic Mean = 48
N (detect) = 19	SD (log detect) = 1.1	Max (detect) = 190 J	Arithmetic SD = 44

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00074	0.041	–	–	–	–	200.624	202.513
Lognormal	0.13	0.27	–	–	–	–	189.496	191.385
Gamma	–	–	0.1391	0.204	0.4815	0.769	188.21	190.099

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Cadmium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **234**

Media:
Waterway Sediment (All Samples)

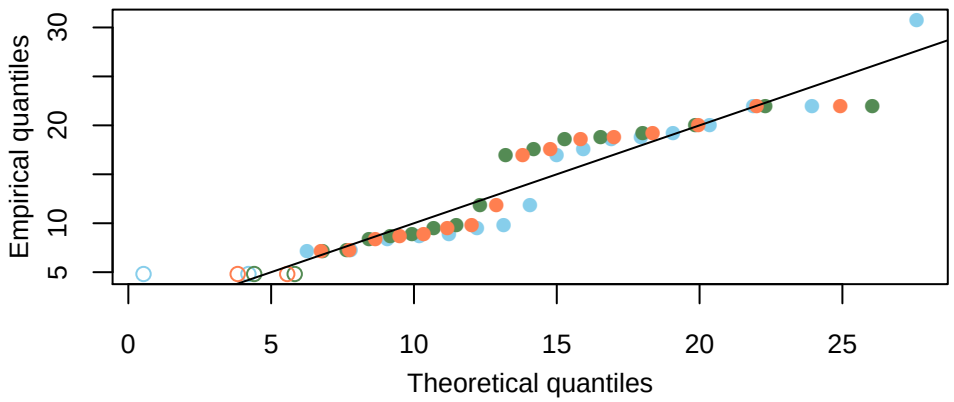
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Cobalt

Legend

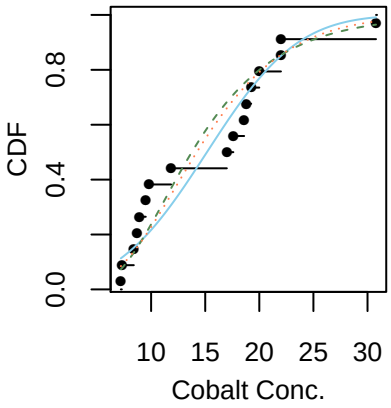
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

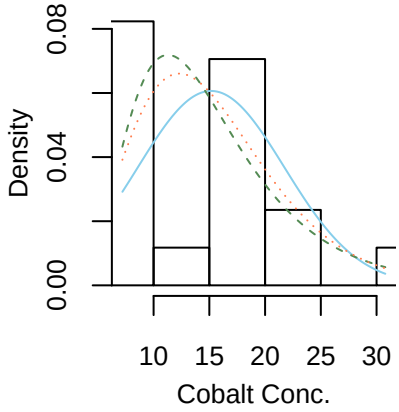


ECDF, Histogram & Q−Q (Detects Only)

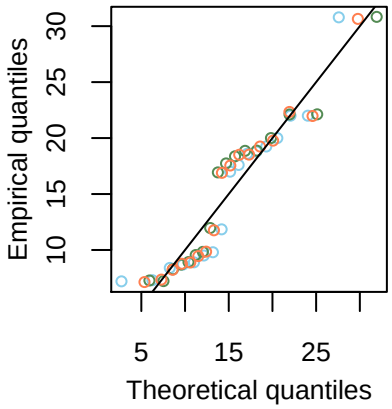
ECDF



Histogram



Q−Q



N = 19	FOD = 89%	Min (detect) = 7 J	Kaplan Meier Mean = 14
N (detect) = 17	SD (log detect) = 0.46	Max (detect) = 31 J	Kaplan Meier SD = 7

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.092	0.049	–	–	–	–	131.786	133.675
Lognormal	0.2	0.052	–	–	–	–	129.245	131.134
Gamma	–	–	0.1838	0.201	0.6049	0.752	128.993	130.882

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.059	0.078	–	–	–	–	116.295	117.961
Lognormal	0.08	0.051	–	–	–	–	113.888	115.554
Gamma	–	–	0.1964	0.21	0.7655	0.742	114.036	115.703

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Cobalt

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **235**

Media:
Waterway Sediment (All Samples)

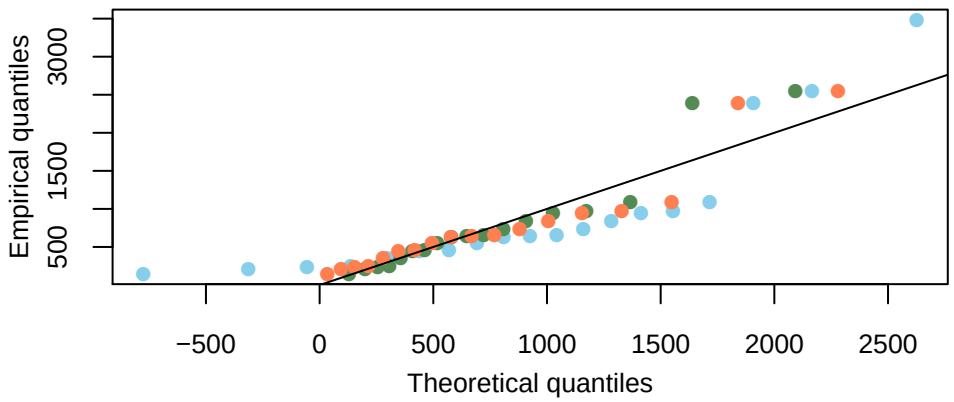
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Copper

Legend

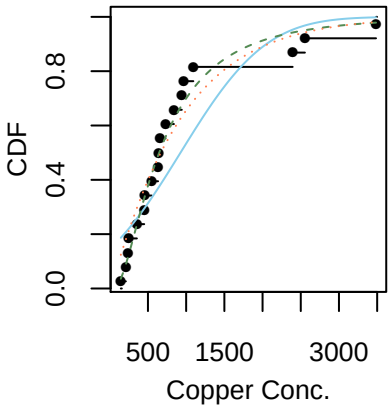
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

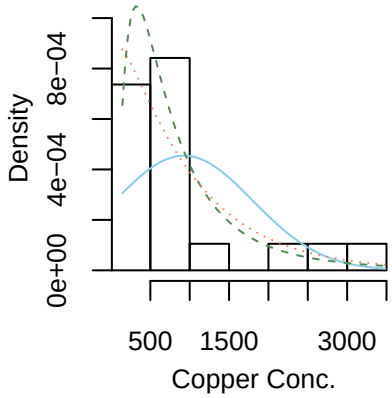


ECDF, Histogram & Q−Q (Detects Only)

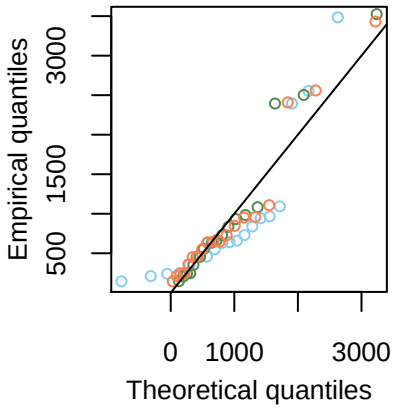
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 140 J	Arithmetic Mean = 930
N (detect) = 19	SD (log detect) = 0.85	Max (detect) = 3,500 J	Arithmetic SD = 900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00019	7e−04	–	–	–	–	315.451	317.34
Lognormal	0.71	0.77	–	–	–	–	296.839	298.728
Gamma	–	–	0.152	0.204	0.6442	0.769	300.781	302.67

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Copper

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **236**

Media:
Waterway Sediment (All Samples)

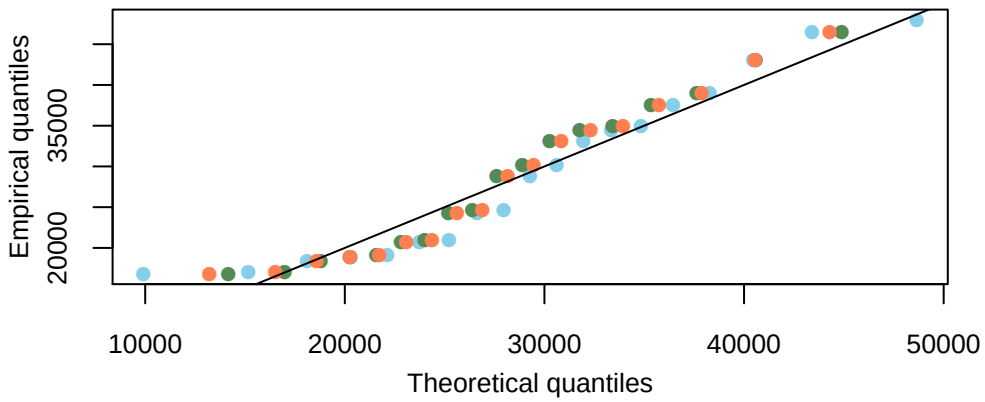
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Iron

Legend

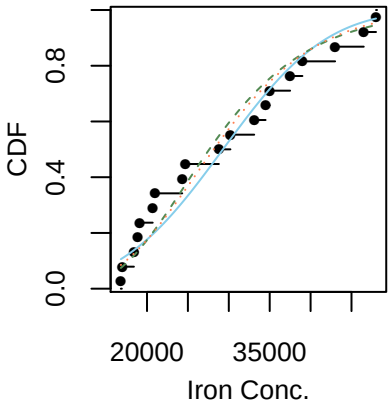
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

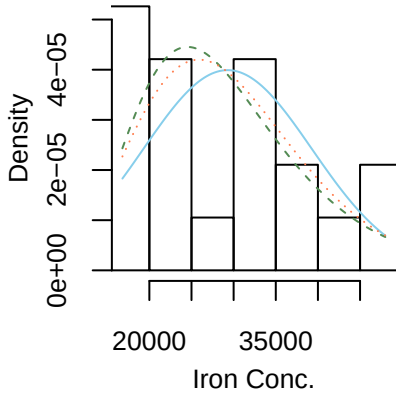


ECDF, Histogram & Q−Q (Detects Only)

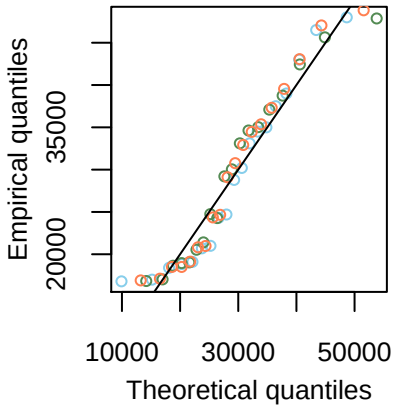
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 17,000 J	Arithmetic Mean = 29,000
N (detect) = 19	SD (log detect) = 0.35	Max (detect) = 48,000 J	Arithmetic SD = 10,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.11	0.24	–	–	–	–	407.895	409.784
Lognormal	0.17	0.32	–	–	–	–	405.978	407.866
Gamma	–	–	0.1584	0.199	0.4782	0.742	406.205	408.094

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Iron

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **237**

Media:
Waterway Sediment (All Samples)

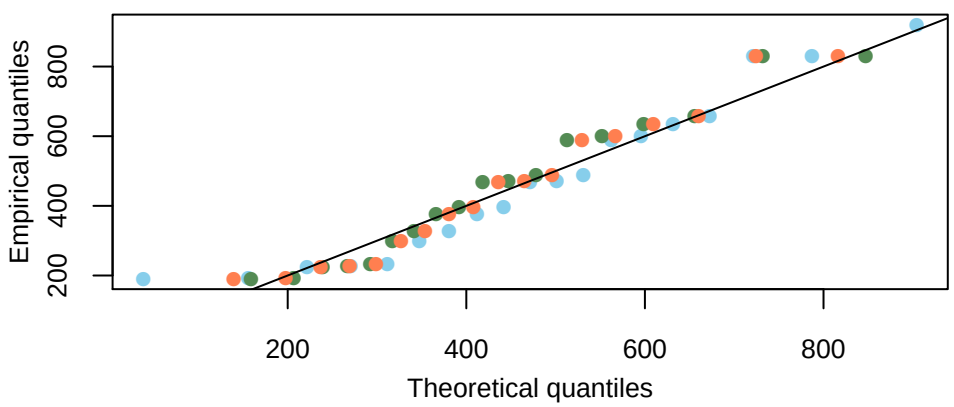
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Manganese

Legend

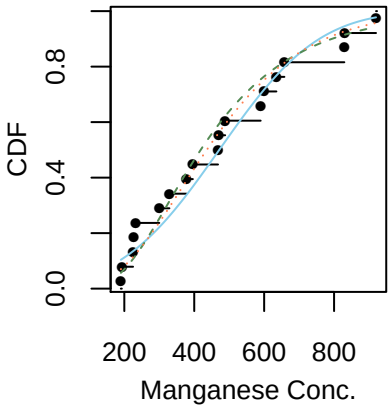
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

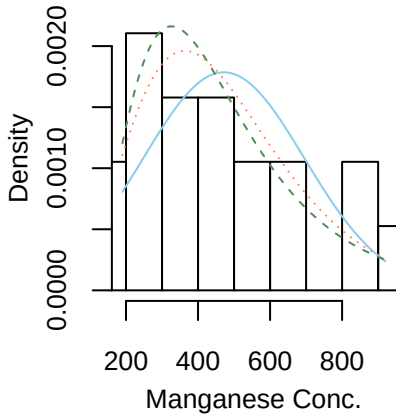


ECDF, Histogram & Q−Q (Detects Only)

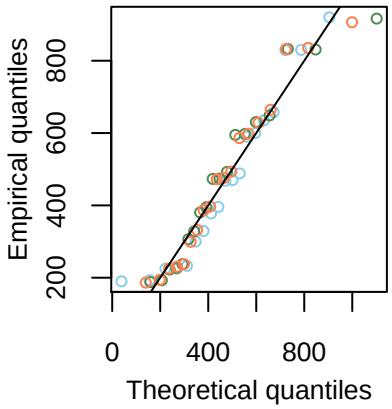
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 190 J	Arithmetic Mean = 470
N (detect) = 19	SD (log detect) = 0.51	Max (detect) = 920 J	Arithmetic SD = 230

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.15	0.75	–	–	–	–	263.466	265.355
Lognormal	0.26	0.47	–	–	–	–	260.933	262.822
Gamma	–	–	0.1374	0.201	0.3546	0.752	260.841	262.73

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Manganese

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **238**

Media:
Waterway Sediment (All Samples)

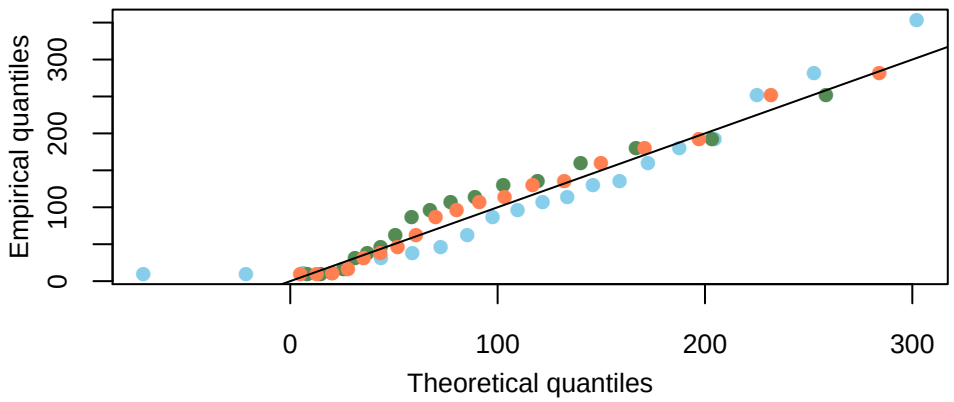
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Mercury

Legend

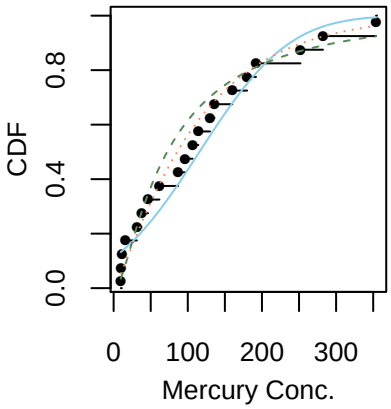
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

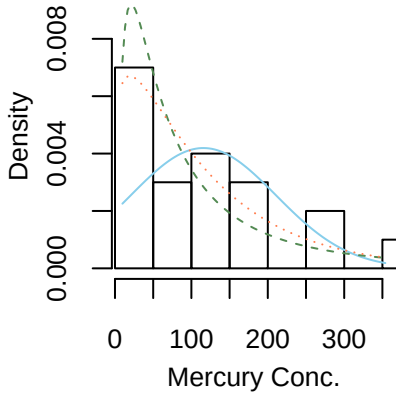


ECDF, Histogram & Q−Q (Detects Only)

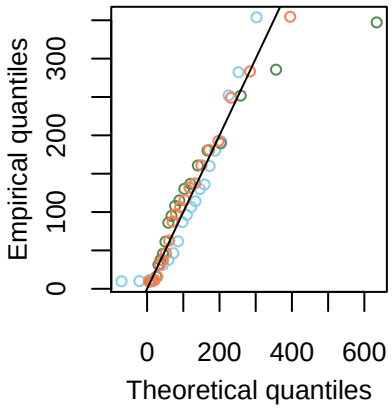
ECDF



Histogram



Q−Q



N = 20	FOD = 100%	Min (detect) = 9 J	Arithmetic Mean = 120
N (detect) = 20	SD (log detect) = 1.1	Max (detect) = 350 J	Arithmetic SD = 98

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.058	0.4	–	–	–	–	242.973	244.965
Lognormal	0.092	0.16	–	–	–	–	236.06	238.052
Gamma	–	–	0.1062	0.199	0.2904	0.768	233.649	235.641

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **239**

Media:
Waterway Sediment (All Samples)

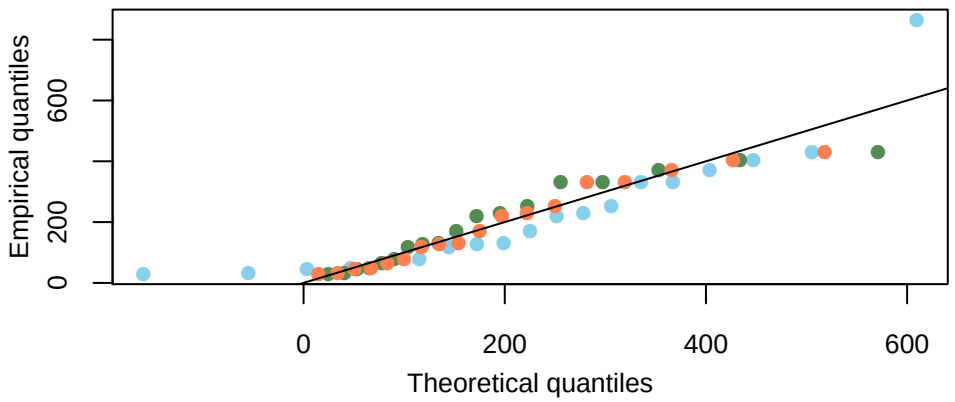
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Nickel

Legend

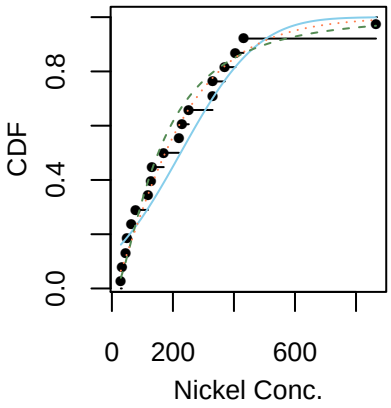
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

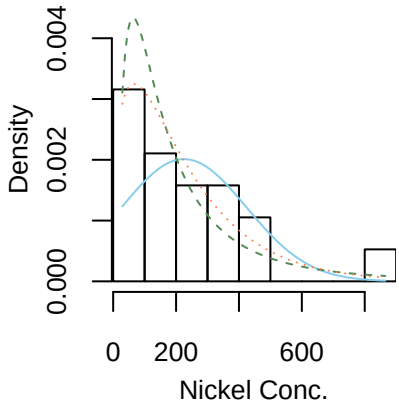


ECDF, Histogram & Q−Q (Detects Only)

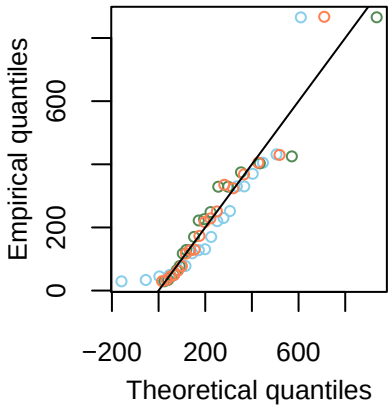
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 29 J	Arithmetic Mean = 230
N (detect) = 19	SD (log detect) = 0.96	Max (detect) = 870 J	Arithmetic SD = 200

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0028	0.17	–	–	–	–	258.943	260.831
Lognormal	0.59	0.63	–	–	–	–	246.369	248.258
Gamma	–	–	0.09583	0.204	0.2566	0.769	246.594	248.483

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Nickel

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **240**

Media:
Waterway Sediment (All Samples)

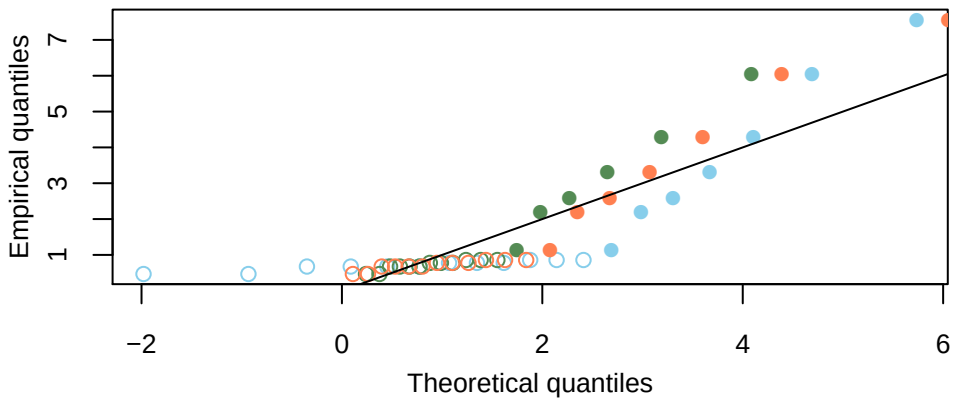
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Thallium

Legend

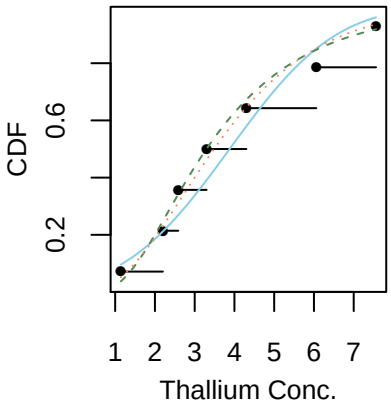
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

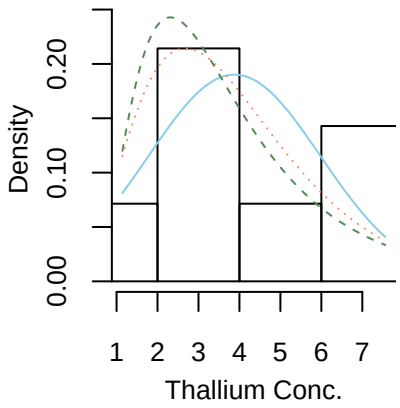


ECDF, Histogram & Q−Q (Detects Only)

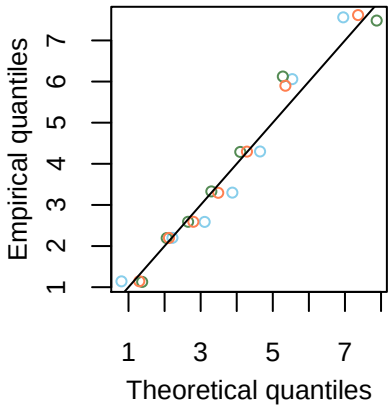
ECDF



Histogram



Q−Q



N = 19	FOD = 37%	Min (detect) = 1 J	Kaplan Meier Mean = 1
N (detect) = 7	SD (log detect) = 0.64	Max (detect) = 7 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	5e−05	1.1e−05	–	–	–	–	84.0917	85.9806
Lognormal	0.0048	0.00013	–	–	–	–	59.6689	61.5578
Gamma	–	–	0.3221	0.204	1.766	0.769	65.0434	66.9323

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.73	0.77	–	–	–	–	34.2378	34.1296
Lognormal	0.95	0.99	–	–	–	–	33.289	33.1808
Gamma	–	–	NA	NA	NA	NA	33.0752	32.967

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Thallium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **241**

Media:
Waterway Sediment (All Samples)

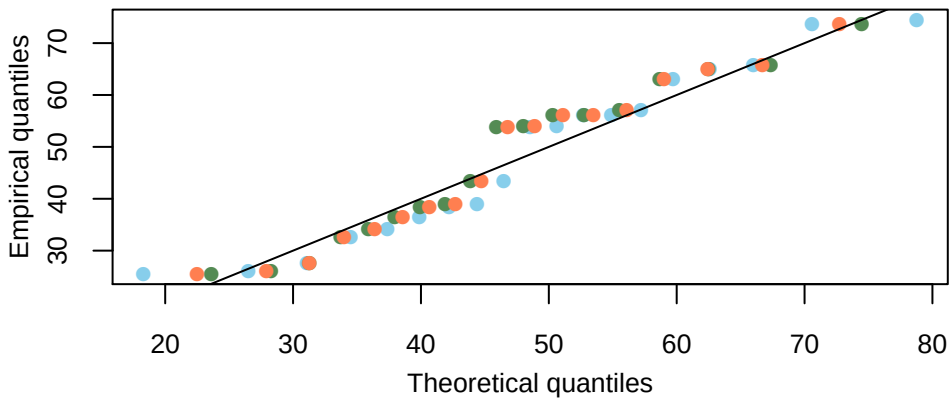
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Vanadium

Legend

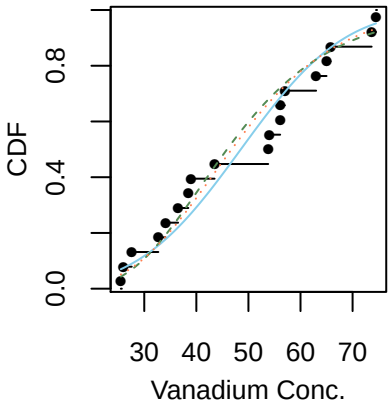
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

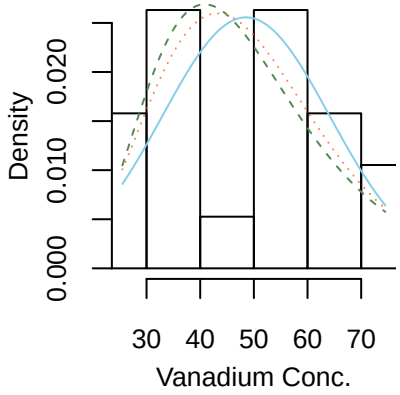


ECDF, Histogram & Q−Q (Detects Only)

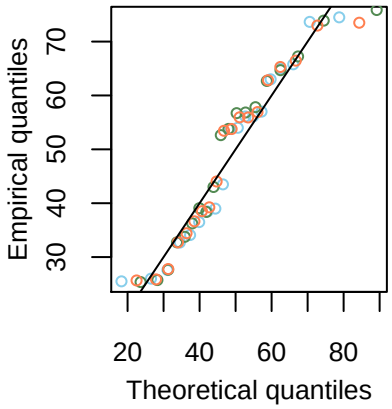
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 26 J	Arithmetic Mean = 49
N (detect) = 19	SD (log detect) = 0.35	Max (detect) = 74 J	Arithmetic SD = 16

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.21	0.27	–	–	–	–	162.324	164.213
Lognormal	0.14	0.043	–	–	–	–	162.634	164.523
Gamma	–	–	0.1909	0.199	0.5068	0.742	162.115	164.004

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Vanadium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **242**

Media:
Waterway Sediment (All Samples)

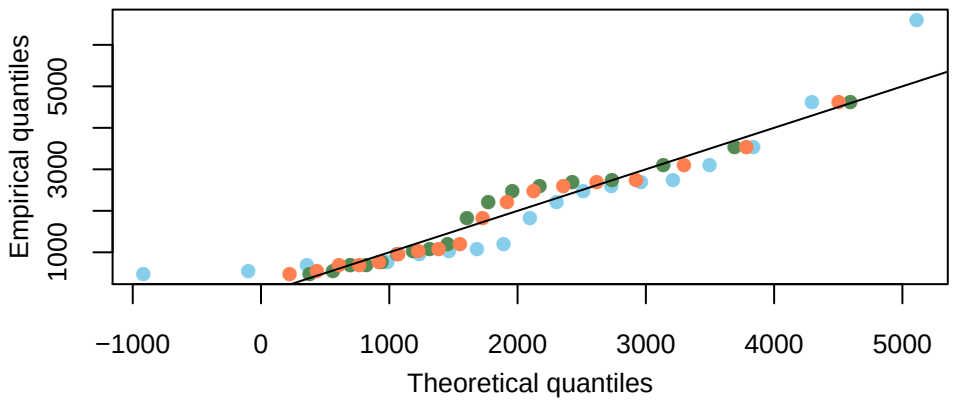
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Zinc

Legend

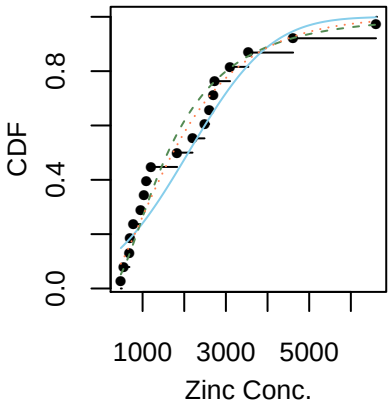
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

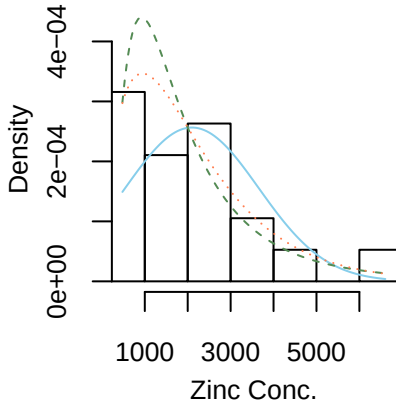


ECDF, Histogram & Q−Q (Detects Only)

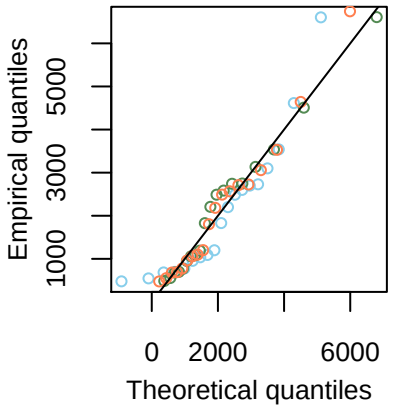
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 480 J	Arithmetic Mean = 2,100
N (detect) = 19	SD (log detect) = 0.77	Max (detect) = 6,600 J	Arithmetic SD = 1,600

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.01	0.08	–	–	–	–	337.201	339.09
Lognormal	0.48	0.45	–	–	–	–	327.204	329.093
Gamma	–	–	0.1404	0.204	0.3645	0.769	328.273	330.162

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Zinc

Media:
Waterway Sediment (All Samples)

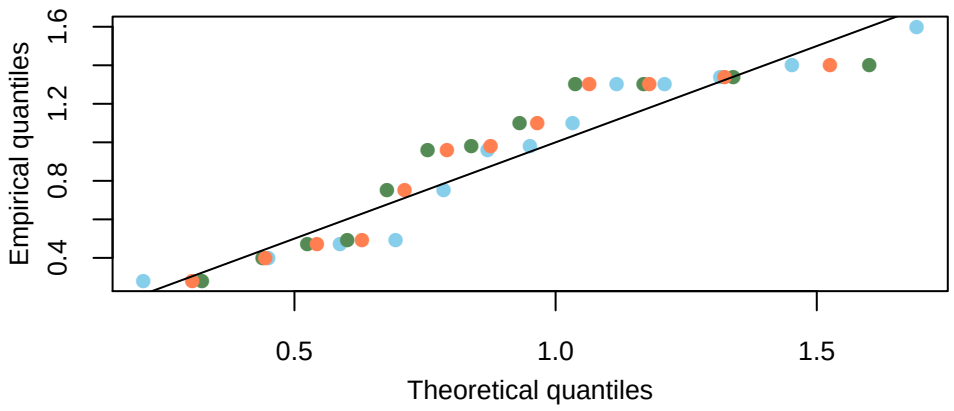
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Benzo[a]pyrene

Legend

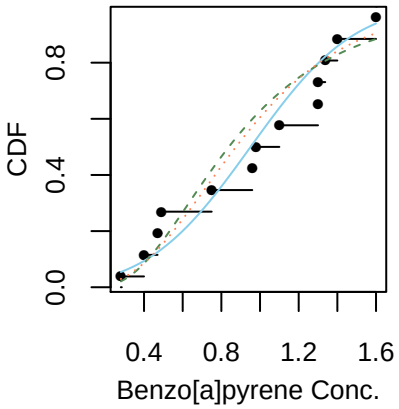
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

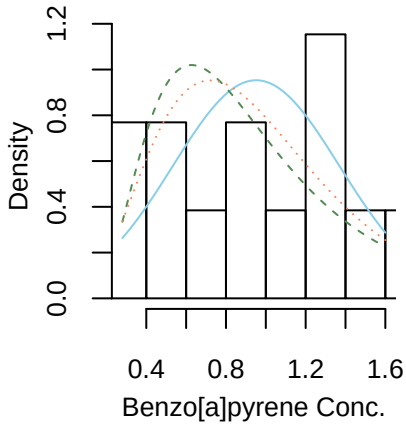


ECDF, Histogram & Q−Q (Detects Only)

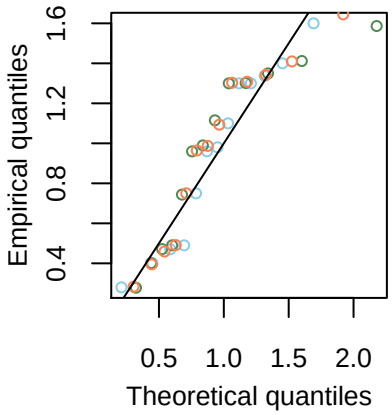
ECDF



Histogram



Q−Q



N = 13	FOD = 100%	Min (detect) = 0.28 J	Arithmetic Mean = 0.95
N (detect) = 13	SD (log detect) = 0.56	Max (detect) = 1 J	Arithmetic SD = 0.44

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.34	0.36	–	–	–	–	18.2454	19.3753
Lognormal	0.1	0.12	–	–	–	–	20.2777	21.4076
Gamma	–	–	0.1881	0.27	0.5679	0.736	18.9518	20.0817

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Benzo[a]pyrene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **244**

Media:
Waterway Sediment (All Samples)

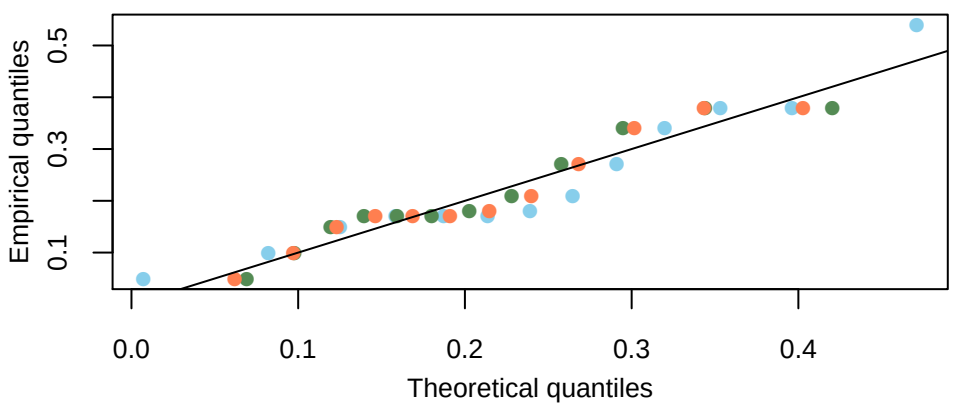
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

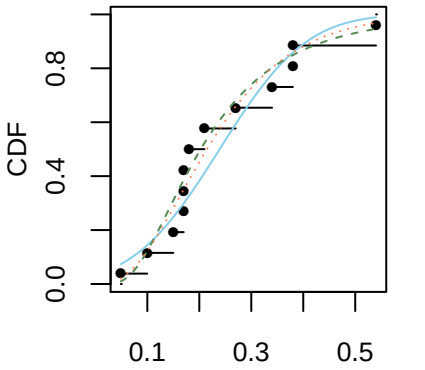
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

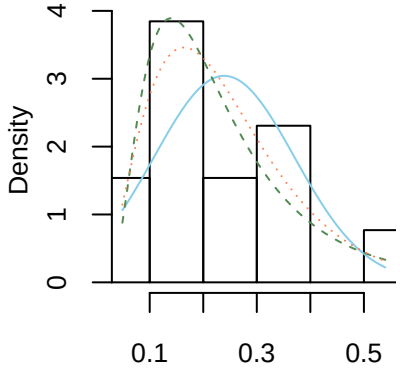


ECDF, Histogram & Q−Q (Detects Only)

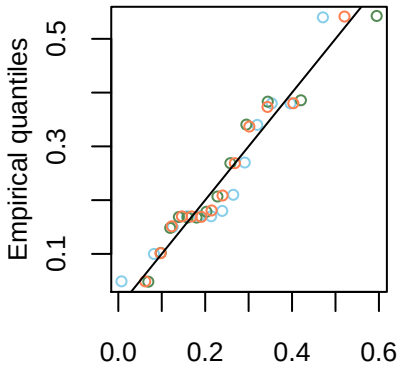
ECDF



Histogram



Q−Q



N = 13	FOD = 100%	Min (detect) = 0.049 J	Arithmetic Mean = 0.24
N (detect) = 13	SD (log detect) = 0.63	Max (detect) = 0.54 J	Arithmetic SD = 0.14

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.26	0.14	–	–	–	–	−11.9321	−10.8022
Lognormal	0.55	0.45	–	–	–	–	−13.5152	−12.3853
Gamma	–	–	0.1533	0.27	0.3153	0.736	−14.2994	−13.1695

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **245**

Media:
Waterway Sediment (All Samples)
Exposure Unit:
Upper Peach Island Creek
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 13	FOD = 23%	Min (detect) = 0.013 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.05 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Aldrin

Media:
Waterway Sediment (All Samples)
Exposure Unit:
Upper Peach Island Creek
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 4	FOD = 25%	Min (detect) = 0.029 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.029 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Heptachlor

Media:
Waterway Sediment (All Samples)

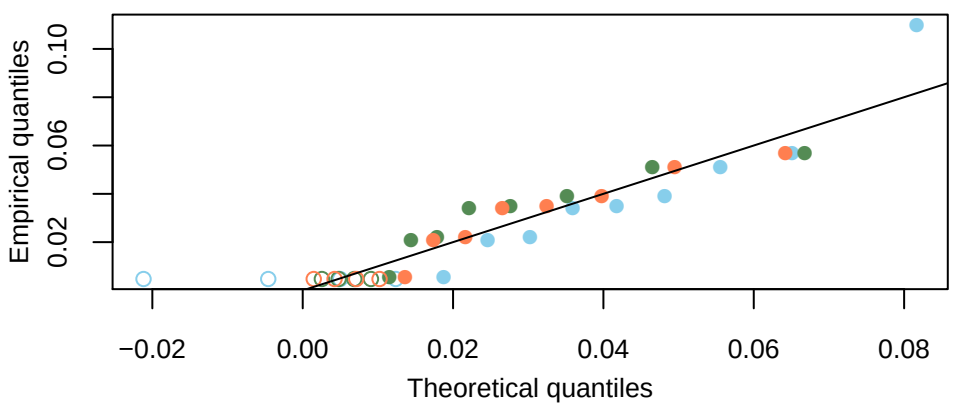
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
Heptachlor Epoxide

Legend

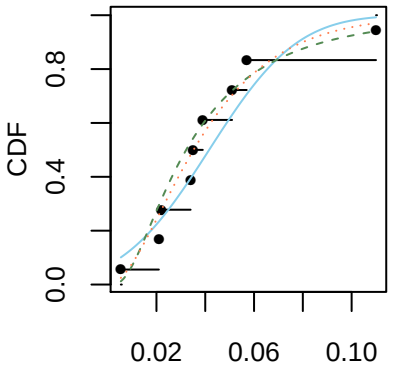
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

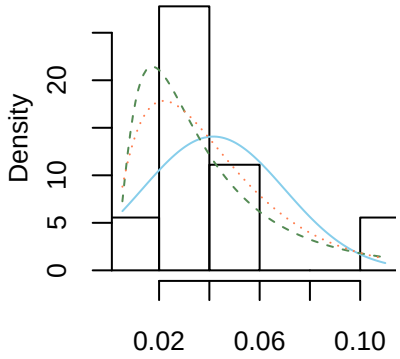


ECDF, Histogram & Q−Q (Detects Only)

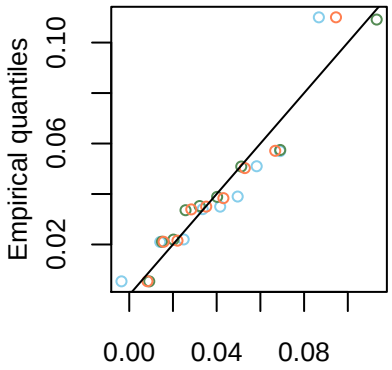
ECDF



Histogram



Q−Q



N = 13	FOD = 69%	Min (detect) = 0.0054 J	Kaplan Meier Mean = 0.029
N (detect) = 9	SD (log detect) = 0.84	Max (detect) = 0.11	Kaplan Meier SD = 0.03

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.011	0.17	–	–	–	–	−51.0896	−49.9597
Lognormal	0.035	0.045	–	–	–	–	−61.2669	−60.137
Gamma	–	–	0.2377	0.274	0.657	0.748	−60.9986	−59.8687

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.13	0.37	–	–	–	–	−34.5984	−34.2039
Lognormal	0.43	0.42	–	–	–	–	−36.5683	−36.1739
Gamma	–	–	0.1478	0.282	0.2606	0.73	−37.5785	−37.184

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Heptachlor Epoxide

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **248**

Media:
Waterway Sediment (All Samples)

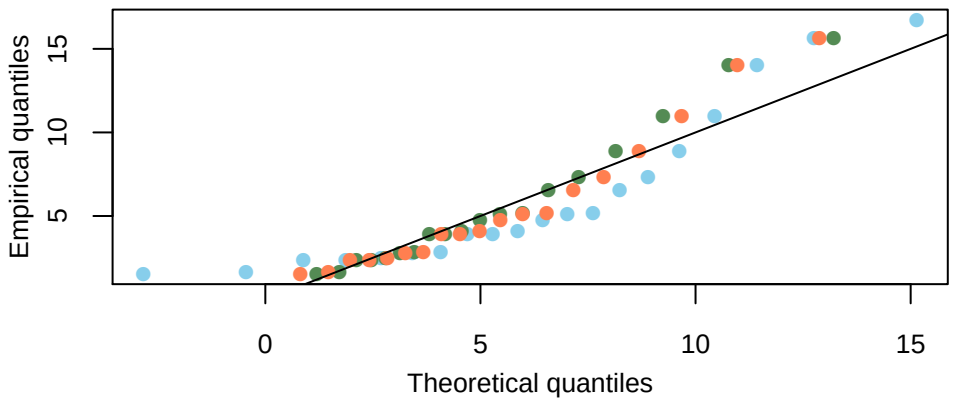
Exposure Unit:
Upper Peach Island Creek

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

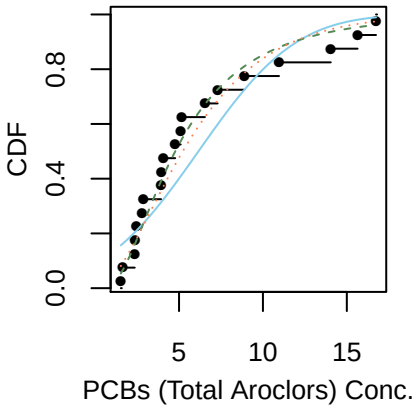
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

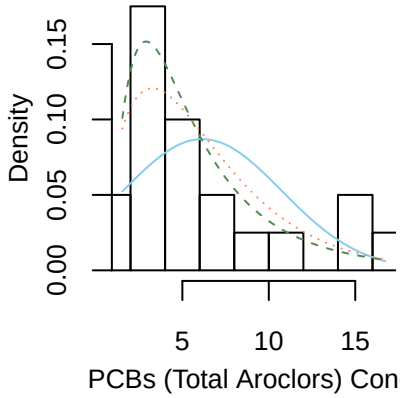


ECDF, Histogram & Q−Q (Detects Only)

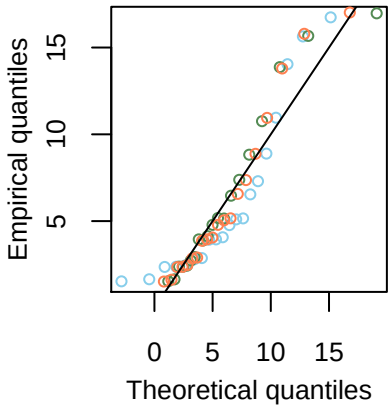
ECDF



Histogram



Q−Q



N = 20	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 6
N (detect) = 20	SD (log detect) = 0.73	Max (detect) = 17 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0025	0.0053	–	–	–	–	121.673	123.665
Lognormal	0.46	0.78	–	–	–	–	109.432	111.424
Gamma	–	–	0.1567	0.196	0.5322	0.752	111.381	113.372

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−PCBs (Total Aroclors)

Media:
Waterway Sediment (All Samples)
Exposure Unit:
Upper Peach Island Creek
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 10	FOD = 10%	Min (detect) = 27	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 27	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Upper Peach Island Creek−Trichloroethene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **250**

Media:
Waterway Sediment (All Samples)

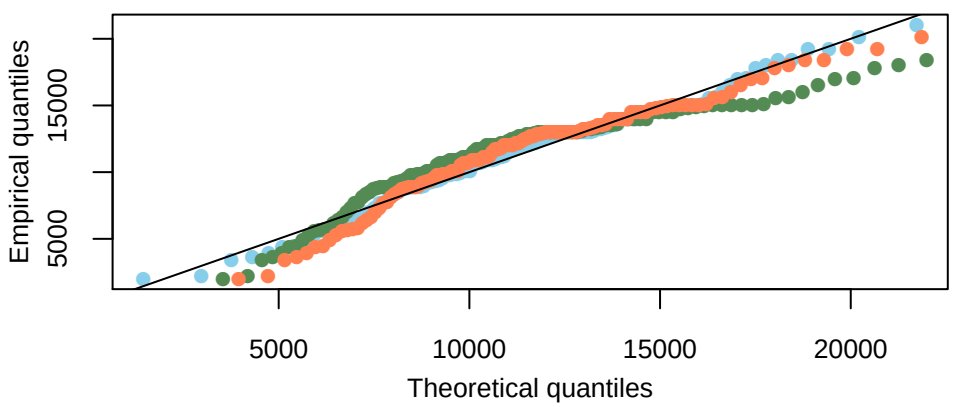
Exposure Unit:
MBC

Chemical (mg/kg):
Aluminum

Legend

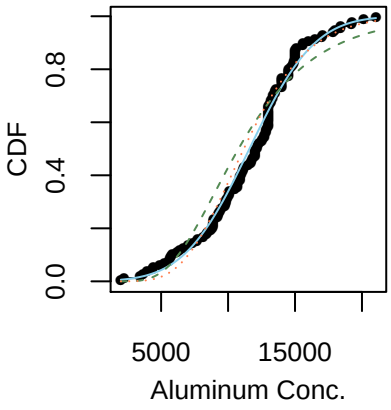
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

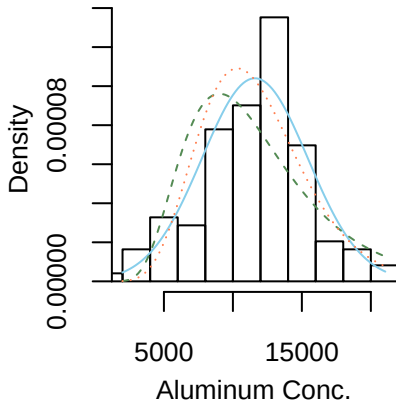


ECDF, Histogram & Q−Q (Detects Only)

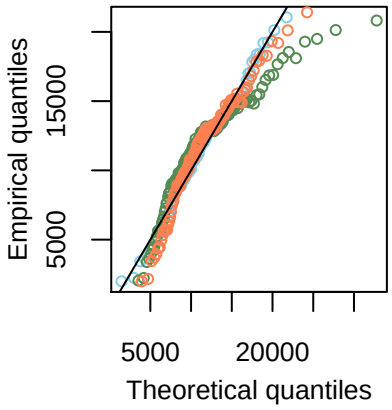
ECDF



Histogram



Q−Q



N = 122	FOD = 100%	Min (detect) = 2,000	Arithmetic Mean = 12,000
N (detect) = 122	SD (log detect) = 0.42	Max (detect) = 21,000	Arithmetic SD = 3,900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.17	0.091	–	–	–	–	2363.68	2369.29
Lognormal	0	3.4e−06	–	–	–	–	2404.62	2410.22
Gamma	–	–	0.1178	0.09	2.716	0.754	2388.63	2394.23

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Aluminum

Media:
Waterway Sediment (All Samples)

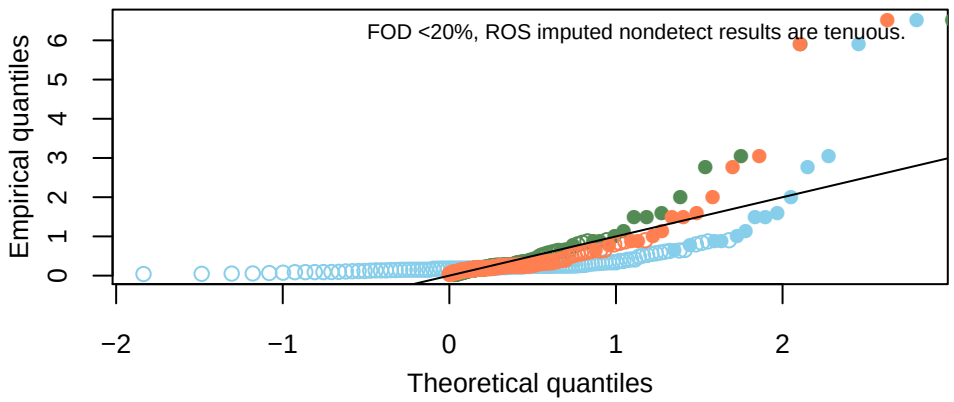
Exposure Unit:
MBC

Chemical (mg/kg):
Antimony

Legend

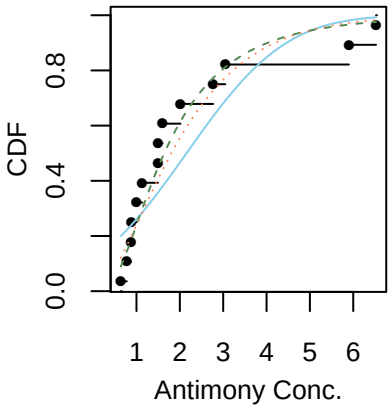
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

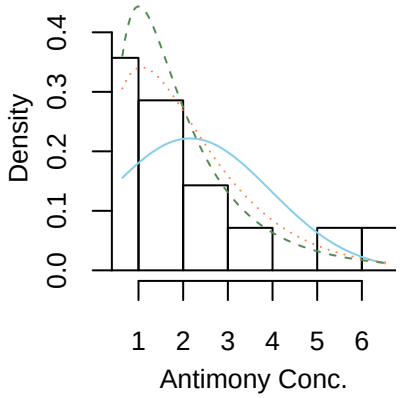


ECDF, Histogram & Q−Q (Detects Only)

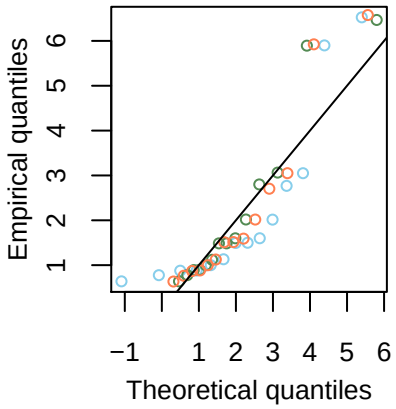
ECDF



Histogram



Q−Q



N = 122	FOD = 11%	Min (detect) = 0.64 J	Kaplan Meier Mean = 0.74
N (detect) = 14	SD (log detect) = 0.73	Max (detect) = 6	Kaplan Meier SD = 0.83

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1e−31	–	–	–	–	313.783	319.358
Lognormal	3e−05	3e−07	–	–	–	–	12.0992	17.6742
Gamma	–	–	0.2234	0.092	8.001	0.783	70.4209	75.9959

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0012	0.011	–	–	–	–	60.1781	61.4562
Lognormal	0.24	0.46	–	–	–	–	47.622	48.9001
Gamma	–	–	0.2045	0.274	0.7125	0.748	50.3036	51.5817

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Antimony

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **252**

Media:
Waterway Sediment (All Samples)

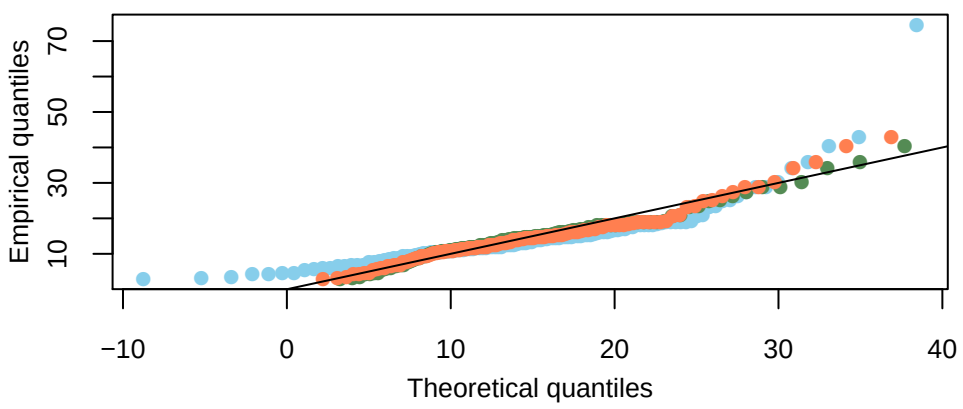
Exposure Unit:
MBC

Chemical (mg/kg):
Arsenic

Legend

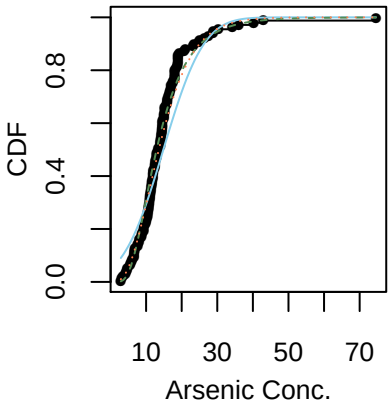
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

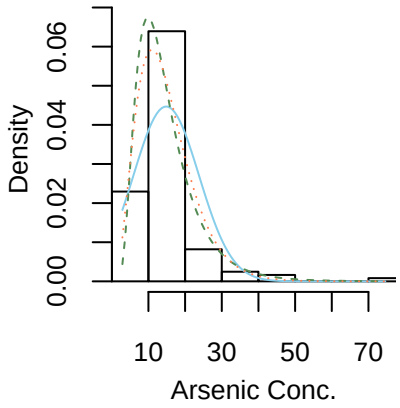


ECDF, Histogram & Q−Q (Detects Only)

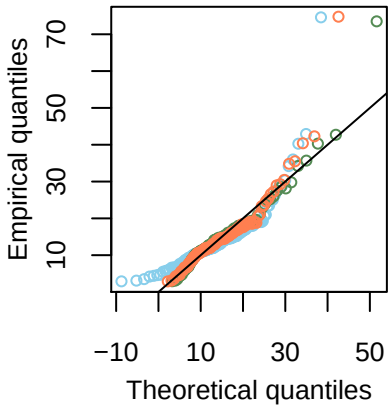
ECDF



Histogram



Q−Q



N = 122	FOD = 100%	Min (detect) = 2	Arithmetic Mean = 15
N (detect) = 122	SD (log detect) = 0.53	Max (detect) = 75 J	Arithmetic SD = 9

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1e−10	–	–	–	–	884.292	889.9
Lognormal	0.013	0.01	–	–	–	–	816.935	822.543
Gamma	–	–	0.1122	0.091	1.417	0.765	822.658	828.266

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Arsenic

Media:
Waterway Sediment (All Samples)

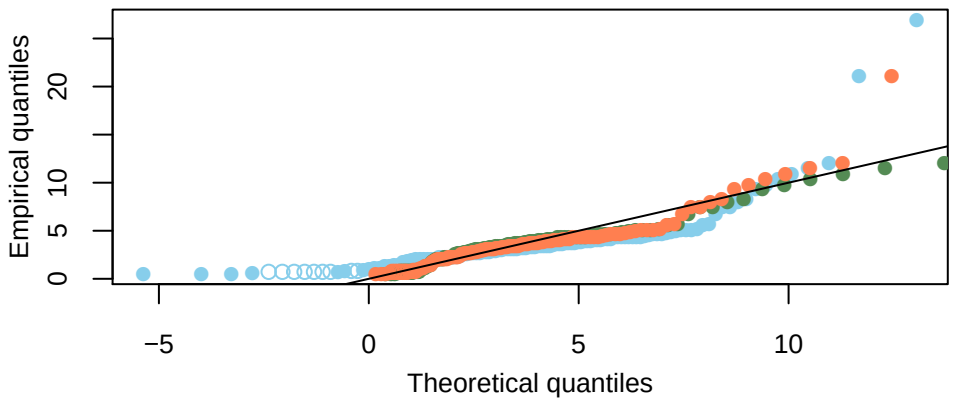
Exposure Unit:
MBC

Chemical (mg/kg):
Cadmium

Legend

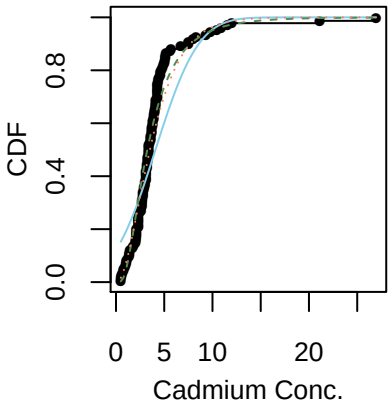
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

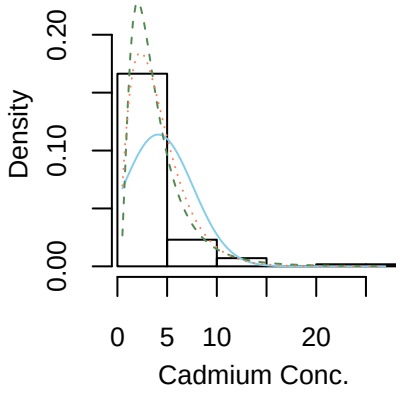


ECDF, Histogram & Q−Q (Detects Only)

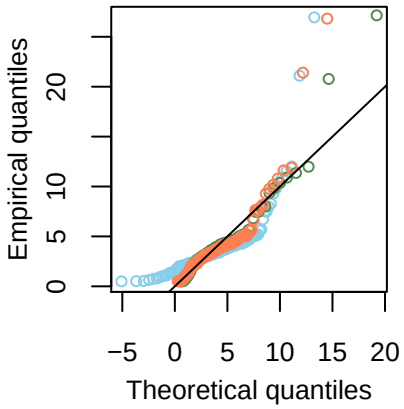
ECDF



Histogram



Q−Q



N = 122	FOD = 93%	Min (detect) = 0.5 J	Kaplan Meier Mean = 3
N (detect) = 113	SD (log detect) = 0.68	Max (detect) = 27 J	Kaplan Meier SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.7e−17	–	–	–	–	654.778	660.386
Lognormal	0.00015	7.4e−05	–	–	–	–	543.377	548.985
Gamma	–	–	0.127	0.092	2.339	0.783	550.358	555.966

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−18	–	–	–	–	608.075	613.53
Lognormal	0.00031	0.0014	–	–	–	–	503.197	508.652
Gamma	–	–	0.1447	0.091	2.733	0.765	512.499	517.954

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Cadmium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **254**

Media:
Waterway Sediment (All Samples)

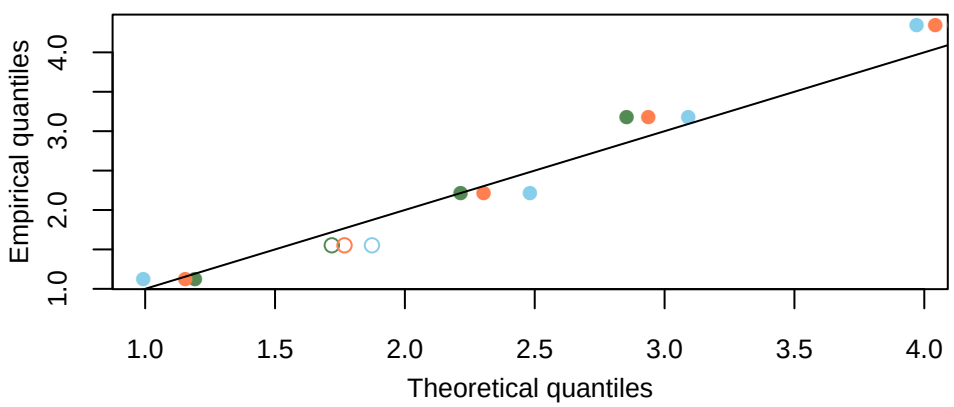
Exposure Unit:
MBC

Chemical (mg/kg):
Chromium (VI)

Legend

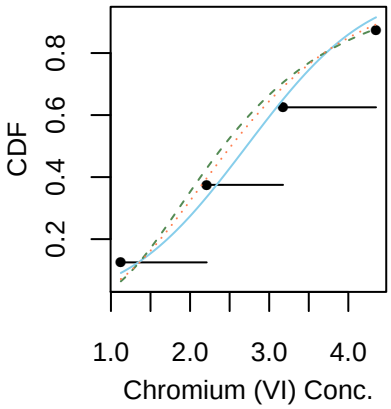
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

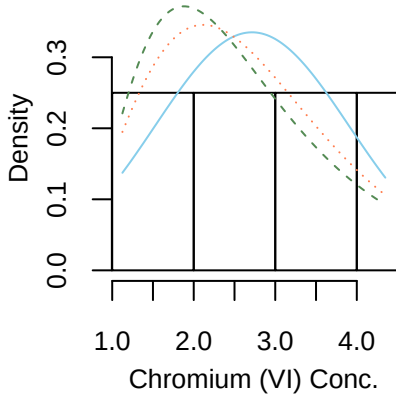


ECDF, Histogram & Q−Q (Detects Only)

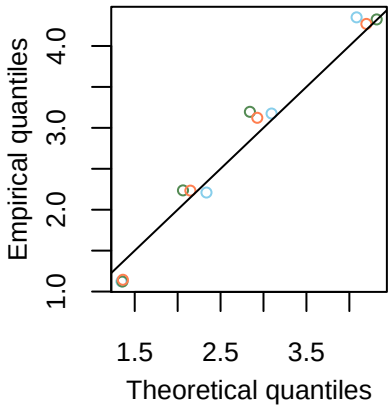
ECDF



Histogram



Q−Q



N = 5	FOD = 80%	Min (detect) = 1	Kaplan Meier Mean = 2
N (detect) = 4	SD (log detect) = 0.58	Max (detect) = 4	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.75	N<5	–	–	–	–	19.6889	18.9078
Lognormal	0.94	N<5	–	–	–	–	18.8811	18.1
Gamma	–	–	NA	NA	NA	NA	18.9375	18.1564

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.99	N<5	–	–	–	–	16.7456	15.5182
Lognormal	0.83	N<5	–	–	–	–	16.9289	15.7014
Gamma	–	–	NA	NA	NA	NA	16.6858	15.4584

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Chromium (VI)

Media:
Waterway Sediment (All Samples)

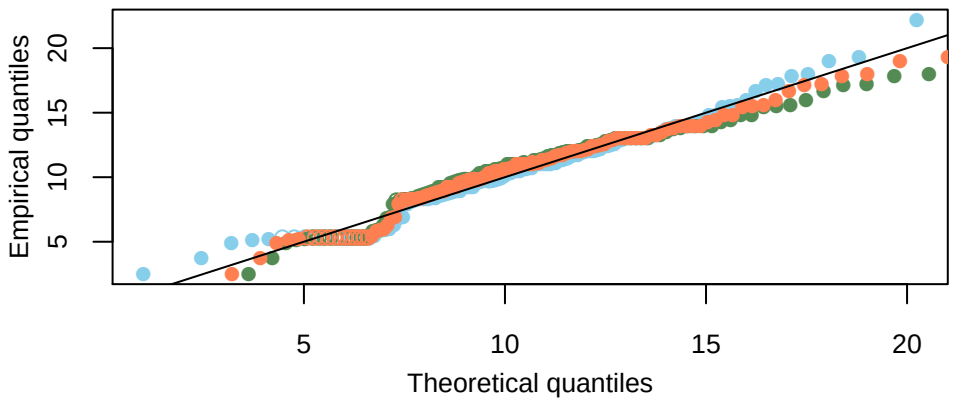
Exposure Unit:
MBC

Chemical (mg/kg):
Cobalt

Legend

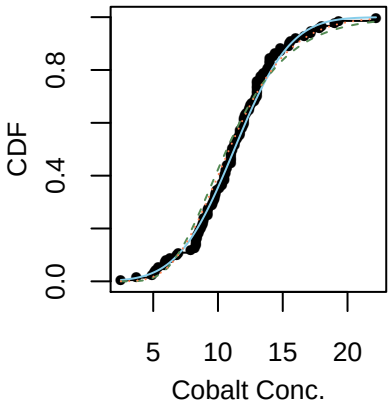
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

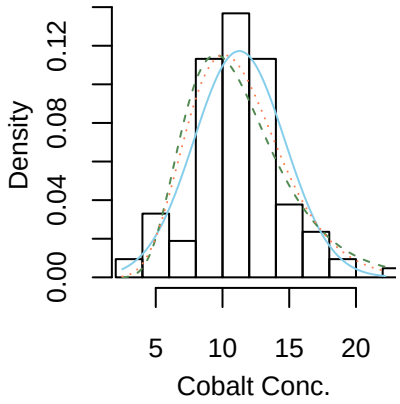


ECDF, Histogram & Q−Q (Detects Only)

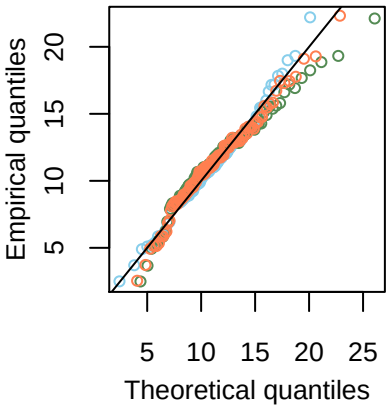
ECDF



Histogram



Q−Q



N = 122	FOD = 87%	Min (detect) = 2 J	Kaplan Meier Mean = 10
N (detect) = 106	SD (log detect) = 0.35	Max (detect) = 22 J	Kaplan Meier SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.047	0.13	–	–	–	–	665.272	670.88
Lognormal	6e−05	0.002	–	–	–	–	675.817	681.425
Gamma	–	–	0.08847	0.09	1.614	0.754	666.928	672.536

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.44	0.23	–	–	–	–	564.357	569.684
Lognormal	4e−05	0.0082	–	–	–	–	580.573	585.9
Gamma	–	–	0.08163	0.09	0.9864	0.754	570.022	575.348

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Cobalt

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **256**

Media:
Waterway Sediment (All Samples)

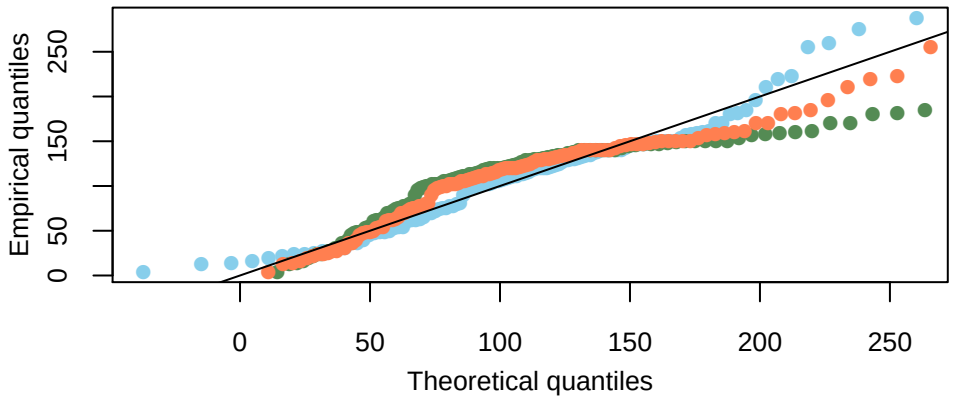
Exposure Unit:
MBC

Chemical (mg/kg):
Copper

Legend

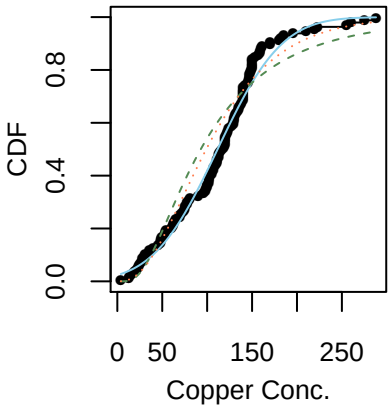
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

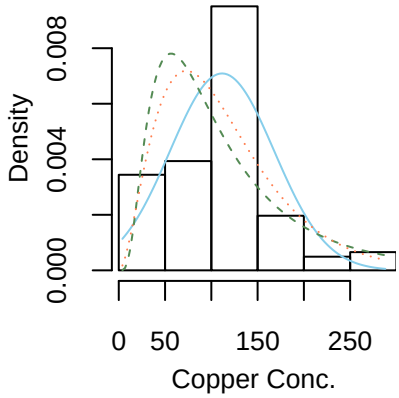


ECDF, Histogram & Q−Q (Detects Only)

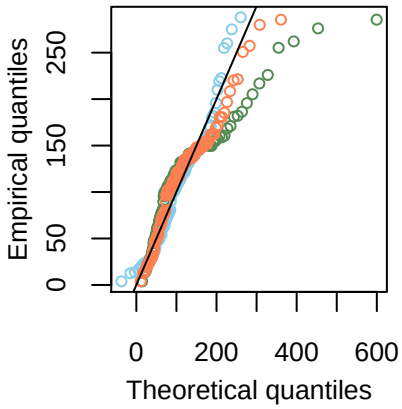
ECDF



Histogram



Q−Q



N = 122	FOD = 100%	Min (detect) = 3	Arithmetic Mean = 110
N (detect) = 122	SD (log detect) = 0.71	Max (detect) = 290 J	Arithmetic SD = 56

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.002	0.012	–	–	–	–	1333.54	1339.15
Lognormal	0	3.1e−12	–	–	–	–	1370.73	1376.33
Gamma	–	–	0.1573	0.091	3.15	0.765	1340.92	1346.53

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Copper

Media:
Waterway Sediment (All Samples)

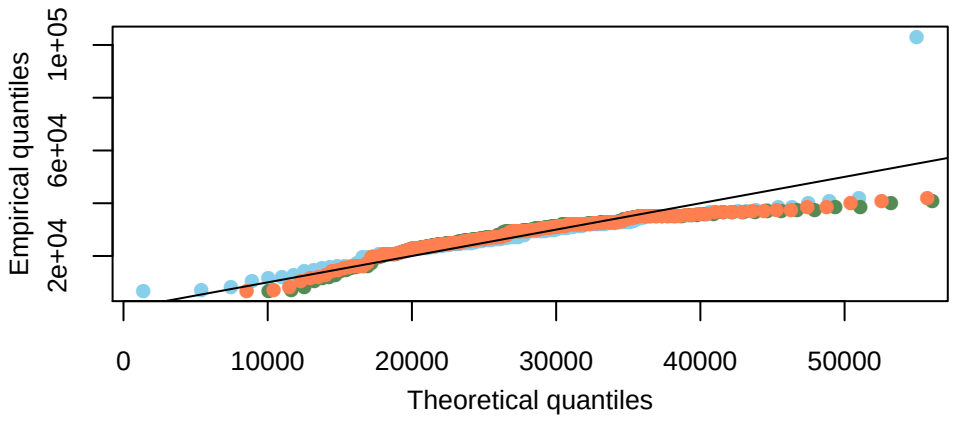
Exposure Unit:
MBC

Chemical (mg/kg):
Iron

Legend

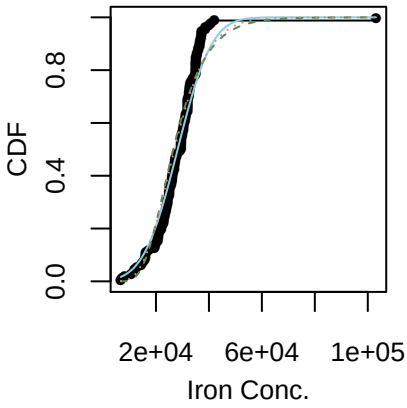
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

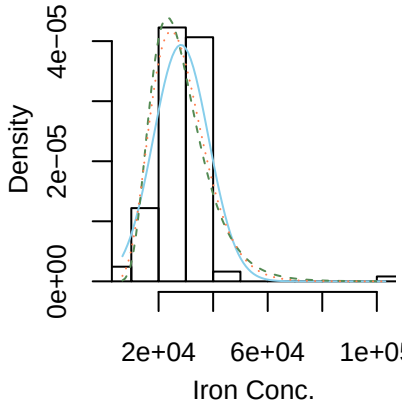


ECDF, Histogram & Q−Q (Detects Only)

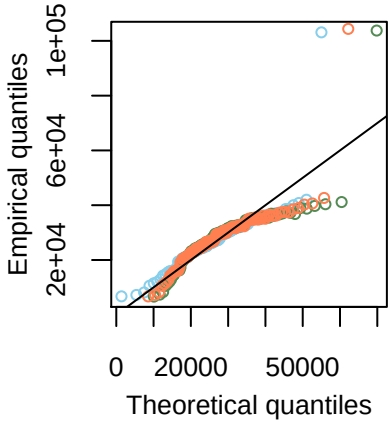
ECDF



Histogram



Q−Q



N = 123	FOD = 100%	Min (detect) = 6,700	Arithmetic Mean = 28,000
N (detect) = 123	SD (log detect) = 0.37	Max (detect) = 100,000 J	Arithmetic SD = 10,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.1e−06	–	–	–	–	2621.99	2627.61
Lognormal	0	4e−05	–	–	–	–	2611.35	2616.97
Gamma	–	–	0.1262	0.09	3.56	0.754	2602.79	2608.42

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Iron

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **258**

Media:
Waterway Sediment (All Samples)

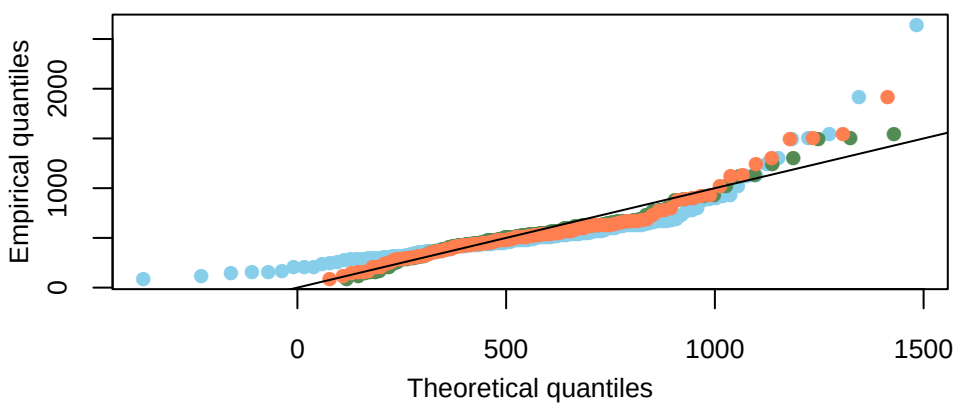
Exposure Unit:
MBC

Chemical (mg/kg):
Manganese

Legend

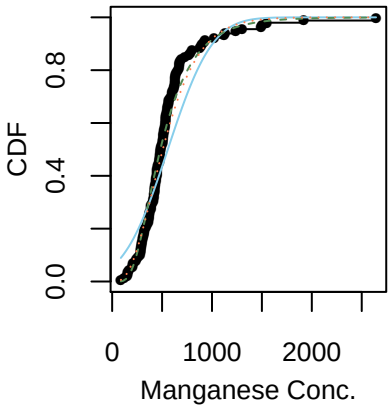
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

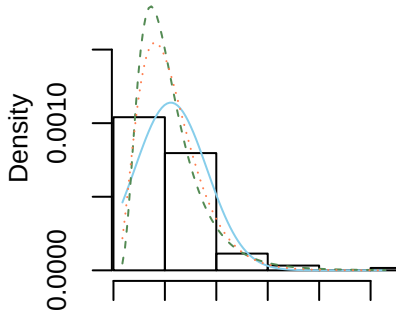


ECDF, Histogram & Q−Q (Detects Only)

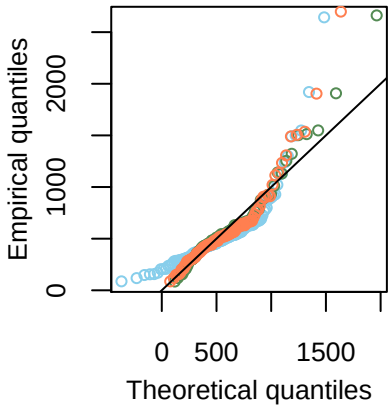
ECDF



Histogram



Q−Q



N = 123	FOD = 100%	Min (detect) = 87 J	Arithmetic Mean = 560
N (detect) = 123	SD (log detect) = 0.53	Max (detect) = 2,600 J	Arithmetic SD = 350

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.4e−13	–	–	–	–	1794.09	1799.71
Lognormal	0.0067	0.0063	–	–	–	–	1717.08	1722.7
Gamma	–	–	0.1241	0.091	2.262	0.765	1726.4	1732.03

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Manganese

Media:
Waterway Sediment (All Samples)

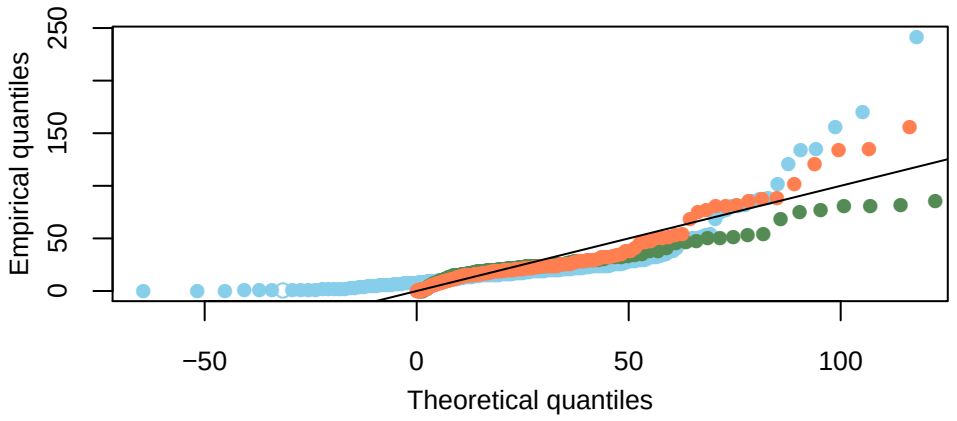
Exposure Unit:
MBC

Chemical (mg/kg):
Mercury

Legend

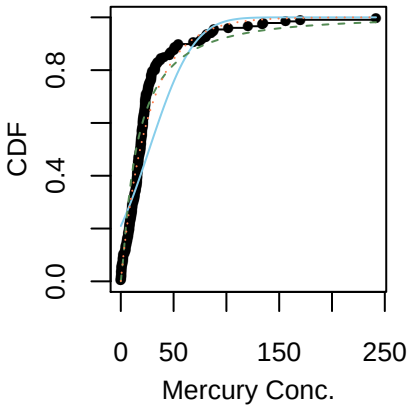
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

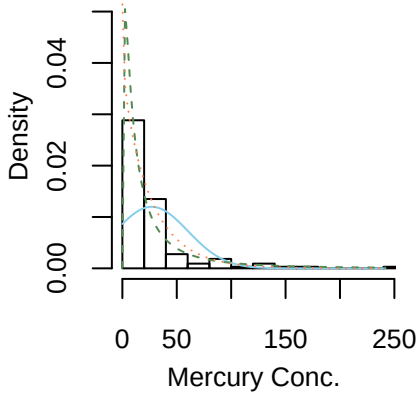


ECDF, Histogram & Q−Q (Detects Only)

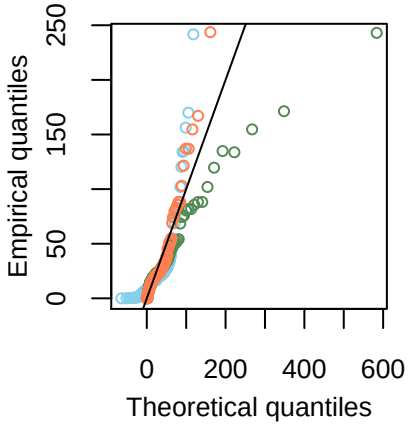
ECDF



Histogram



Q−Q



N = 164	FOD = 99%	Min (detect) = 0.019 J	Kaplan Meier Mean = 27
N (detect) = 163	SD (log detect) = 1.4	Max (detect) = 240 J	Kaplan Meier SD = 33

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	8.8e−31	–	–	–	–	1618.76	1624.96
Lognormal	0	3.9e−10	–	–	–	–	1443.33	1449.53
Gamma	–	–	0.1215	0.095	3.211	0.818	1409.57	1415.77

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	9.1e−31	–	–	–	–	1609.29	1615.48
Lognormal	0	8.5e−10	–	–	–	–	1436.28	1442.46
Gamma	–	–	0.1234	0.095	3.246	0.818	1403.26	1409.45

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **260**

Media:
Waterway Sediment (All Samples)

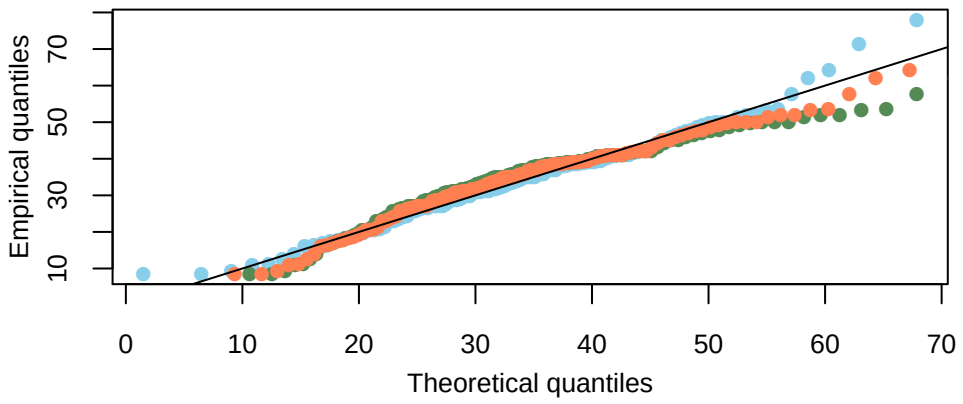
Exposure Unit:
MBC

Chemical (mg/kg):
Nickel

Legend

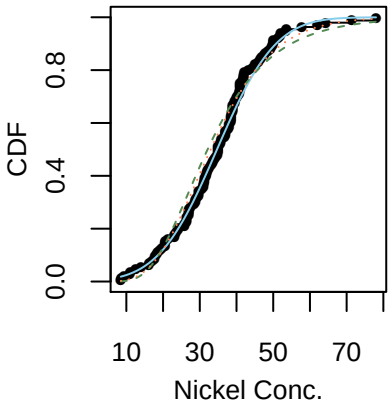
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

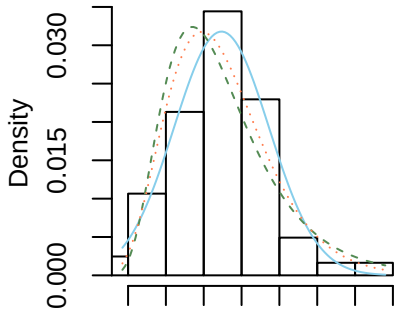


ECDF, Histogram & Q−Q (Detects Only)

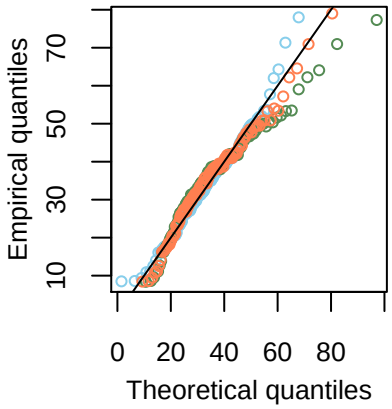
ECDF



Histogram



Q−Q



N = 122	FOD = 100%	Min (detect) = 8	Arithmetic Mean = 35
N (detect) = 122	SD (log detect) = 0.42	Max (detect) = 78 J	Arithmetic SD = 13

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.098	0.11	–	–	–	–	967.471	973.079
Lognormal	1e−05	0.00056	–	–	–	–	984.171	989.779
Gamma	–	–	0.08607	0.09	1.3	0.754	971.352	976.96

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

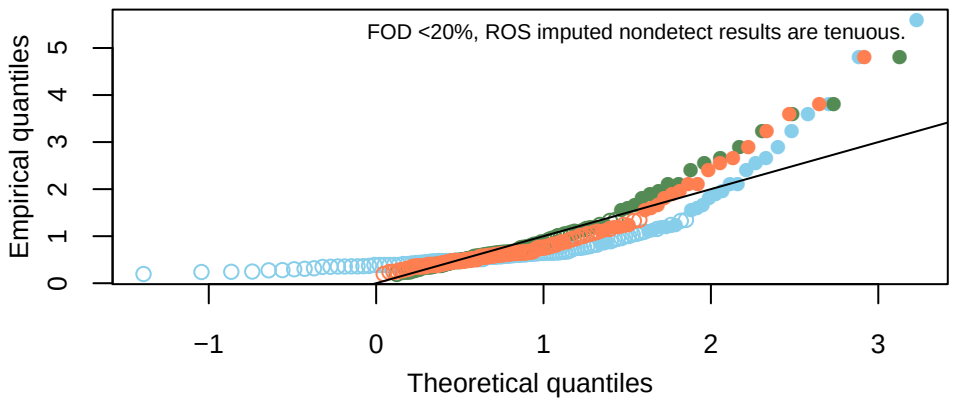
DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Nickel

Media:
Waterway Sediment (All Samples)
Exposure Unit:
MBC
Chemical (mg/kg):
Thallium

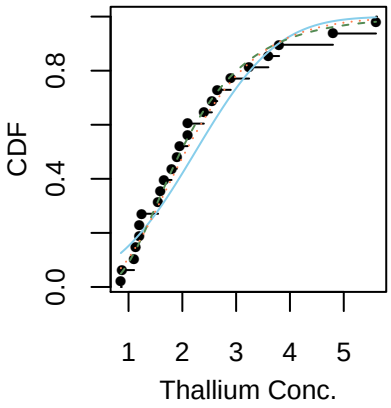
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

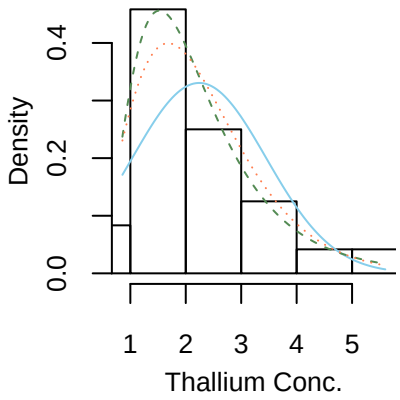


ECDF, Histogram & Q−Q (Detects Only)

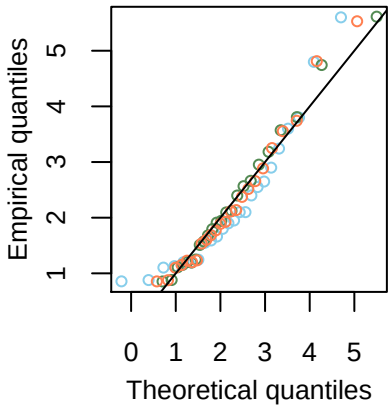
ECDF



Histogram



Q−Q



N = 122	FOD = 20%	Min (detect) = 0.86 J	Kaplan Meier Mean = 0.94
N (detect) = 24	SD (log detect) = 0.52	Max (detect) = 5 J	Kaplan Meier SD = 0.91

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.8e−17	–	–	–	–	317.289	322.897
Lognormal	7e−05	2.3e−05	–	–	–	–	164.832	170.44
Gamma	–	–	0.176	0.091	5.219	0.765	197.858	203.466

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.011	0.068	–	–	–	–	81.1348	83.4909
Lognormal	0.79	0.72	–	–	–	–	71.771	74.1271
Gamma	–	–	0.1094	0.18	0.3159	0.755	73.3675	75.7236

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Thallium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **262**

Media:
Waterway Sediment (All Samples)

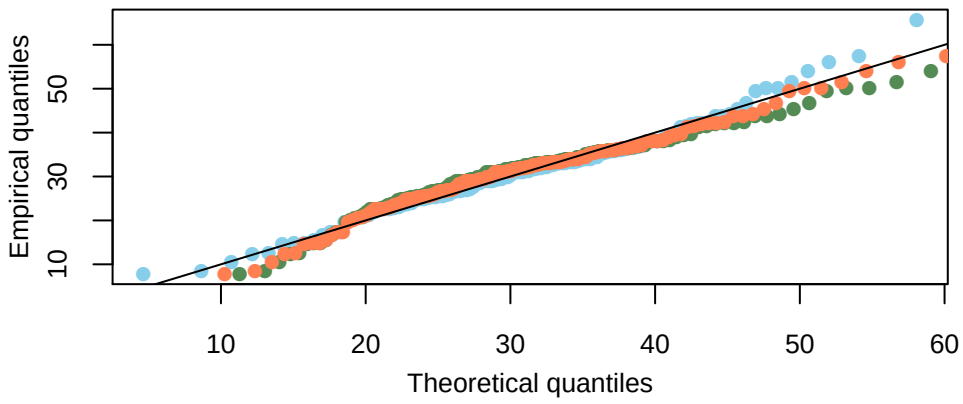
Exposure Unit:
MBC

Chemical (mg/kg):
Vanadium

Legend

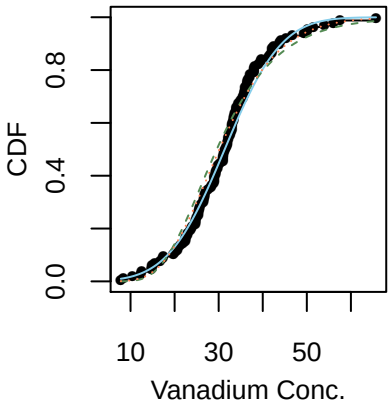
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

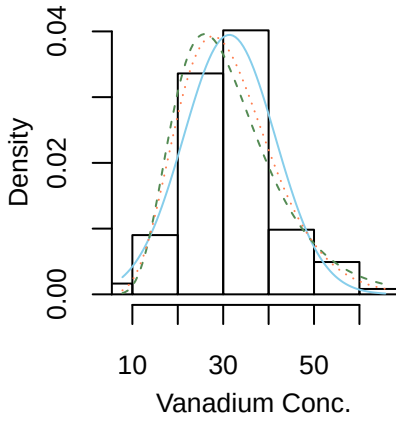


ECDF, Histogram & Q−Q (Detects Only)

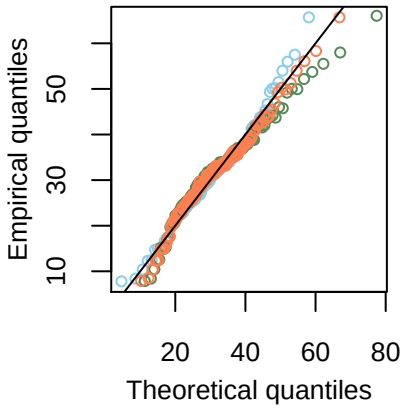
ECDF



Histogram



Q−Q



N = 122	FOD = 100%	Min (detect) = 7 J	Arithmetic Mean = 31
N (detect) = 122	SD (log detect) = 0.37	Max (detect) = 66 J	Arithmetic SD = 10

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.1	0.13	–	–	–	–	914.621	920.229
Lognormal	2e−05	0.0019	–	–	–	–	930.071	935.679
Gamma	–	–	0.08185	0.09	1.185	0.754	918.563	924.171

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Vanadium

Media:
Waterway Sediment (All Samples)

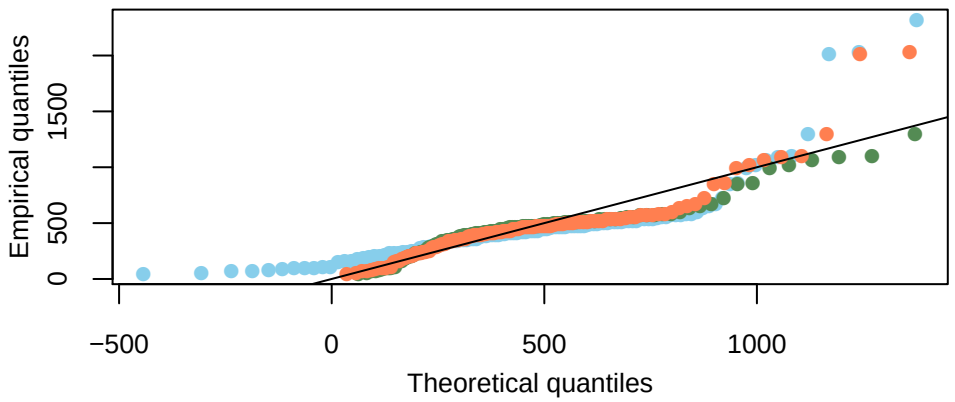
Exposure Unit:
MBC

Chemical (mg/kg):
Zinc

Legend

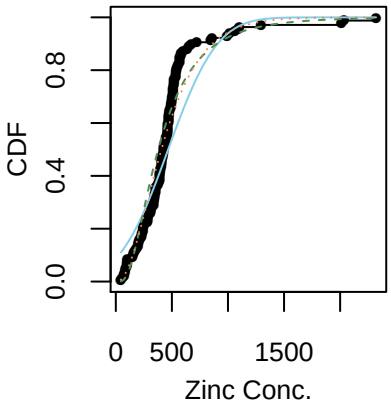
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

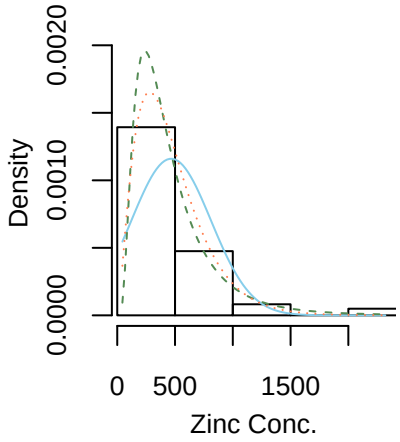


ECDF, Histogram & Q−Q (Detects Only)

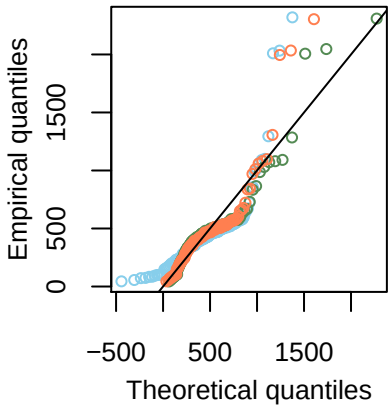
ECDF



Histogram



Q−Q



N = 122	FOD = 100%	Min (detect) = 45	Arithmetic Mean = 470
N (detect) = 122	SD (log detect) = 0.68	Max (detect) = 2,300 J	Arithmetic SD = 350

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.6e−19	–	–	–	–	1775.3	1780.91
Lognormal	0	1.2e−06	–	–	–	–	1703.56	1709.16
Gamma	–	–	0.1546	0.091	3.166	0.765	1701.87	1707.48

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

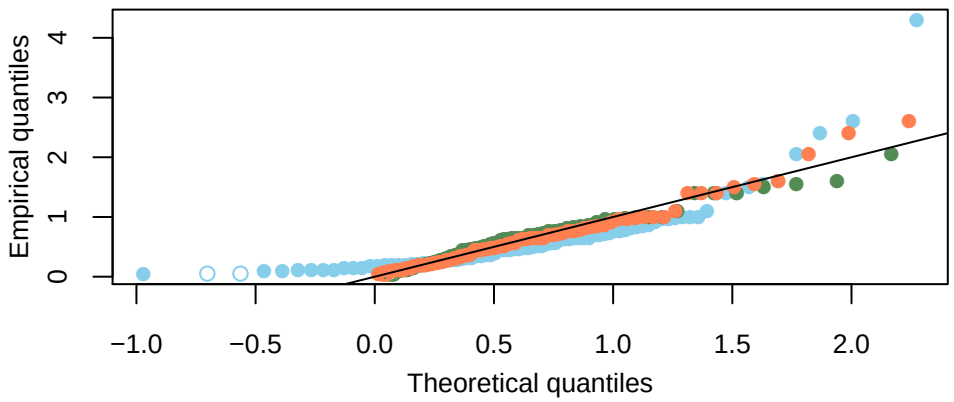
DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Zinc

Media:
Waterway Sediment (All Samples)
Exposure Unit:
MBC
Chemical (mg/kg):
Benzo[a]pyrene

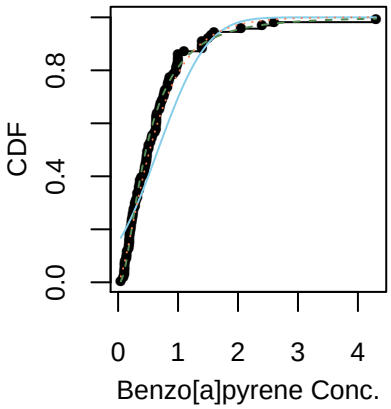
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

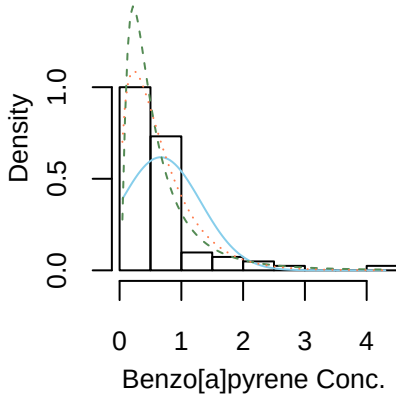


ECDF, Histogram & Q−Q (Detects Only)

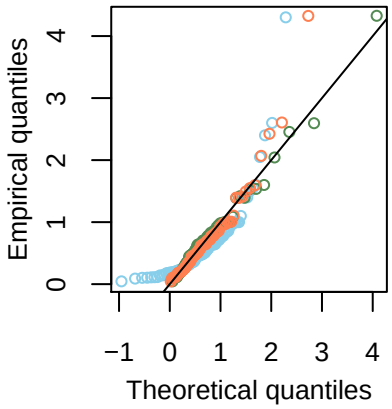
ECDF



Histogram



Q−Q



N = 84	FOD = 98%	Min (detect) = 0.045	Kaplan Meier Mean = 0.65
N (detect) = 82	SD (log detect) = 0.87	Max (detect) = 4 J	Kaplan Meier SD = 0.65

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.1e−06	–	–	–	–	168.718	173.579
Lognormal	0.61	0.17	–	–	–	–	90.7415	95.6031
Gamma	–	–	0.07455	0.103	0.4129	0.782	94.3573	99.2189

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.5e−06	–	–	–	–	165.021	169.834
Lognormal	0.9	0.36	–	–	–	–	87.5546	92.368
Gamma	–	–	0.07735	0.103	0.5245	0.782	93.4984	98.3118

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Benzo[a]pyrene

Media:
Waterway Sediment (All Samples)

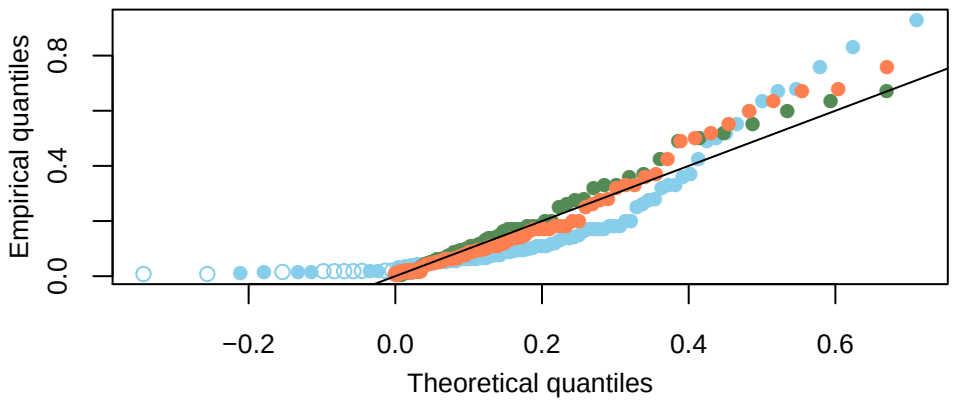
Exposure Unit:
MBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

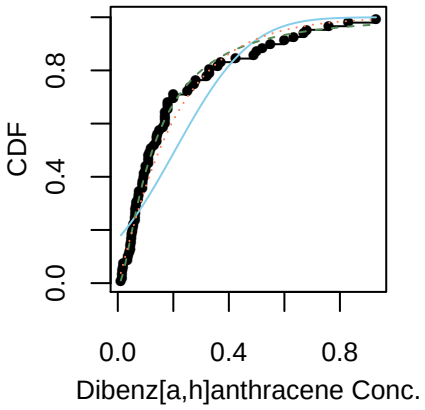
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

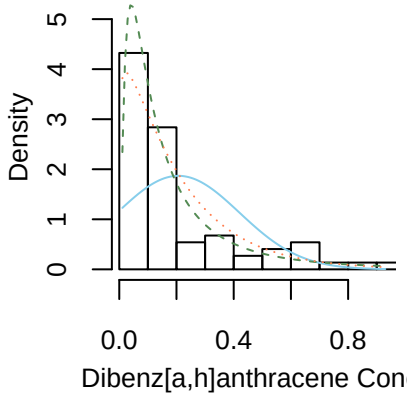


ECDF, Histogram & Q−Q (Detects Only)

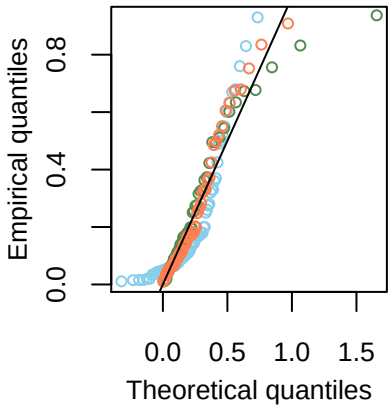
ECDF



Histogram



Q−Q



N = 84	FOD = 88%	Min (detect) = 0.011	Kaplan Meier Mean = 0.18
N (detect) = 74	SD (log detect) = 1.1	Max (detect) = 0.93 J	Kaplan Meier SD = 0.21

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.6e−12	–	–	–	–	−20.1014	−15.2398
Lognormal	0.096	0.059	–	–	–	–	−118.79	−113.928
Gamma	–	–	0.09589	0.105	1.083	0.819	−112.919	−108.057

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.8e−11	–	–	–	–	−14.5356	−9.92752
Lognormal	0.33	0.88	–	–	–	–	−87.3402	−82.732
Gamma	–	–	0.1185	0.11	1.1	0.78	−82.0848	−77.4766

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **266**

Media:
Waterway Sediment (All Samples)

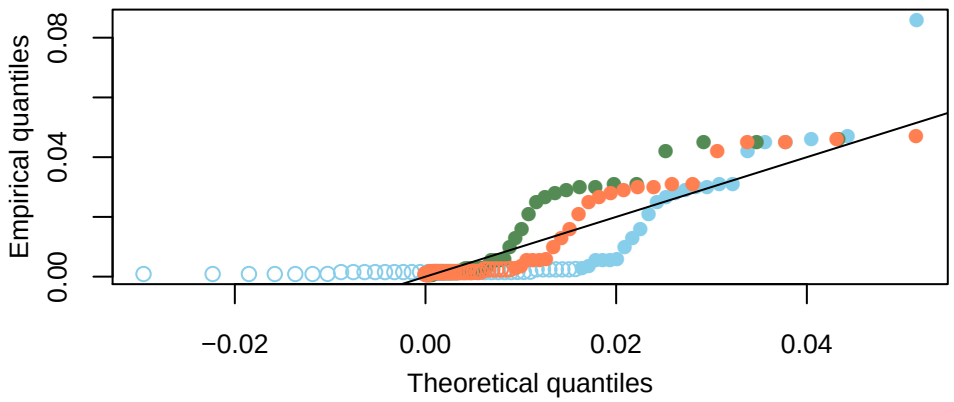
Exposure Unit:
MBC

Chemical (mg/kg):
Aldrin

Legend

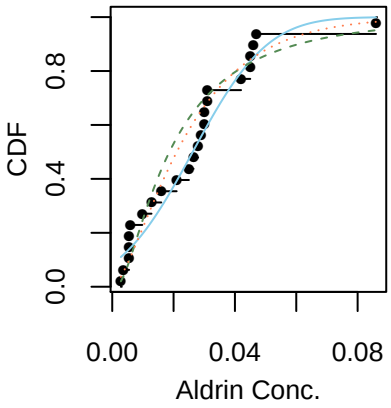
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

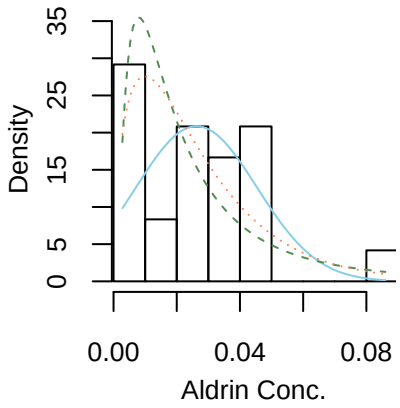


ECDF, Histogram & Q−Q (Detects Only)

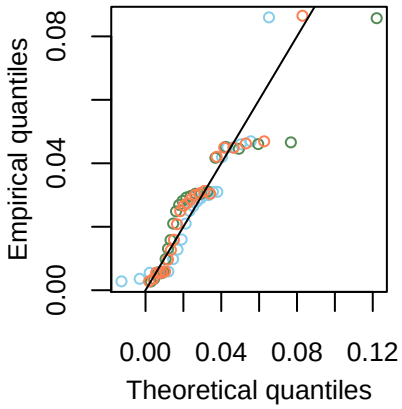
ECDF



Histogram



Q−Q



N = 63	FOD = 38%	Min (detect) = 0.0028 J	Kaplan Meier Mean = 0.01
N (detect) = 24	SD (log detect) = 0.94	Max (detect) = 0.086 J	Kaplan Meier SD = 0.017

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.6e−19	–	–	–	–	−331.973	−327.687
Lognormal	0	5.2e−10	–	–	–	–	−475.327	−471.04
Gamma	–	–	0.2934	0.121	6.645	0.816	−451.596	−447.31

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.013	0.15	–	–	–	–	−117.819	−115.463
Lognormal	0.032	0.0099	–	–	–	–	−122.918	−120.562
Gamma	–	–	0.1649	0.183	0.7009	0.772	−125.574	−123.218

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

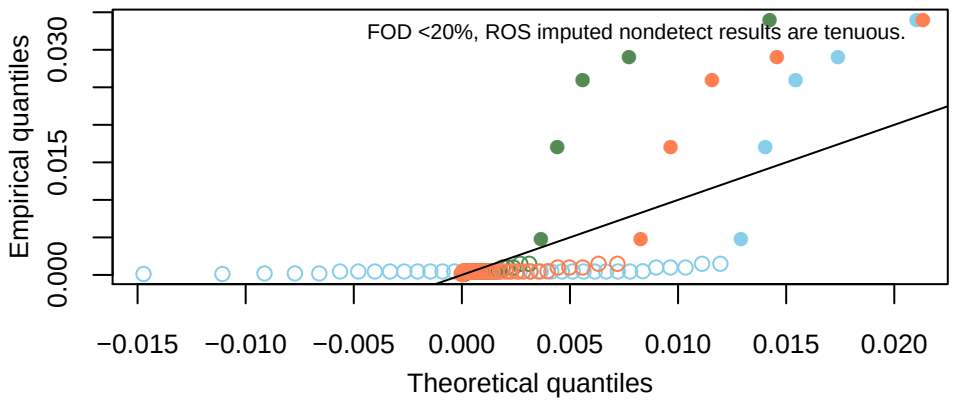
DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Aldrin

Media:
Waterway Sediment (All Samples)
Exposure Unit:
MBC
Chemical (mg/kg):
Heptachlor

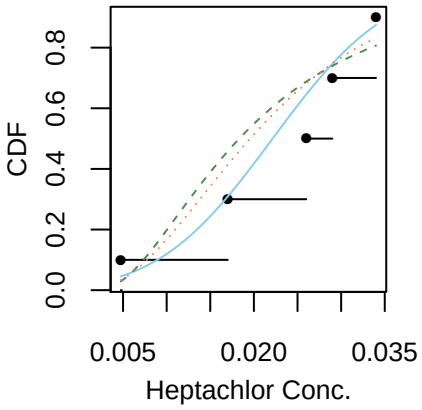
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

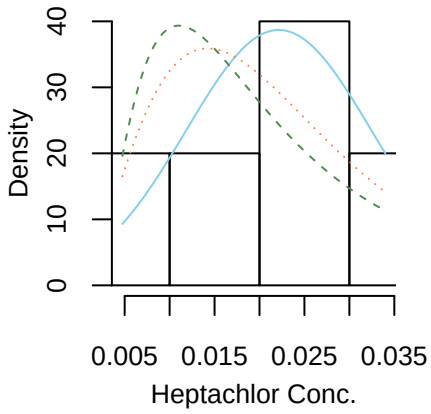


ECDF, Histogram & Q−Q (Detects Only)

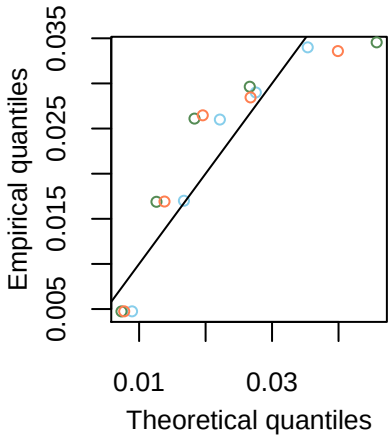
ECDF



Histogram



Q−Q



N = 41	FOD = 12%	Min (detect) = 0.0047 J	Kaplan Meier Mean = 0.0028
N (detect) = 5	SD (log detect) = 0.8	Max (detect) = 0.034 J	Kaplan Meier SD = 0.0081

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.4e−25	–	–	–	–	−276.131	−272.704
Lognormal	0	2.1e−15	–	–	–	–	−450.28	−446.853
Gamma	–	–	0.4145	0.1547	8.859	0.9096	−413.254	−409.827

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.66	N<5	–	–	–	–	−27.5562	−28.3373
Lognormal	0.1	N<5	–	–	–	–	−25.1789	−25.9601
Gamma	–	–	NA	NA	NA	NA	−26.3539	−27.1351

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Heptachlor

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **268**

Media:
Waterway Sediment (All Samples)

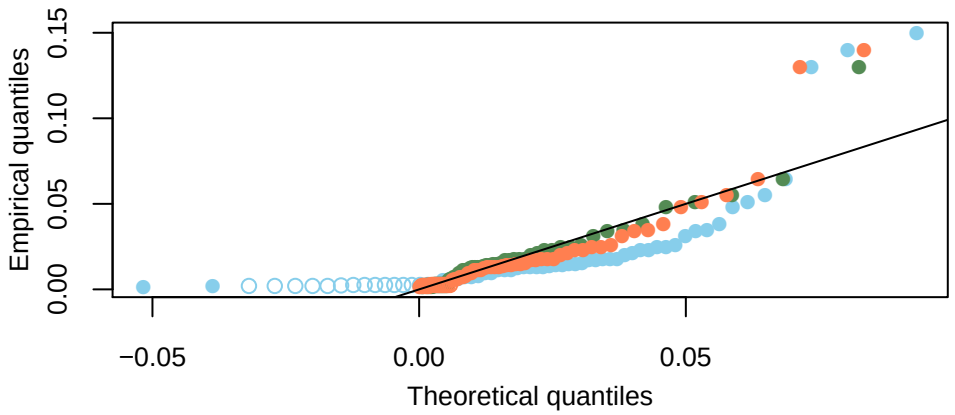
Exposure Unit:
MBC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

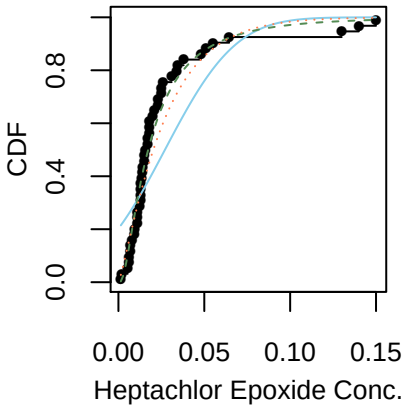
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

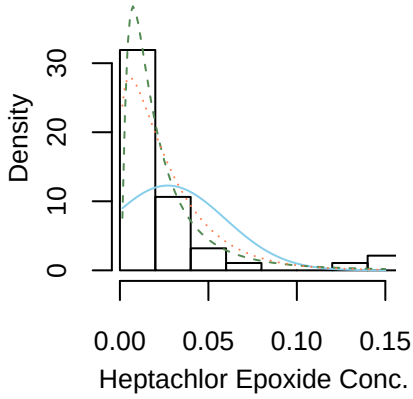


ECDF, Histogram & Q−Q (Detects Only)

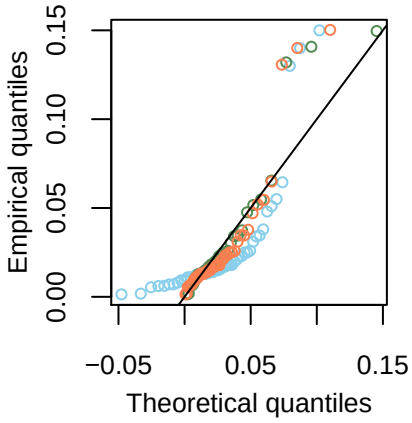
ECDF



Histogram



Q−Q



N = 63	FOD = 75%	Min (detect) = 0.0014 J	Kaplan Meier Mean = 0.02
N (detect) = 47	SD (log detect) = 0.93	Max (detect) = 0.15 J	Kaplan Meier SD = 0.03

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−11	–	–	–	–	−258.8	−254.514
Lognormal	0.0076	0.00017	–	–	–	–	−371.298	−367.012
Gamma	–	–	0.1377	0.121	1.698	0.816	−358.945	−354.659

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.9e−10	–	–	–	–	−184.722	−181.022
Lognormal	0.079	0.27	–	–	–	–	−251.399	−247.699
Gamma	–	–	0.1649	0.136	1.829	0.777	−242.625	−238.925

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Heptachlor Epoxide

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **269**

Media:
Waterway Sediment (All Samples)

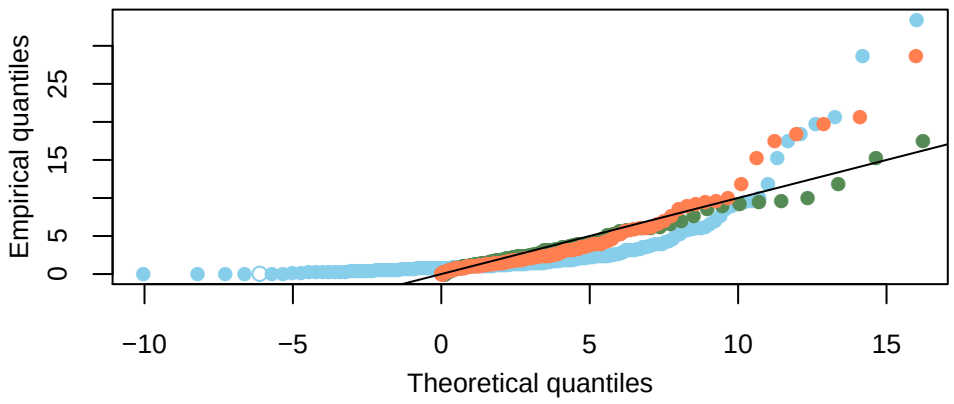
Exposure Unit:
MBC

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

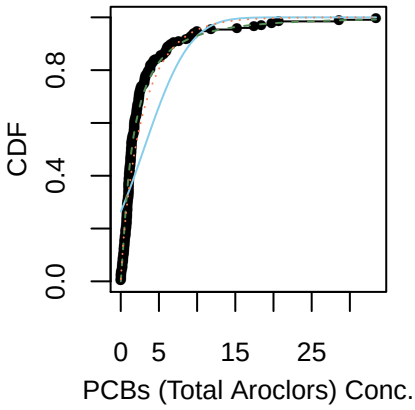
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

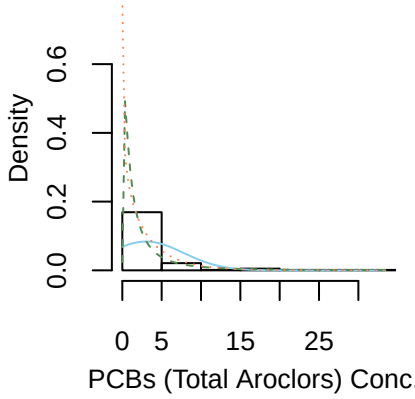


ECDF, Histogram & Q−Q (Detects Only)

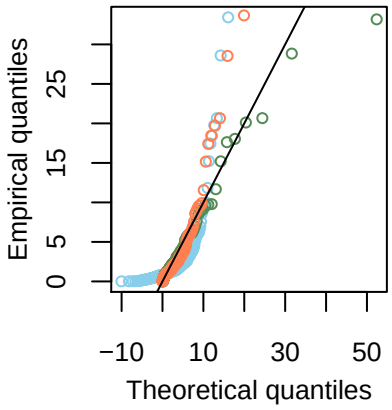
ECDF



Histogram



Q−Q



N = 163	FOD = 99%	Min (detect) = 0.0098	Kaplan Meier Mean = 3
N (detect) = 162	SD (log detect) = 1.3	Max (detect) = 33 J	Kaplan Meier SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.9e−33	–	–	–	–	974.786	980.973
Lognormal	1e−05	1e−04	–	–	–	–	670.657	676.844
Gamma	–	–	0.1331	0.095	4.001	0.818	680.103	686.291

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	8.7e−33	–	–	–	–	969.439	975.614
Lognormal	1e−05	0.00028	–	–	–	–	667.324	673.5
Gamma	–	–	0.1354	0.095	4.159	0.818	679.066	685.241

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **270**

Media:
Waterway Sediment (All Samples)
Exposure Unit:
MBC
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 71	FOD = 1%	Min (detect) = 0.0012 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0012 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in MBC−Trichloroethene

Media:
Waterway Sediment (All Samples)

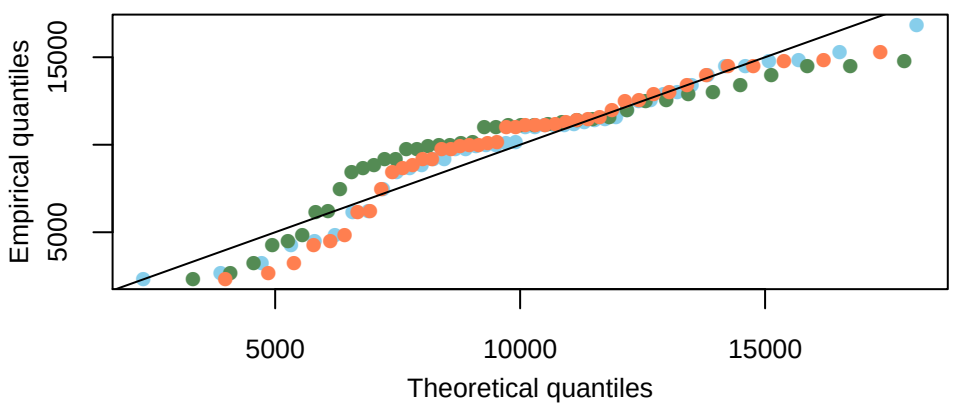
Exposure Unit:
BCC

Chemical (mg/kg):
Aluminum

Legend

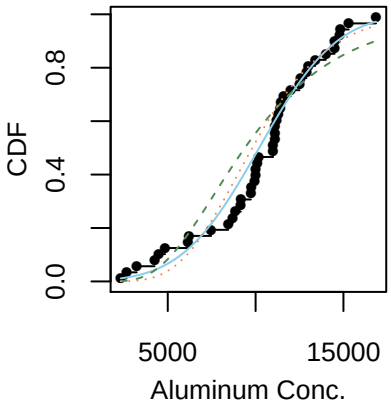
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

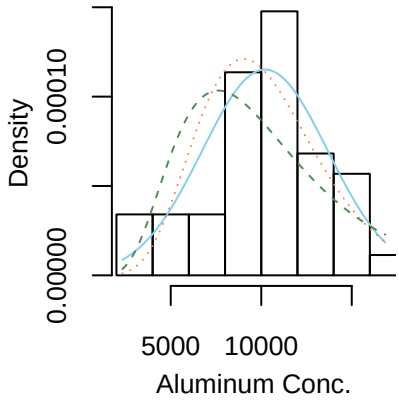


ECDF, Histogram & Q−Q (Detects Only)

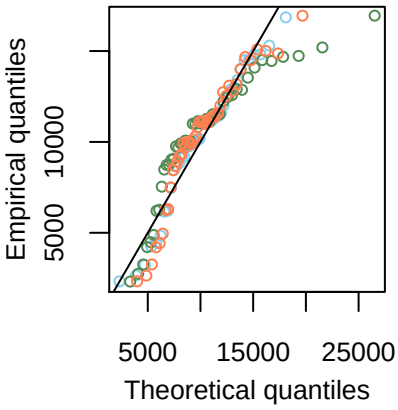
ECDF



Histogram



Q−Q



N = 44	FOD = 100%	Min (detect) = 2,300 J	Arithmetic Mean = 10,000
N (detect) = 44	SD (log detect) = 0.46	Max (detect) = 17,000 J	Arithmetic SD = 3,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.073	0.068	–	–	–	–	846.097	849.666
Lognormal	1e−05	3e−05	–	–	–	–	864.713	868.281
Gamma	–	–	0.1717	0.14	2.125	0.751	859.25	862.818

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in BCC−Aluminum

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **272**

Media:
Waterway Sediment (All Samples)

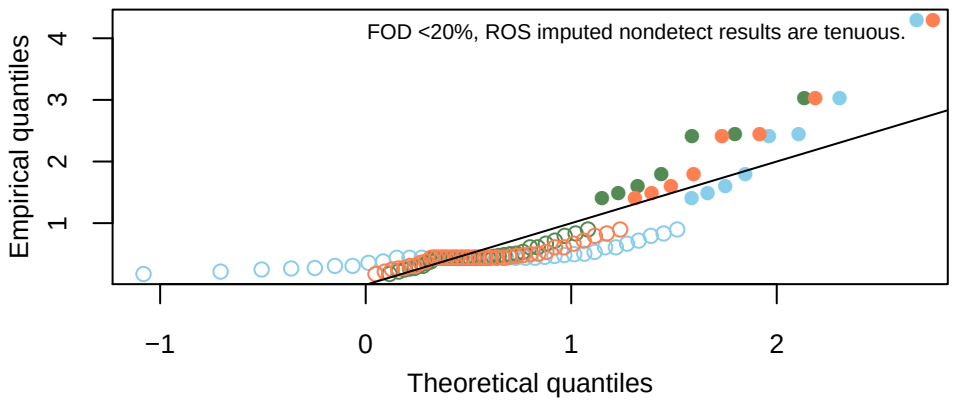
Exposure Unit:
BCC

Chemical (mg/kg):
Antimony

Legend

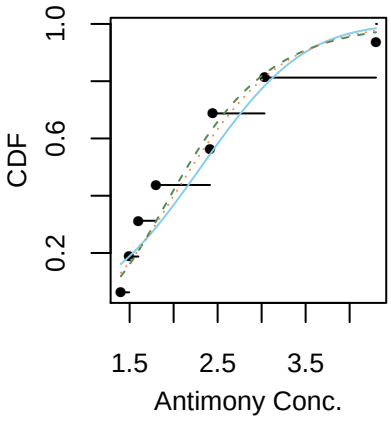
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

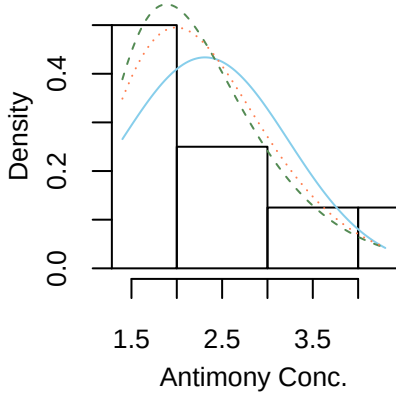


ECDF, Histogram & Q−Q (Detects Only)

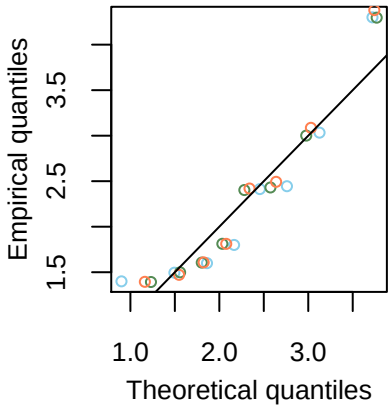
ECDF



Histogram



Q−Q



N = 44	FOD = 18%	Min (detect) = 1 J	Kaplan Meier Mean = 0.89
N (detect) = 8	SD (log detect) = 0.39	Max (detect) = 4 J	Kaplan Meier SD = 0.78

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.6e−10	–	–	–	–	112.031	115.6
Lognormal	0.00023	1.7e−05	–	–	–	–	51.4826	55.051
Gamma	–	–	0.2548	0.144	3.758	0.779	65.5152	69.0836

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.14	0.47	–	–	–	–	25.366	25.5249
Lognormal	0.5	0.65	–	–	–	–	22.8412	23.0001
Gamma	–	–	0.1989	0.295	0.3617	0.719	23.4549	23.6138

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in BCC−Antimony

Media:
Waterway Sediment (All Samples)

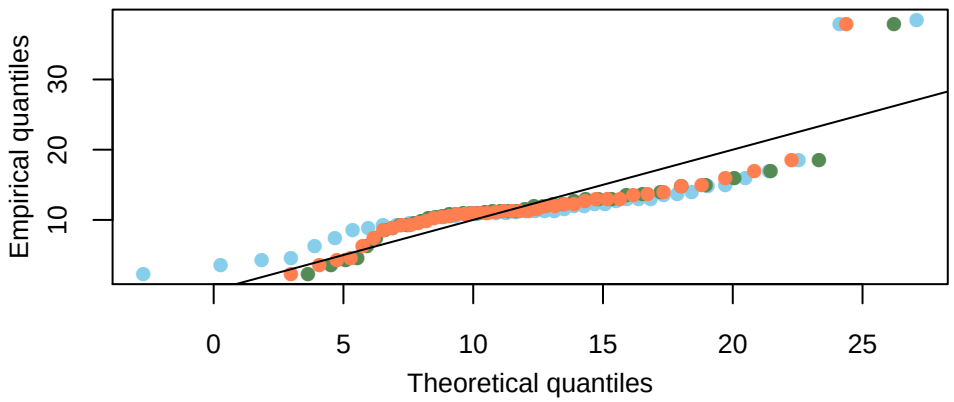
Exposure Unit:
BCC

Chemical (mg/kg):
Arsenic

Legend

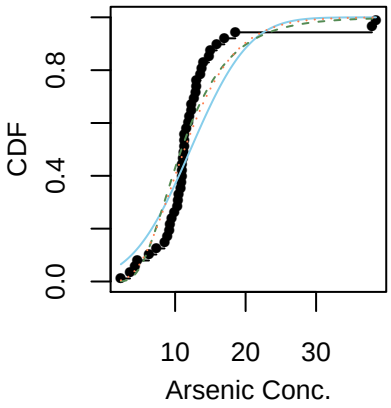
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

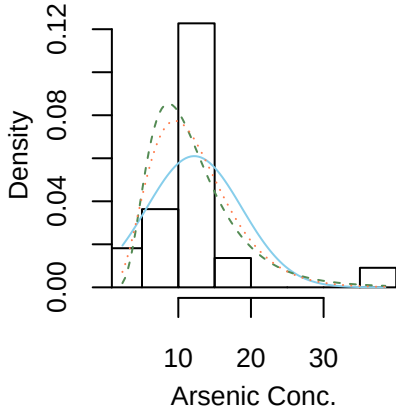


ECDF, Histogram & Q−Q (Detects Only)

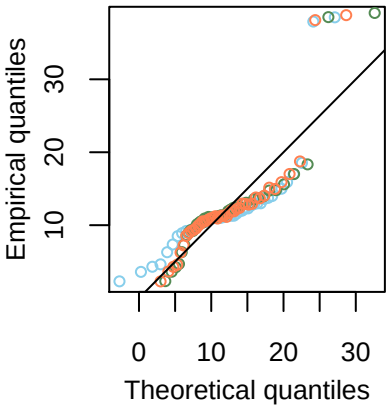
ECDF



Histogram



Q−Q



N = 44	FOD = 100%	Min (detect) = 2	Arithmetic Mean = 12
N (detect) = 44	SD (log detect) = 0.49	Max (detect) = 38 J	Arithmetic SD = 6

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.2e−06	–	–	–	–	294.124	297.693
Lognormal	0.00012	0.00081	–	–	–	–	274.686	278.255
Gamma	–	–	0.1648	0.141	2.376	0.759	275.142	278.71

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in BCC−Arsenic

Media:
Waterway Sediment (All Samples)

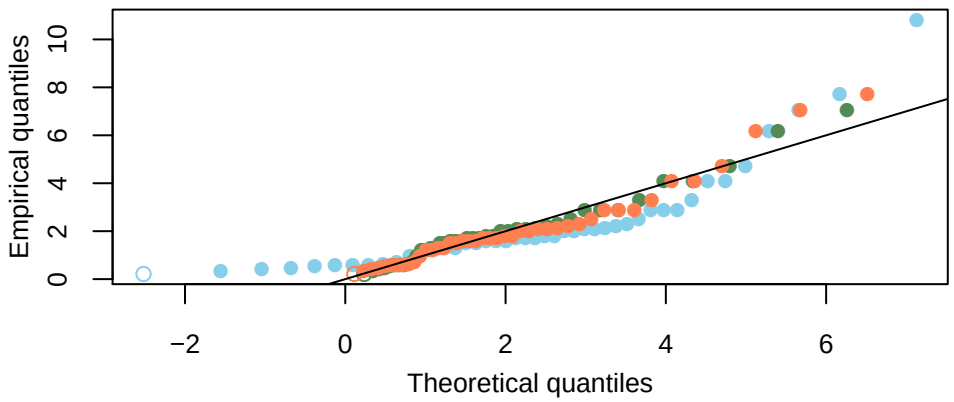
Exposure Unit:
BCC

Chemical (mg/kg):
Cadmium

Legend

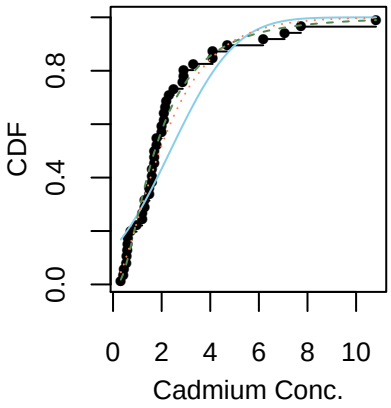
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

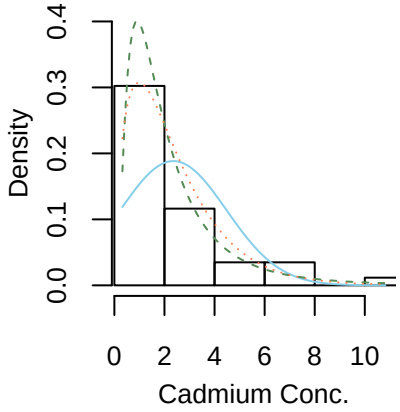


ECDF, Histogram & Q−Q (Detects Only)

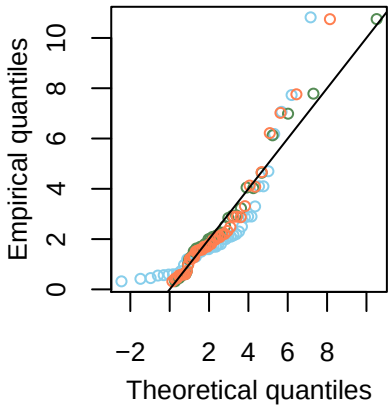
ECDF



Histogram



Q−Q



N = 44	FOD = 98%	Min (detect) = 0.32 J	Kaplan Meier Mean = 2
N (detect) = 43	SD (log detect) = 0.81	Max (detect) = 11 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.1e−06	–	–	–	–	194.909	198.478
Lognormal	0.57	0.12	–	–	–	–	157.689	161.257
Gamma	–	–	0.1237	0.144	0.6808	0.779	160.519	164.087

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4e−06	–	–	–	–	190.571	194.094
Lognormal	0.46	0.22	–	–	–	–	153.106	156.628
Gamma	–	–	0.1315	0.144	0.7818	0.779	157.274	160.796

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in BCC−Cadmium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **275**

Media:
Waterway Sediment (All Samples)

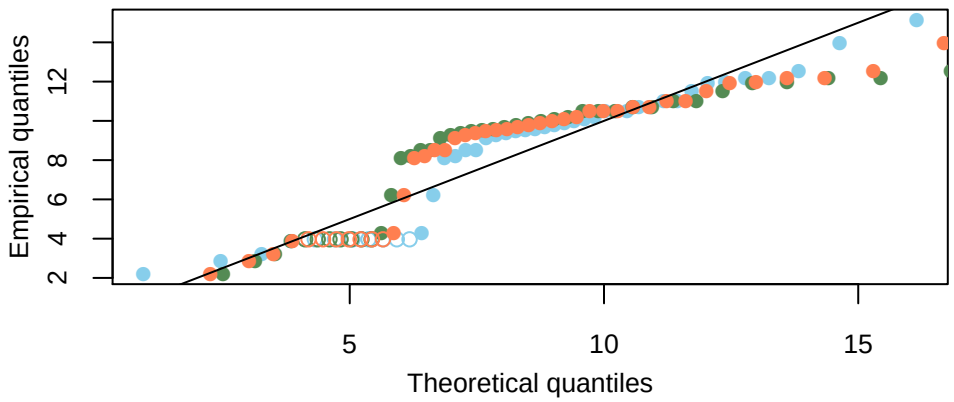
Exposure Unit:
BCC

Chemical (mg/kg):
Cobalt

Legend

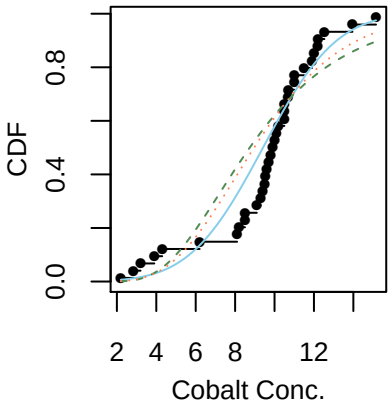
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

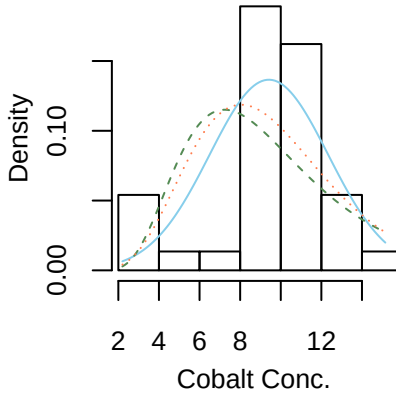


ECDF, Histogram & Q−Q (Detects Only)

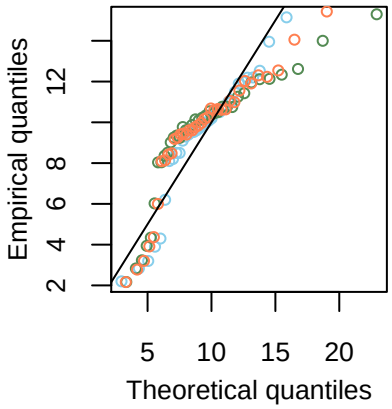
ECDF



Histogram



Q−Q



N = 44	FOD = 84%	Min (detect) = 2 J	Kaplan Meier Mean = 8
N (detect) = 37	SD (log detect) = 0.44	Max (detect) = 15 J	Kaplan Meier SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0017	0.0011	–	–	–	–	234.941	238.509
Lognormal	2e−05	5.2e−07	–	–	–	–	246.423	249.991
Gamma	–	–	0.2278	0.141	2.946	0.759	240.72	244.288

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.003	0.0021	–	–	–	–	188.306	191.528
Lognormal	0	2.9e−07	–	–	–	–	208.018	211.24
Gamma	–	–	0.2451	0.149	2.94	0.75	199.767	202.989

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in BCC−Cobalt

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **276**

Media:
Waterway Sediment (All Samples)

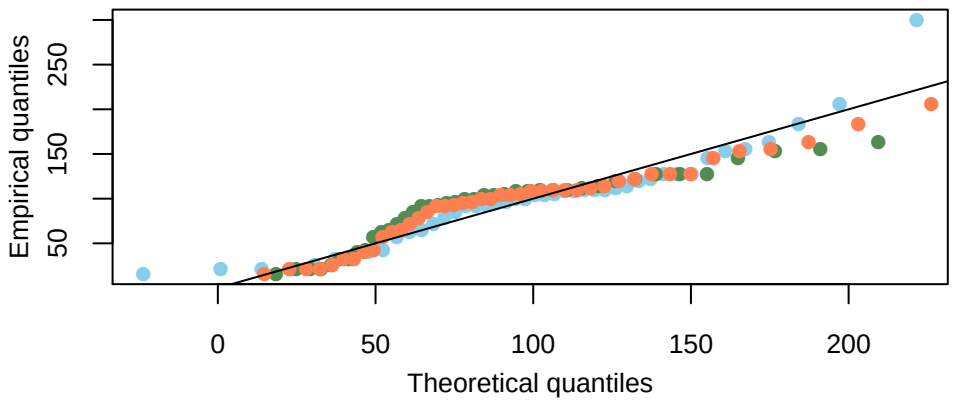
Exposure Unit:
BCC

Chemical (mg/kg):
Copper

Legend

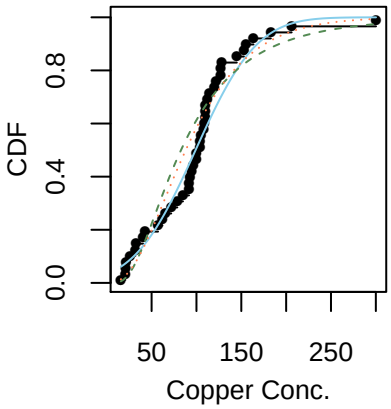
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

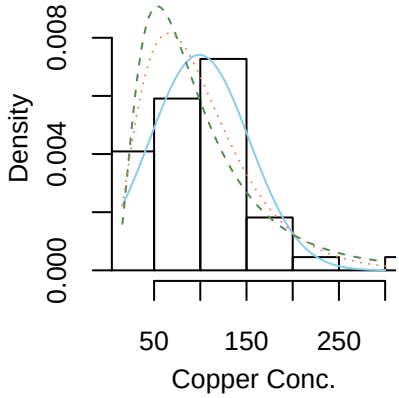


ECDF, Histogram & Q−Q (Detects Only)

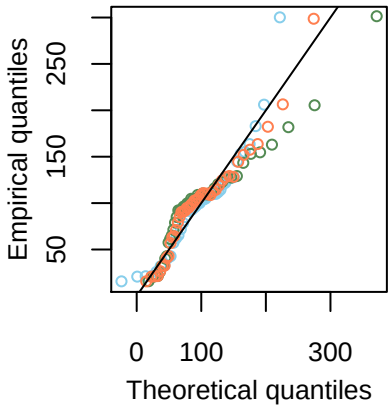
ECDF



Histogram



Q−Q



N = 44	FOD = 100%	Min (detect) = 16	Arithmetic Mean = 99
N (detect) = 44	SD (log detect) = 0.67	Max (detect) = 300 J	Arithmetic SD = 54

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0029	0.034	–	–	–	–	479.605	483.173
Lognormal	0.00098	1.2e−05	–	–	–	–	480.813	484.381
Gamma	–	–	0.1854	0.141	1.307	0.759	474.898	478.466

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in BCC−Copper

Media:
Waterway Sediment (All Samples)

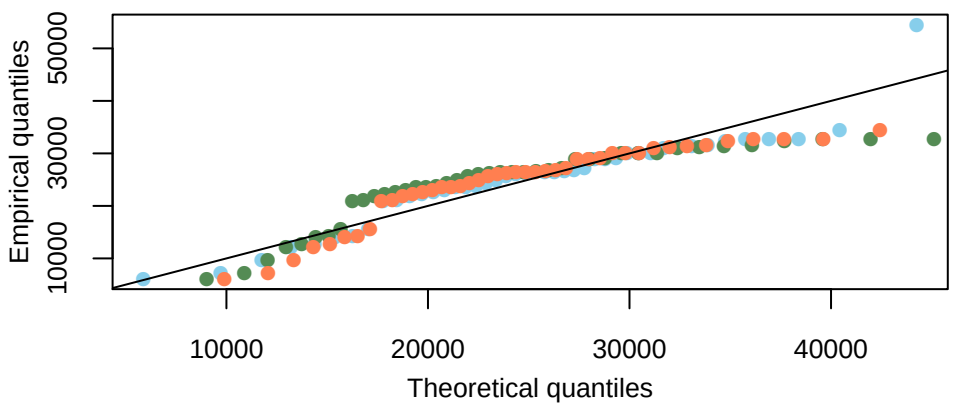
Exposure Unit:
BCC

Chemical (mg/kg):
Iron

Legend

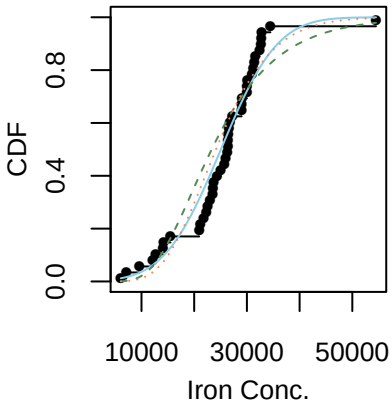
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

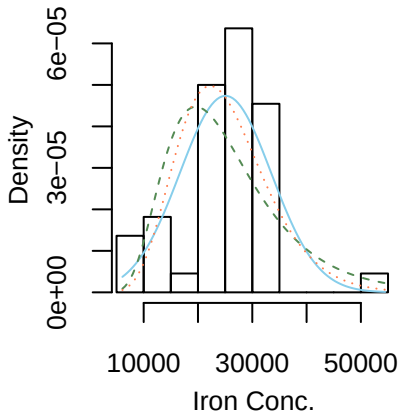


ECDF, Histogram & Q−Q (Detects Only)

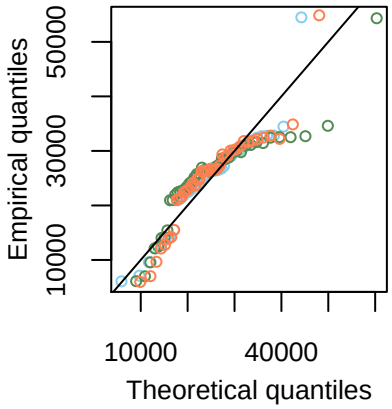
ECDF



Histogram



Q−Q



N = 44	FOD = 100%	Min (detect) = 6,100 J	Arithmetic Mean = 25,000
N (detect) = 44	SD (log detect) = 0.42	Max (detect) = 54,000 J	Arithmetic SD = 8,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0026	0.038	–	–	–	–	924.265	927.833
Lognormal	2e−05	1.6e−05	–	–	–	–	936.952	940.52
Gamma	–	–	0.1613	0.14	2.117	0.751	931.206	934.775

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

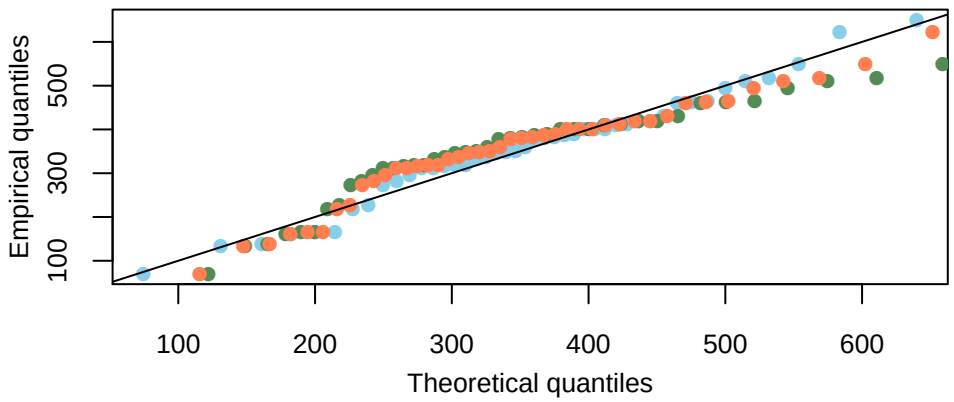
DRAFT

Distribution: Waterway Sediment (All Samples) in BCC−Iron

Media:
Waterway Sediment (All Samples)
Exposure Unit:
BCC
Chemical (mg/kg):
Manganese

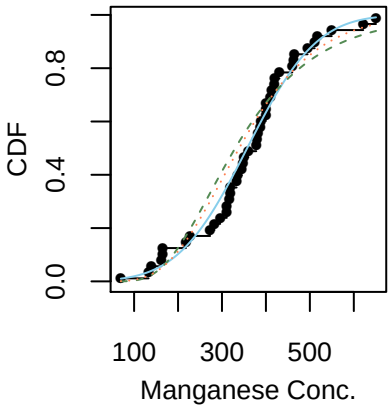
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

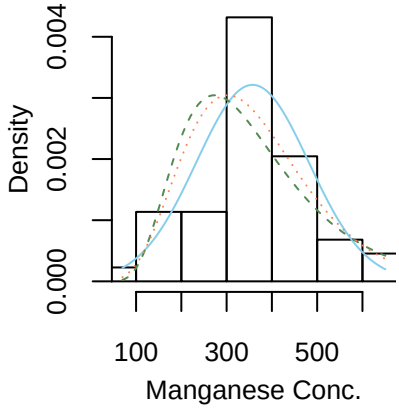


ECDF, Histogram & Q−Q (Detects Only)

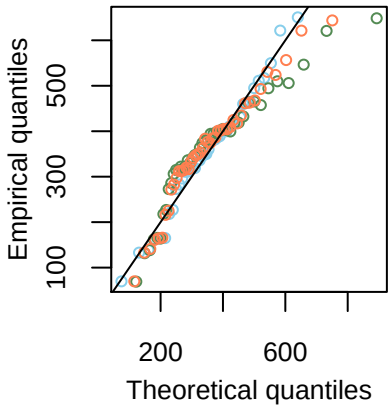
ECDF



Histogram



Q−Q



N = 44	FOD = 100%	Min (detect) = 70 J	Arithmetic Mean = 360
N (detect) = 44	SD (log detect) = 0.44	Max (detect) = 650 J	Arithmetic SD = 130

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.55	0.24	–	–	–	–	553.134	556.703
Lognormal	0.00026	0.00019	–	–	–	–	566.327	569.895
Gamma	–	–	0.1658	0.14	1.198	0.751	559.229	562.798

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in BCC−Manganese

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **279**

Media:
Waterway Sediment (All Samples)

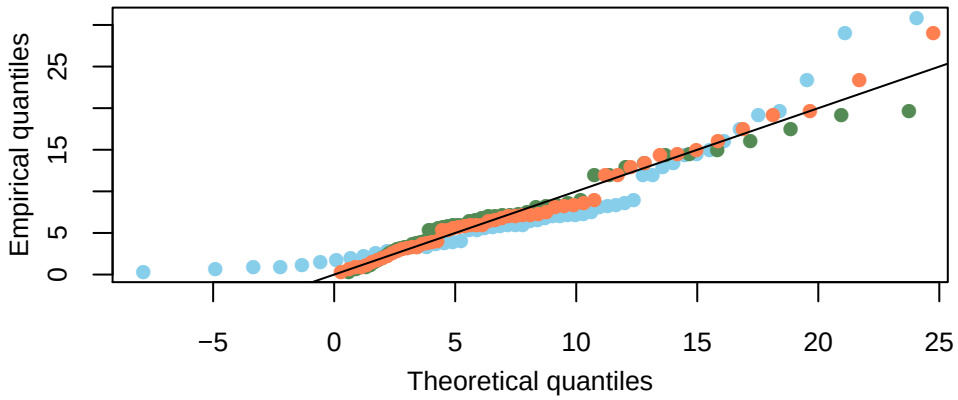
Exposure Unit:
BCC

Chemical (mg/kg):
Mercury

Legend

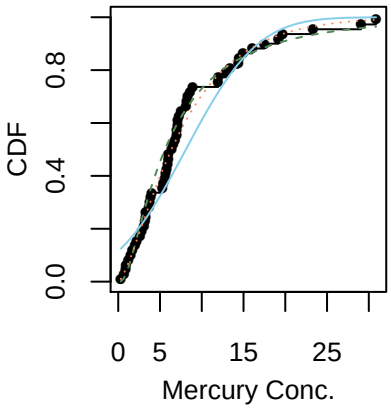
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

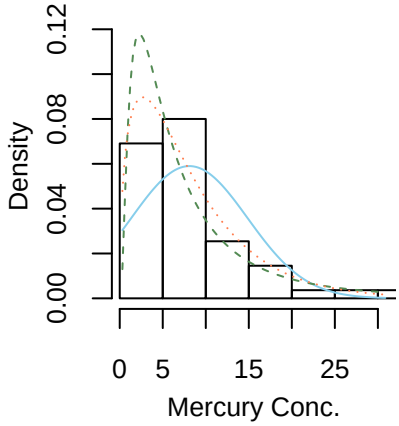


ECDF, Histogram & Q−Q (Detects Only)

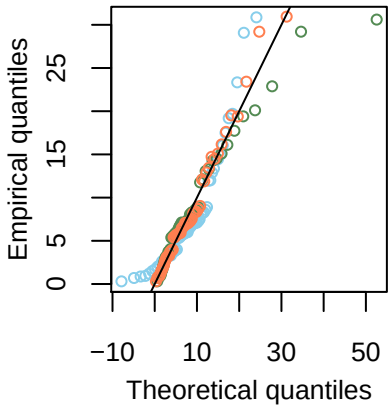
ECDF



Histogram



Q−Q



N = 55	FOD = 100%	Min (detect) = 0.31 J	Arithmetic Mean = 8
N (detect) = 55	SD (log detect) = 0.96	Max (detect) = 31 J	Arithmetic SD = 6

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	1.1e−05	–	–	–	–	370.352	374.367
Lognormal	0.091	0.018	–	–	–	–	343.608	347.623
Gamma	–	–	0.09336	0.129	0.3205	0.78	339.275	343.29

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in BCC−Mercury

Media:
Waterway Sediment (All Samples)

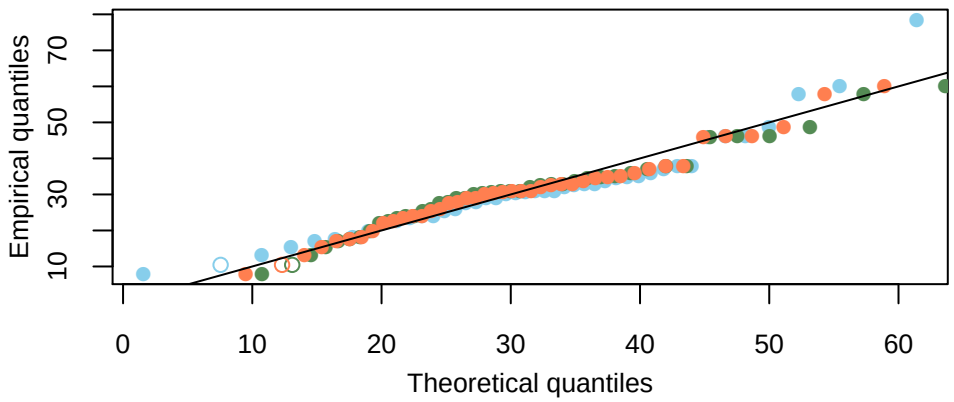
Exposure Unit:
BCC

Chemical (mg/kg):
Nickel

Legend

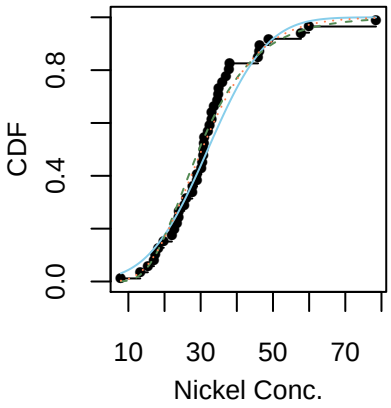
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

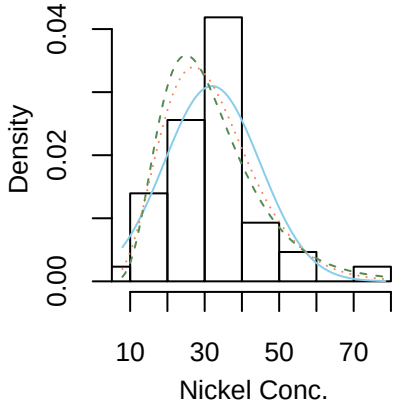


ECDF, Histogram & Q−Q (Detects Only)

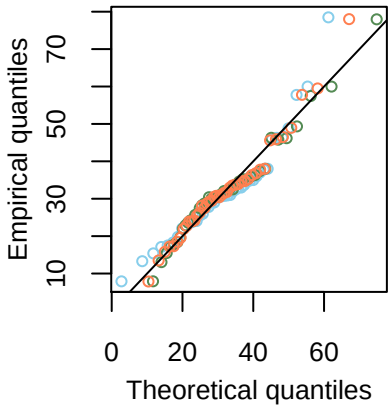
ECDF



Histogram



Q−Q



N = 44	FOD = 98%	Min (detect) = 7 J	Kaplan Meier Mean = 31
N (detect) = 43	SD (log detect) = 0.41	Max (detect) = 78 J	Kaplan Meier SD = 14

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0055	0.011	–	–	–	–	355.484	359.052
Lognormal	0.13	0.1	–	–	–	–	351.225	354.793
Gamma	–	–	0.1133	0.14	0.5462	0.751	349.372	352.94

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0034	0.0077	–	–	–	–	345.837	349.359
Lognormal	0.16	0.19	–	–	–	–	340.487	344.01
Gamma	–	–	0.1179	0.14	0.5366	0.751	339.215	342.737

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in BCC−Nickel

Media:
Waterway Sediment (All Samples)

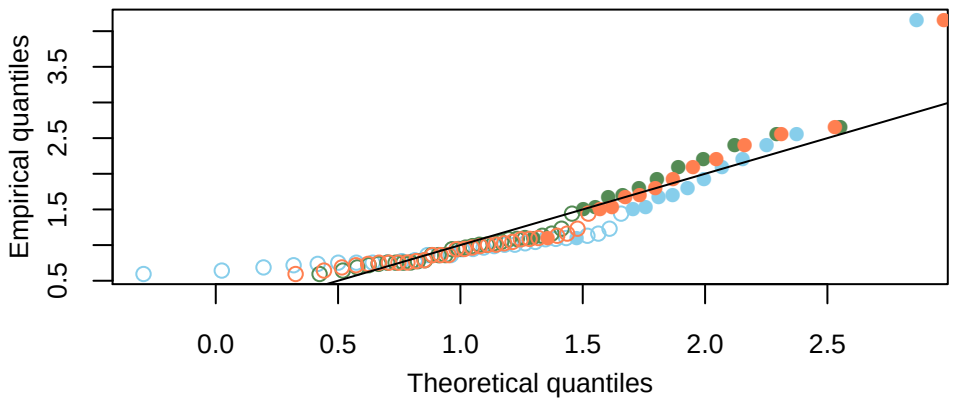
Exposure Unit:
BCC

Chemical (mg/kg):
Thallium

Legend

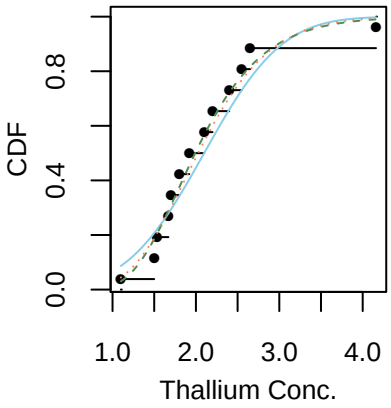
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

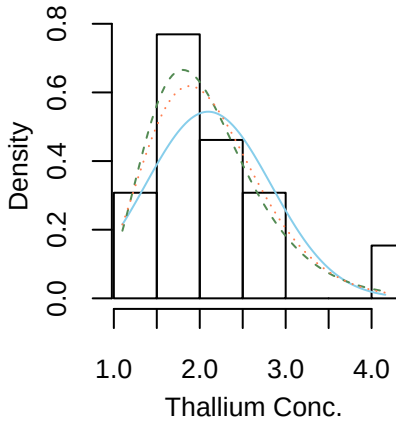


ECDF, Histogram & Q−Q (Detects Only)

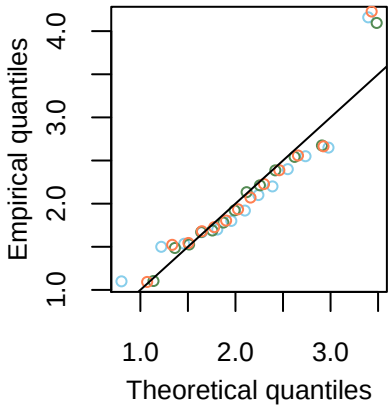
ECDF



Histogram



Q−Q



N = 44	FOD = 30%	Min (detect) = 1 J	Kaplan Meier Mean = 1
N (detect) = 13	SD (log detect) = 0.33	Max (detect) = 4 J	Kaplan Meier SD = 0.7

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3e−06	–	–	–	–	93.1373	96.6127
Lognormal	0.011	0.0083	–	–	–	–	66.4161	69.8915
Gamma	–	–	0.1911	0.141	1.553	0.759	72.8815	76.3568

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.048	0.5	–	–	–	–	32.8378	33.9677
Lognormal	0.89	0.89	–	–	–	–	28.8826	30.0125
Gamma	–	–	0.118	0.267	0.302	0.729	29.7442	30.8741

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in BCC−Thallium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **282**

Media:
Waterway Sediment (All Samples)

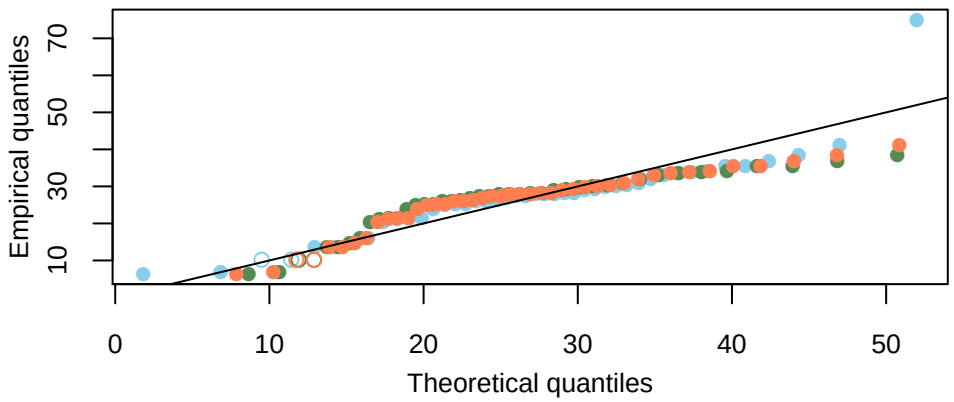
Exposure Unit:
BCC

Chemical (mg/kg):
Vanadium

Legend

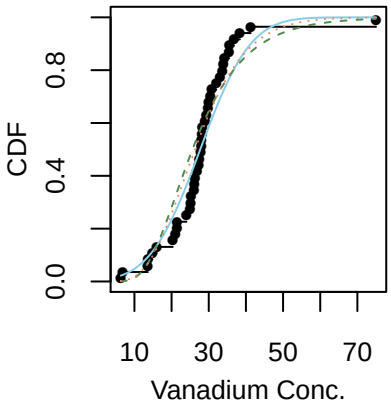
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

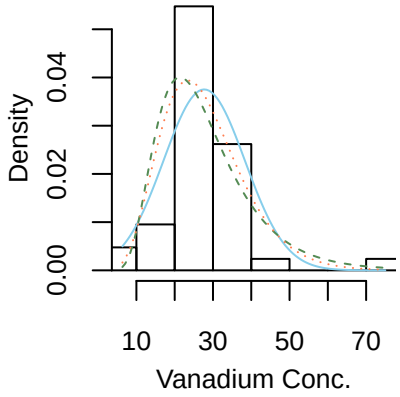


ECDF, Histogram & Q−Q (Detects Only)

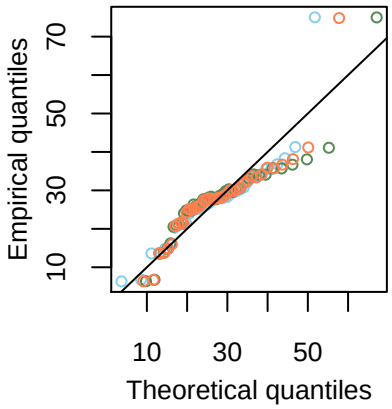
ECDF



Histogram



Q−Q



N = 44	FOD = 95%	Min (detect) = 6 J	Kaplan Meier Mean = 26
N (detect) = 42	SD (log detect) = 0.43	Max (detect) = 75 J	Kaplan Meier SD = 12

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	6e−05	0.039	–	–	–	–	339.953	343.521
Lognormal	0.00015	1.3e−05	–	–	–	–	341.948	345.516
Gamma	–	–	0.192	0.14	1.77	0.751	337.049	340.617

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	3e−05	0.041	–	–	–	–	321.749	325.224
Lognormal	5e−05	3.7e−05	–	–	–	–	323.96	327.436
Gamma	–	–	0.1877	0.14	1.767	0.751	318.94	322.416

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in BCC−Vanadium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **283**

Media:
Waterway Sediment (All Samples)

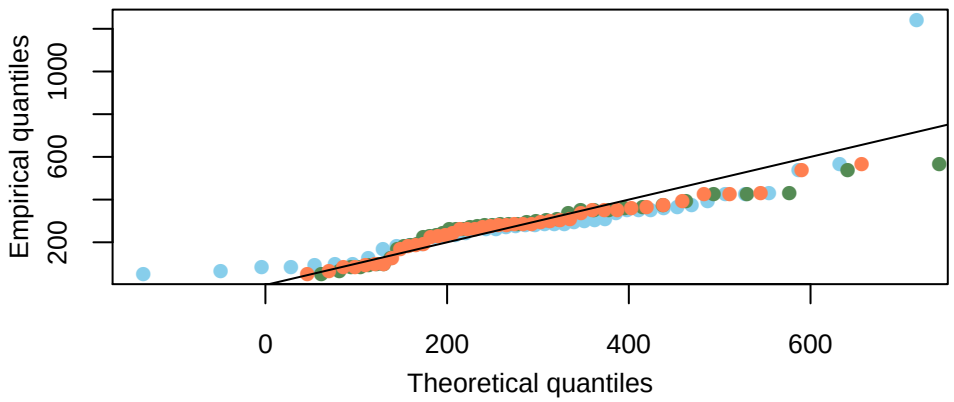
Exposure Unit:
BCC

Chemical (mg/kg):
Zinc

Legend

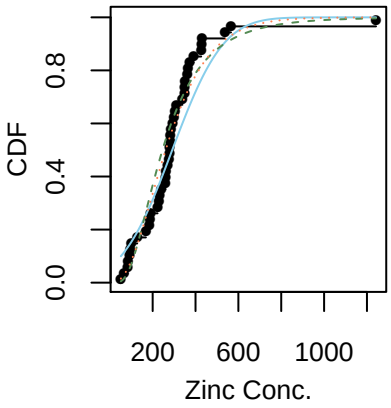
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

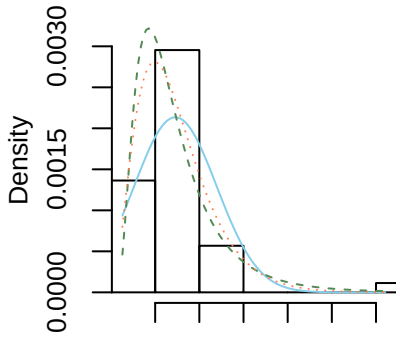


ECDF, Histogram & Q−Q (Detects Only)

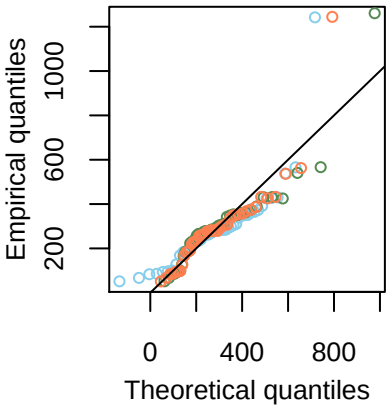
ECDF



Histogram



Q−Q



N = 44	FOD = 100%	Min (detect) = 52	Arithmetic Mean = 290
N (detect) = 44	SD (log detect) = 0.61	Max (detect) = 1,200 J	Arithmetic SD = 190

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.0018	–	–	–	–	589.128	592.696
Lognormal	0.0083	0.002	–	–	–	–	569.15	572.718
Gamma	–	–	0.1346	0.141	1.062	0.759	568.386	571.955

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in BCC−Zinc

Media:
Waterway Sediment (All Samples)

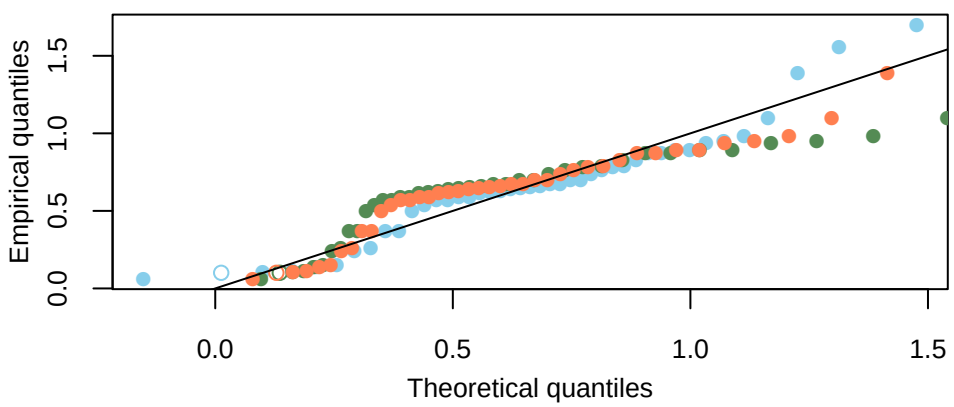
Exposure Unit:
BCC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

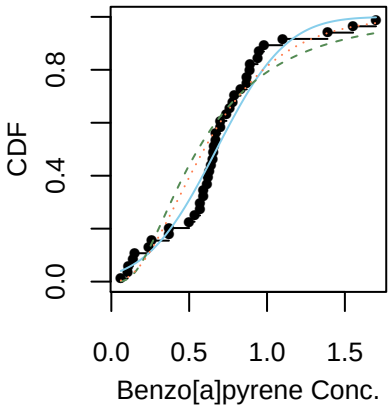
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

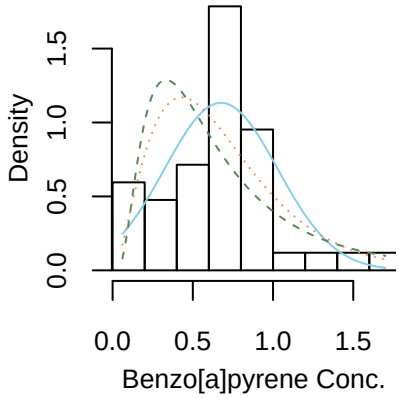


ECDF, Histogram & Q−Q (Detects Only)

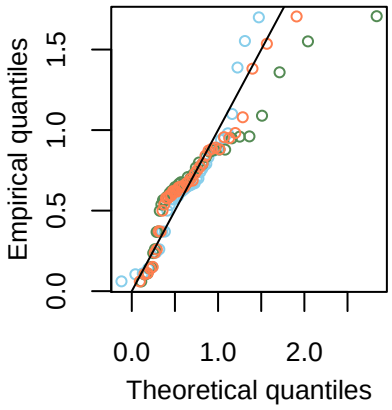
ECDF



Histogram



Q−Q



N = 43	FOD = 98%	Min (detect) = 0.061 J	Kaplan Meier Mean = 0.66
N (detect) = 42	SD (log detect) = 0.73	Max (detect) = 1 J	Kaplan Meier SD = 0.36

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.017	0.12	–	–	–	–	37.8375	41.3599
Lognormal	5e−05	2.1e−07	–	–	–	–	48.3879	51.9103
Gamma	–	–	0.2136	0.141	1.765	0.759	38.554	42.0764

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.019	0.13	–	–	–	–	35.5102	38.9856
Lognormal	6e−05	4.7e−07	–	–	–	–	46.5137	49.989
Gamma	–	–	0.2102	0.141	1.647	0.759	36.7393	40.2146

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in BCC−Benzo[a]pyrene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **285**

Media:
Waterway Sediment (All Samples)

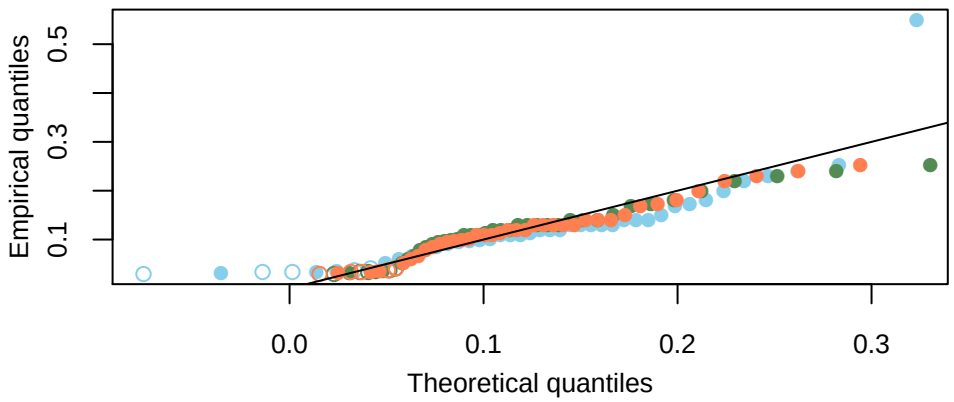
Exposure Unit:
BCC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

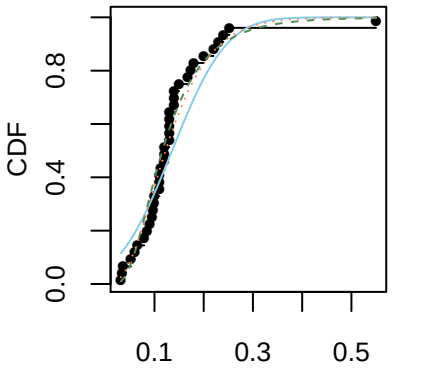
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

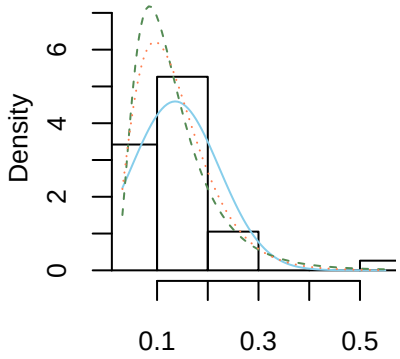


ECDF, Histogram & Q−Q (Detects Only)

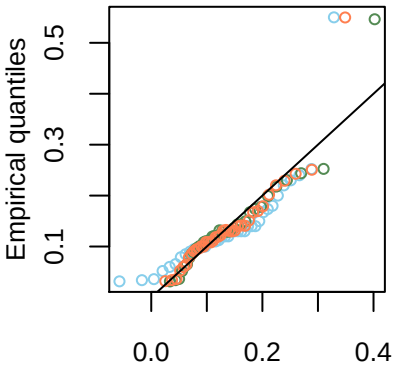
ECDF



Histogram



Q−Q



N = 43	FOD = 88%	Min (detect) = 0.032 J	Kaplan Meier Mean = 0.12
N (detect) = 38	SD (log detect) = 0.57	Max (detect) = 0.55 J	Kaplan Meier SD = 0.091

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00025	–	–	–	–	−83.1481	−79.6257
Lognormal	0.031	0.04	–	–	–	–	−107.716	−104.194
Gamma	–	–	0.11	0.141	0.7244	0.759	−106.519	−102.997

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	9.1e−05	–	–	–	–	−73.8561	−70.5809
Lognormal	0.099	0.15	–	–	–	–	−95.9778	−92.7027
Gamma	–	–	0.1425	0.151	0.7114	0.76	−94.2136	−90.9384

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in BCC−Dibenz[a,h]anthracene

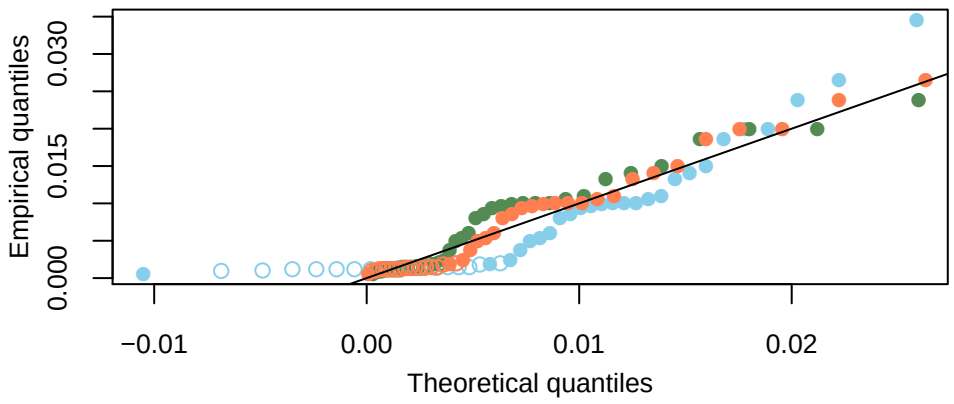
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **286**

Media:
Waterway Sediment (All Samples)
Exposure Unit:
BCC
Chemical (mg/kg):
Aldrin

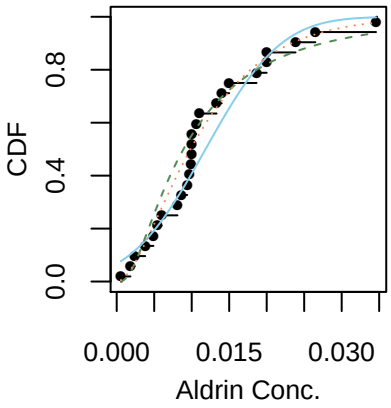
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

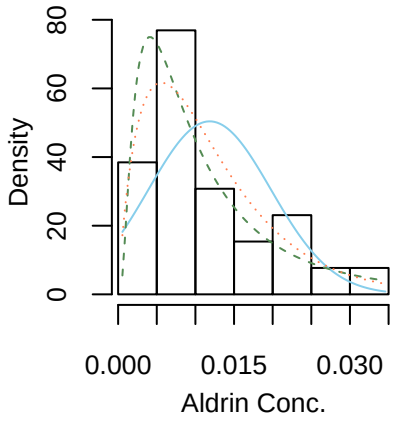


ECDF, Histogram & Q−Q (Detects Only)

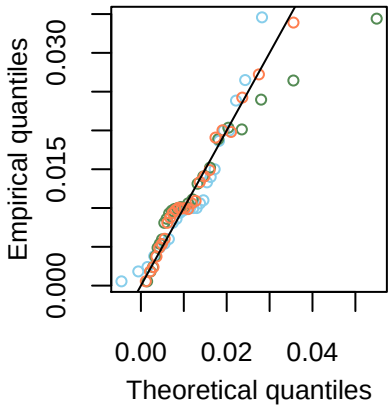
ECDF



Histogram



Q−Q



N = 43	FOD = 60%	Min (detect) = 0.00055 J	Kaplan Meier Mean = 0.0072
N (detect) = 26	SD (log detect) = 0.9	Max (detect) = 0.035 J	Kaplan Meier SD = 0.0084

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	6.6e−05	–	–	–	–	−289.007	−285.485
Lognormal	0.0014	0.00074	–	–	–	–	−331.973	−328.45
Gamma	–	–	0.2044	0.148	1.792	0.813	−328.647	−325.125

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.04	0.012	–	–	–	–	−173.843	−171.327
Lognormal	0.018	0.018	–	–	–	–	−174.411	−171.895
Gamma	–	–	0.1351	0.18	0.3675	0.773	−179.91	−177.394

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in BCC−Aldrin

Media:
Waterway Sediment (All Samples)

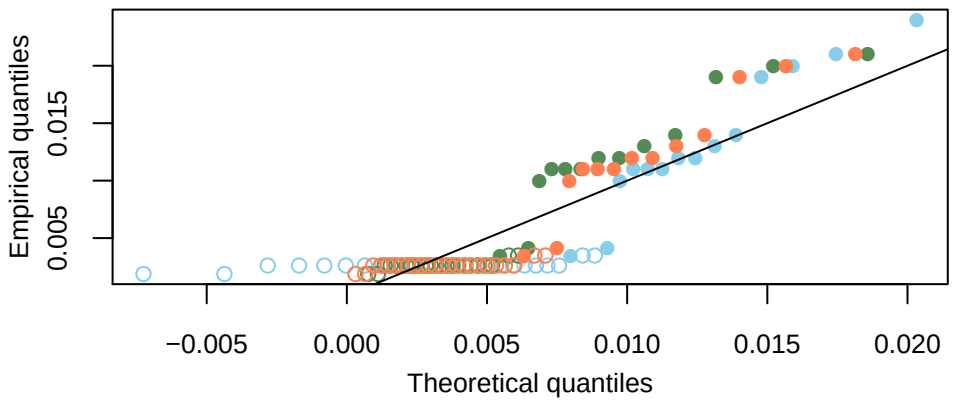
Exposure Unit:
BCC

Chemical (mg/kg):
Heptachlor

Legend

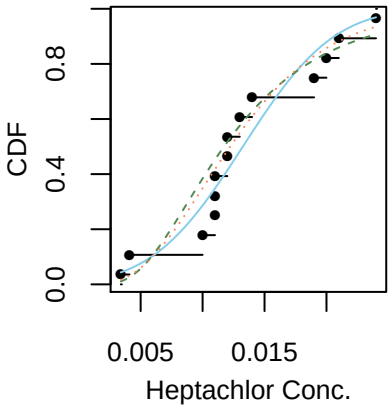
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

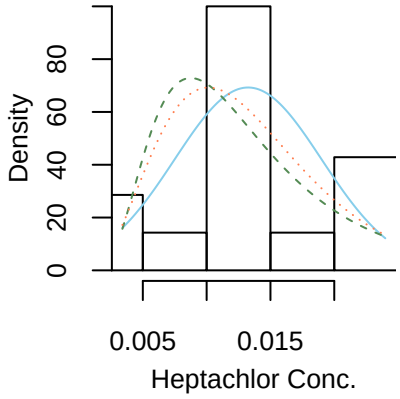


ECDF, Histogram & Q−Q (Detects Only)

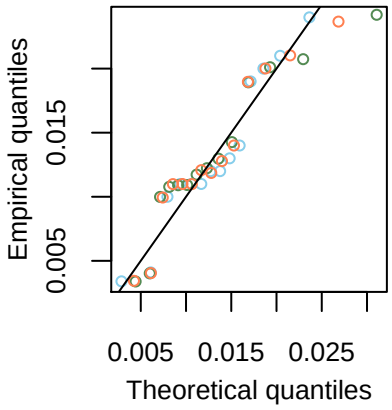
ECDF



Histogram



Q−Q



N = 38	FOD = 37%	Min (detect) = 0.0034 J	Kaplan Meier Mean = 0.005
N (detect) = 14	SD (log detect) = 0.56	Max (detect) = 0.024 J	Kaplan Meier SD = 0.0072

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.5e−12	–	–	–	–	−274.372	−271.097
Lognormal	0	1.9e−11	–	–	–	–	−314.954	−311.679
Gamma	–	–	0.3334	0.153	4.883	0.776	−305.755	−302.48

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.36	0.39	–	–	–	–	−100.66	−99.3822
Lognormal	0.034	0.022	–	–	–	–	−97.9848	−96.7067
Gamma	–	–	0.2059	0.27	0.61	0.736	−99.9394	−98.6613

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in BCC−Heptachlor

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **288**

Media:
Waterway Sediment (All Samples)

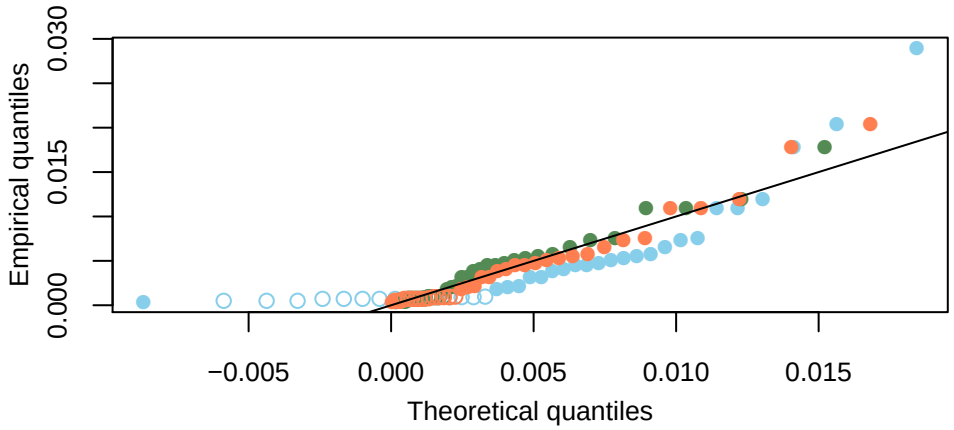
Exposure Unit:
BCC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

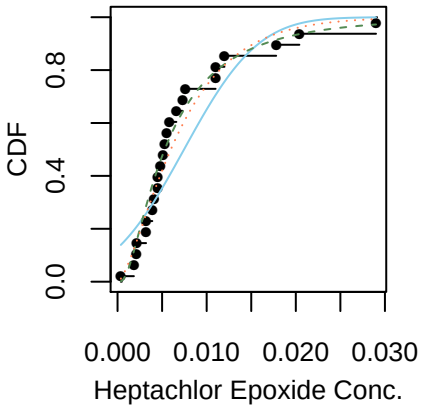
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

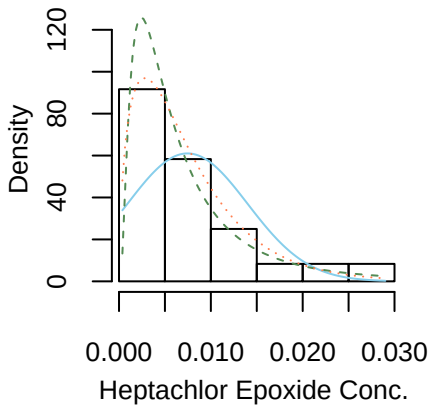


ECDF, Histogram & Q−Q (Detects Only)

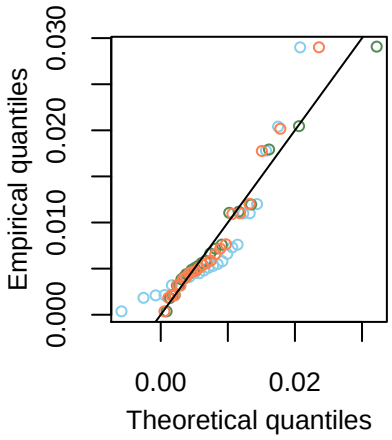
ECDF



Histogram



Q−Q



N = 39	FOD = 62%	Min (detect) = 0.00037 J	Kaplan Meier Mean = 0.0047
N (detect) = 24	SD (log detect) = 0.91	Max (detect) = 0.029 J	Kaplan Meier SD = 0.0062

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−05	–	–	–	–	−283.349	−280.022
Lognormal	0.023	0.001	–	–	–	–	−339.603	−336.276
Gamma	–	–	0.1979	0.157	1.2	0.812	−333.722	−330.395

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00017	0.00085	–	–	–	–	−169.346	−166.99
Lognormal	0.21	0.46	–	–	–	–	−185.279	−182.923
Gamma	–	–	0.139	0.183	0.4931	0.772	−185.927	−183.571

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in BCC−Heptachlor Epoxide

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

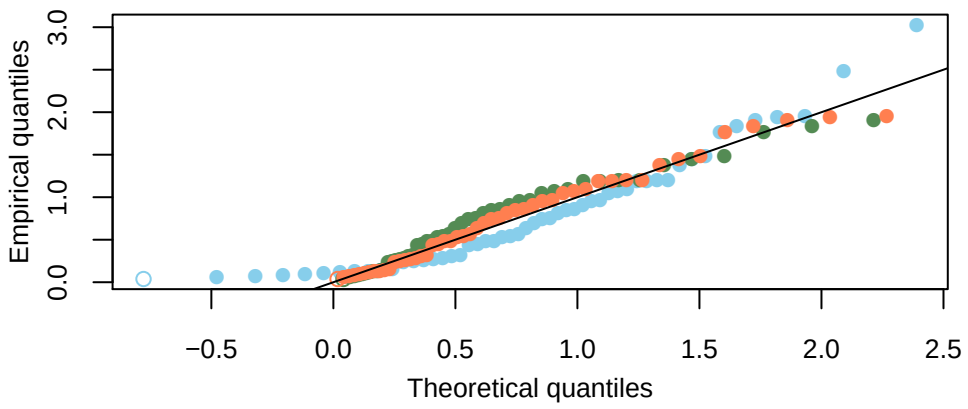
Figure **289**

Media:
Waterway Sediment (All Samples)
Exposure Unit:
BCC
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

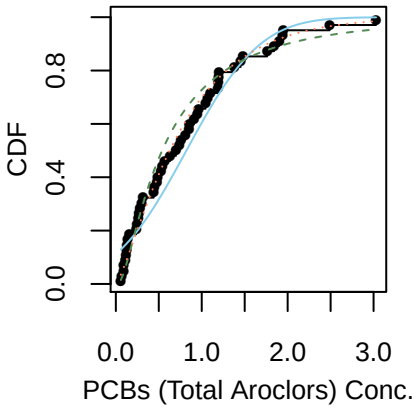
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

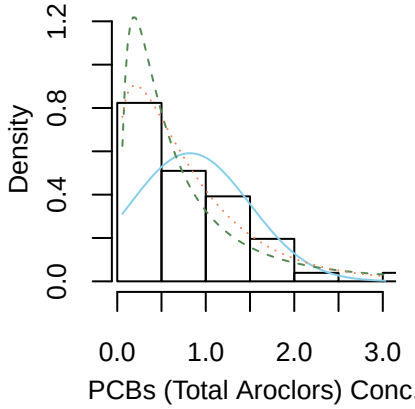


ECDF, Histogram & Q−Q (Detects Only)

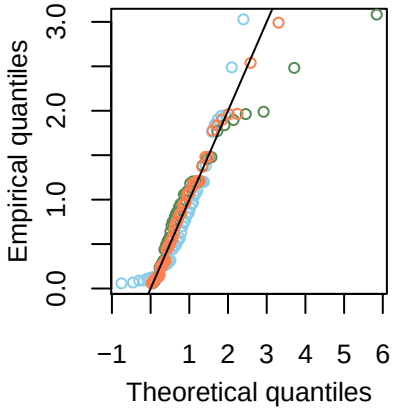
ECDF



Histogram



Q−Q



N = 52	FOD = 98%	Min (detect) = 0.058 J	Kaplan Meier Mean = 0.81
N (detect) = 51	SD (log detect) = 1	Max (detect) = 3 J	Kaplan Meier SD = 0.68

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00025	0.027	–	–	–	–	110.972	114.875
Lognormal	0.03	0.09	–	–	–	–	89.4721	93.3746
Gamma	–	–	0.07712	0.129	0.3788	0.78	84.2135	88.116

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00032	0.028	–	–	–	–	108.6	112.463
Lognormal	0.031	0.12	–	–	–	–	87.8018	91.6655
Gamma	–	–	0.0768	0.129	0.389	0.78	83.6213	87.4849

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in BCC−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **290**

Media:
Waterway Sediment (All Samples)

Exposure Unit:
BCC

Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 37	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in BCC−Trichloroethene

Media:
Waterway Sediment (All Samples)

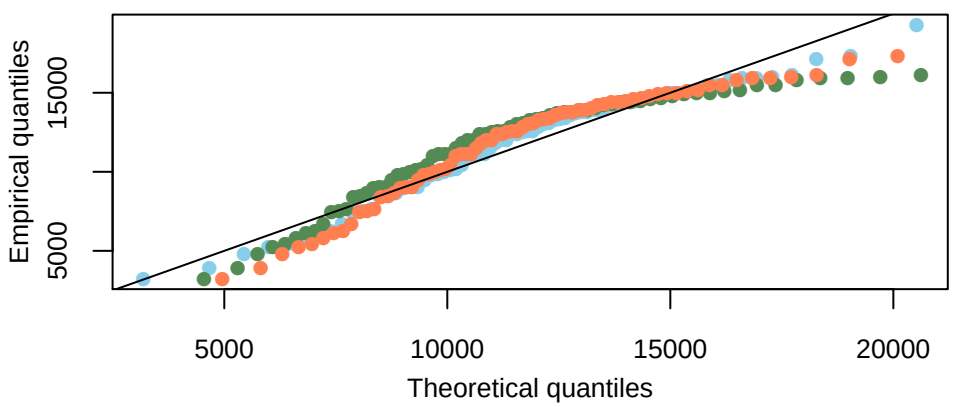
Exposure Unit:
LBC

Chemical (mg/kg):
Aluminum

Legend

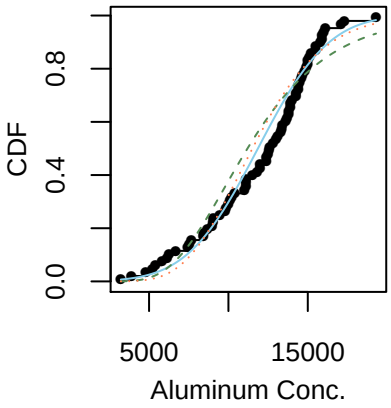
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

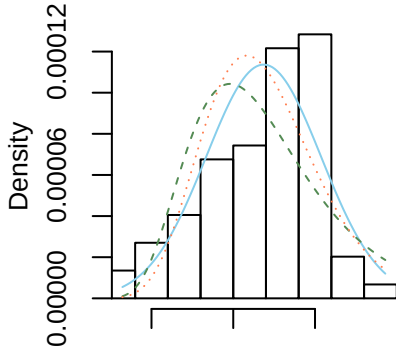


ECDF, Histogram & Q−Q (Detects Only)

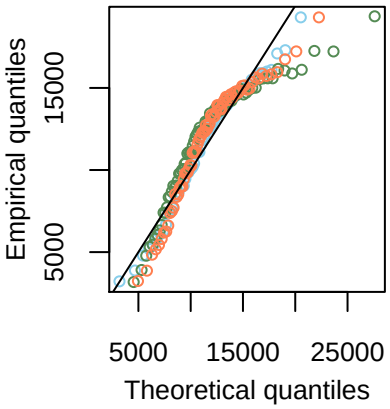
ECDF



Histogram



Q−Q



N = 74	FOD = 100%	Min (detect) = 3,200 J	Arithmetic Mean = 12,000
N (detect) = 74	SD (log detect) = 0.37	Max (detect) = 19,000 J	Arithmetic SD = 3,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.018	0.018	–	–	–	–	1422.17	1426.78
Lognormal	0	4.8e−05	–	–	–	–	1444.77	1449.37
Gamma	–	–	0.1524	0.106	2.581	0.751	1437.15	1441.76

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in LBC−Aluminum

Media:
Waterway Sediment (All Samples)

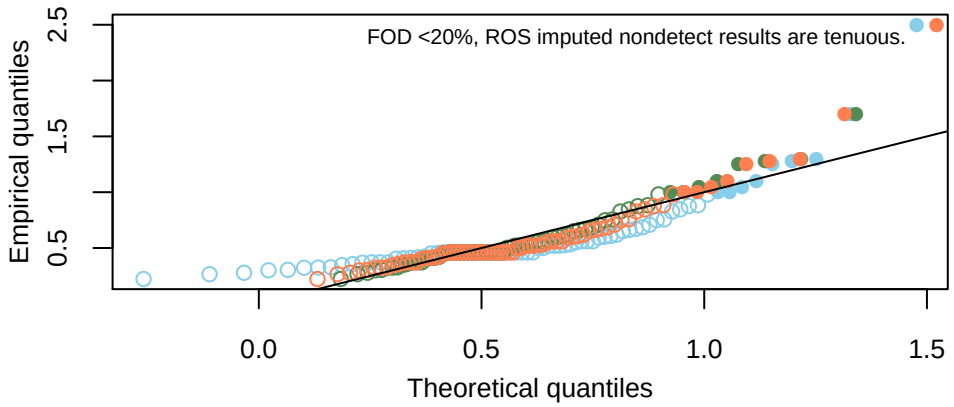
Exposure Unit:
LBC

Chemical (mg/kg):
Antimony

Legend

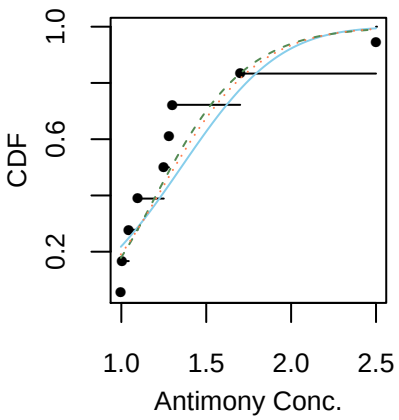
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

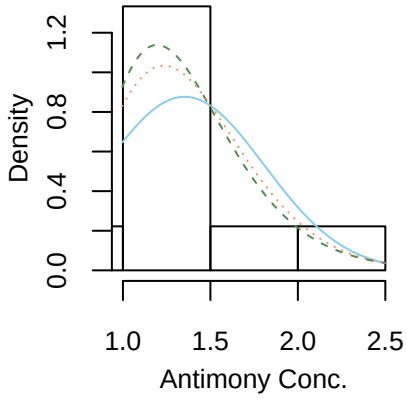


ECDF, Histogram & Q−Q (Detects Only)

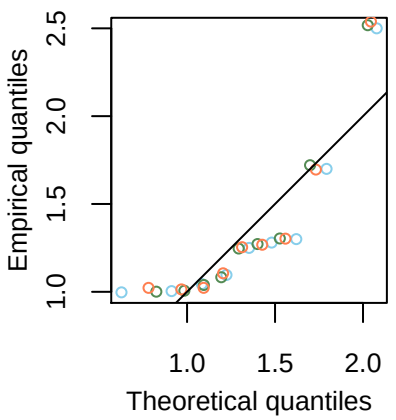
ECDF



Histogram



Q−Q



N = 74	FOD = 12%	Min (detect) = 1 J	Kaplan Meier Mean = 0.64
N (detect) = 9	SD (log detect) = 0.3	Max (detect) = 2 J	Kaplan Meier SD = 0.35

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3e−09	–	–	–	–	59.2478	63.8559
Lognormal	0.0015	5.7e−05	–	–	–	–	2.53429	7.14242
Gamma	–	–	0.1752	0.108	2.761	0.763	15.6992	20.3073

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0048	0.0081	–	–	–	–	15.3741	15.7686
Lognormal	0.044	0.056	–	–	–	–	11.3838	11.7783
Gamma	–	–	0.2909	0.279	0.7619	0.722	12.5539	12.9484

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in LBC−Antimony

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **293**

Media:
Waterway Sediment (All Samples)

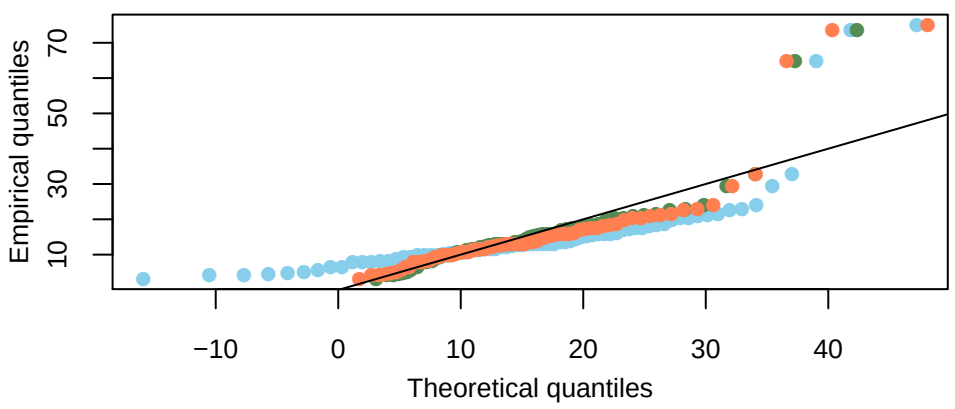
Exposure Unit:
LBC

Chemical (mg/kg):
Arsenic

Legend

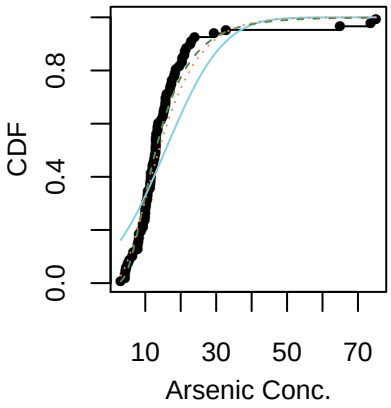
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

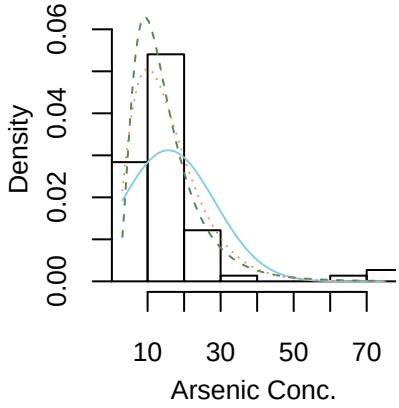


ECDF, Histogram & Q−Q (Detects Only)

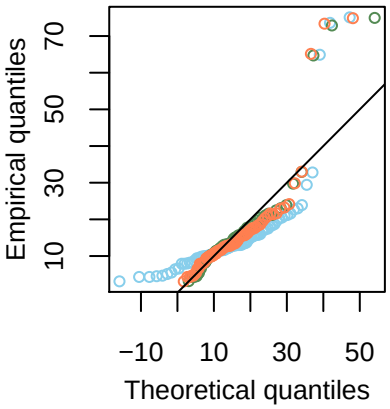
ECDF



Histogram



Q−Q



N = 74	FOD = 100%	Min (detect) = 3	Arithmetic Mean = 16
N (detect) = 74	SD (log detect) = 0.58	Max (detect) = 75 J	Arithmetic SD = 13

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.6e−09	–	–	–	–	591.066	595.674
Lognormal	0.0036	0.15	–	–	–	–	512.05	516.658
Gamma	–	–	0.1227	0.108	2.313	0.763	526.476	531.084

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in LBC−Arsenic

Media:
Waterway Sediment (All Samples)

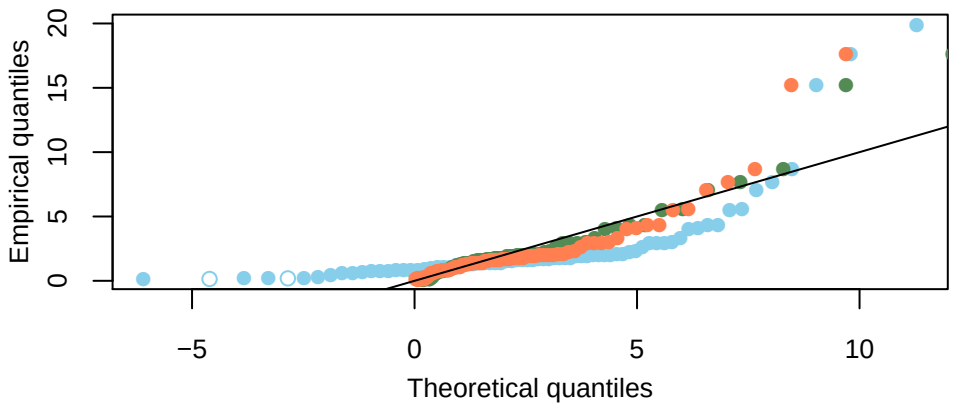
Exposure Unit:
LBC

Chemical (mg/kg):
Cadmium

Legend

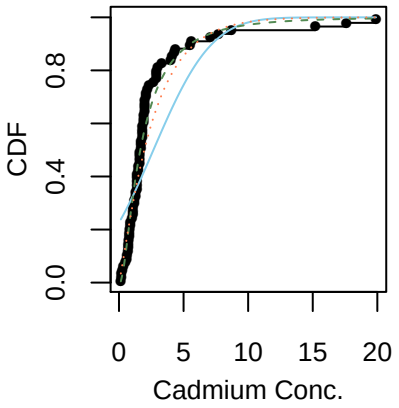
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

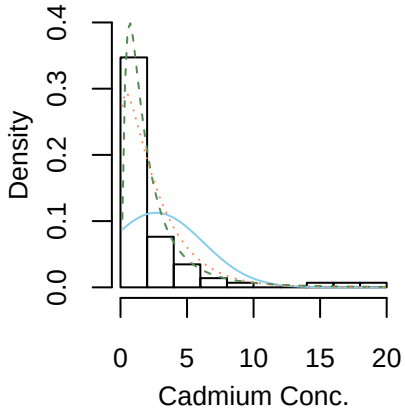


ECDF, Histogram & Q−Q (Detects Only)

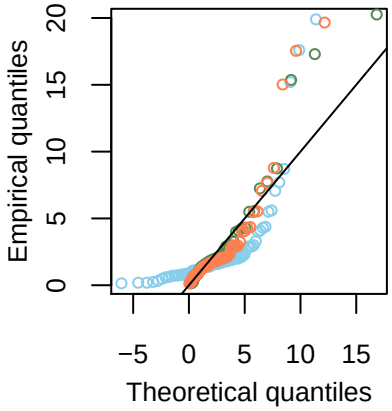
ECDF



Histogram



Q−Q



N = 74	FOD = 97%	Min (detect) = 0.14 J	Kaplan Meier Mean = 2
N (detect) = 72	SD (log detect) = 0.95	Max (detect) = 20 J	Kaplan Meier SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.9e−17	–	–	–	–	400.171	404.779
Lognormal	0.017	0.024	–	–	–	–	279.276	283.884
Gamma	–	–	0.1861	0.11	2.499	0.78	292.904	297.512

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.5e−16	–	–	–	–	390.476	395.029
Lognormal	0.029	0.01	–	–	–	–	272.062	276.615
Gamma	–	–	0.1957	0.11	2.783	0.78	288.057	292.611

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in LBC−Cadmium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **295**

Media:
Waterway Sediment (All Samples)

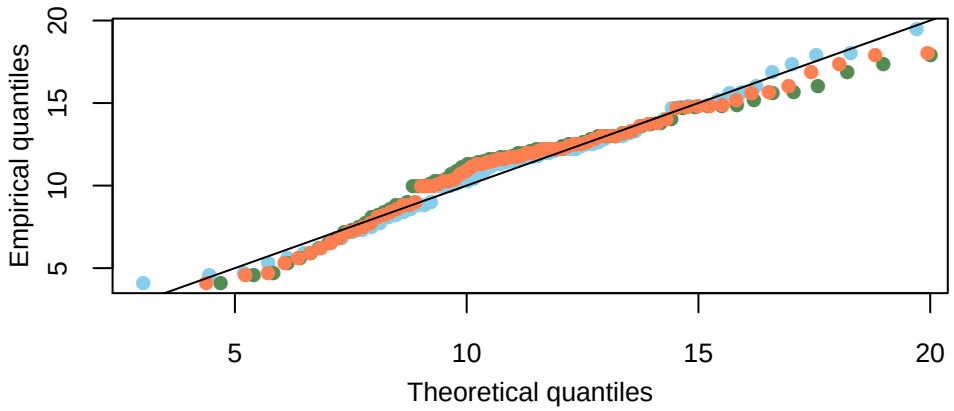
Exposure Unit:
LBC

Chemical (mg/kg):
Cobalt

Legend

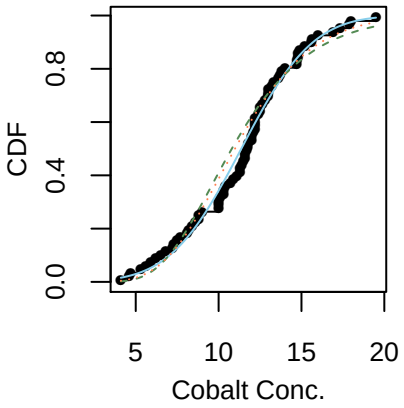
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

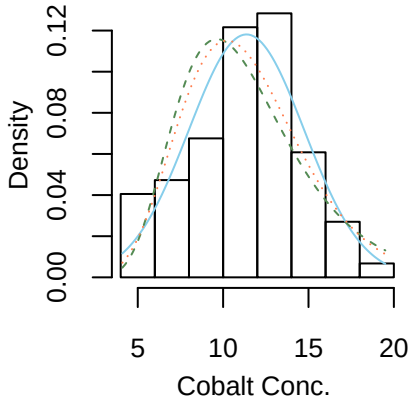


ECDF, Histogram & Q−Q (Detects Only)

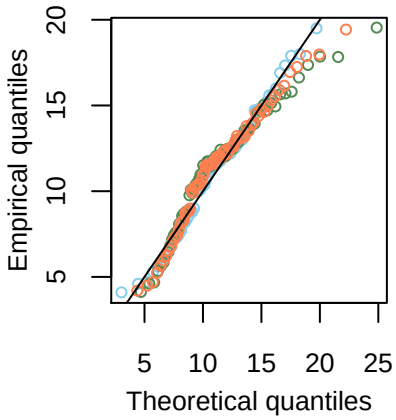
ECDF



Histogram



Q−Q



N = 74	FOD = 100%	Min (detect) = 4 J	Arithmetic Mean = 11
N (detect) = 74	SD (log detect) = 0.34	Max (detect) = 20 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.55	0.19	–	–	–	–	394.131	398.739
Lognormal	0.00095	0.00039	–	–	–	–	405.429	410.037
Gamma	–	–	0.1292	0.107	1.104	0.754	399.306	403.914

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in LBC−Cobalt

Media:
Waterway Sediment (All Samples)

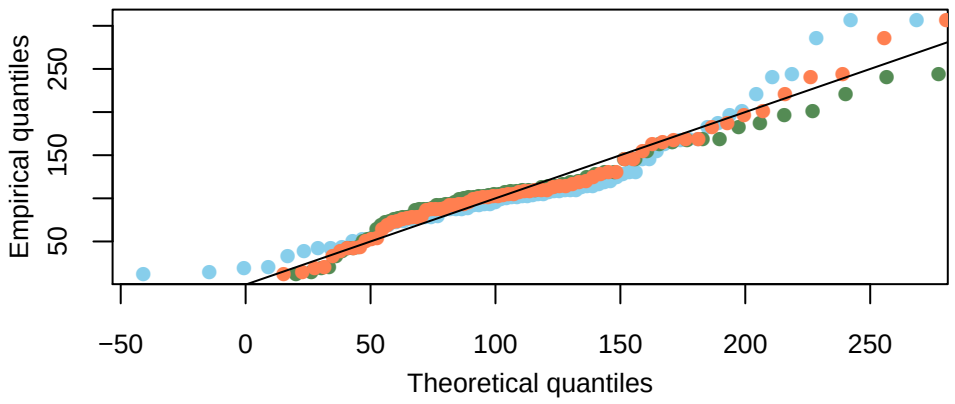
Exposure Unit:
LBC

Chemical (mg/kg):
Copper

Legend

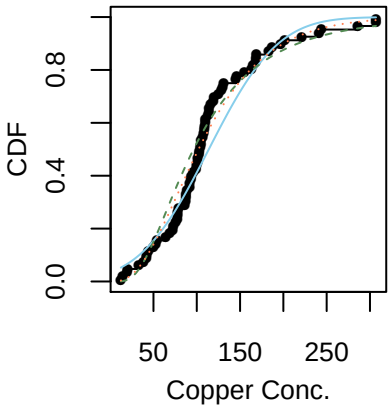
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

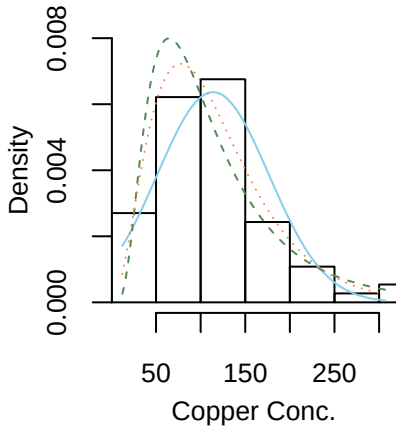


ECDF, Histogram & Q−Q (Detects Only)

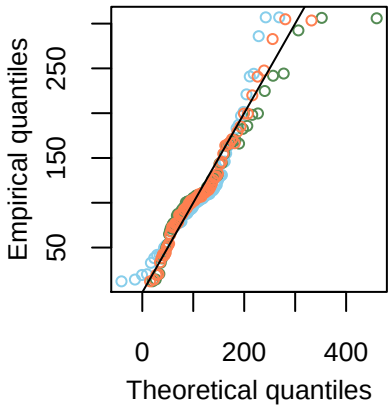
ECDF



Histogram



Q−Q



N = 74	FOD = 100%	Min (detect) = 12	Arithmetic Mean = 110
N (detect) = 74	SD (log detect) = 0.64	Max (detect) = 310 J	Arithmetic SD = 63

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	7e−05	3.7e−05	–	–	–	–	826.392	831.001
Lognormal	0.00024	0.00041	–	–	–	–	822.308	826.916
Gamma	–	–	0.1068	0.108	0.9949	0.763	813.31	817.918

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in LBC−Copper

Media:
Waterway Sediment (All Samples)

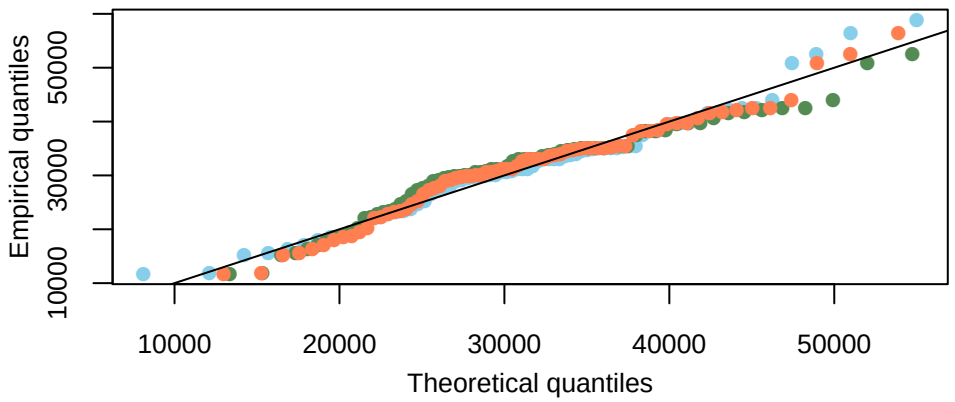
Exposure Unit:
LBC

Chemical (mg/kg):
Iron

Legend

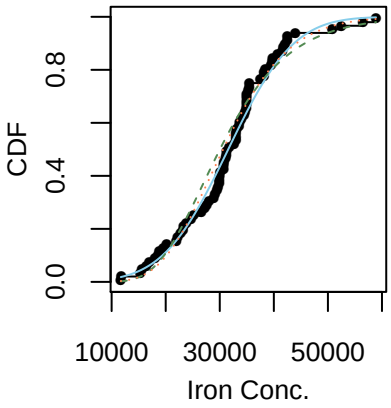
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

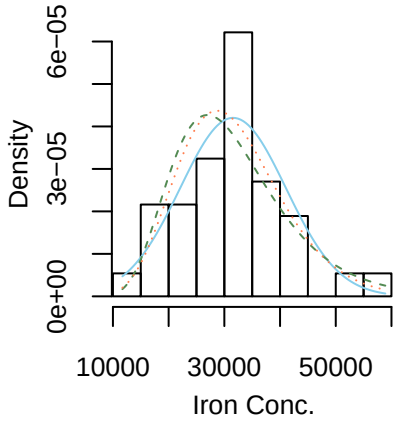


ECDF, Histogram & Q−Q (Detects Only)

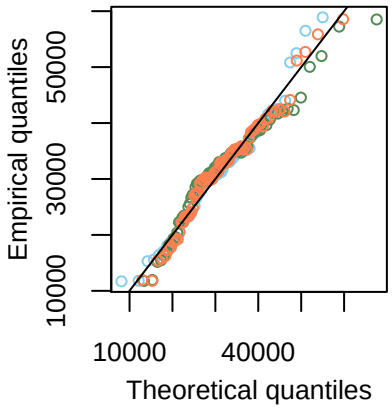
ECDF



Histogram



Q−Q



N = 74	FOD = 100%	Min (detect) = 12,000 J	Arithmetic Mean = 32,000
N (detect) = 74	SD (log detect) = 0.33	Max (detect) = 59,000 J	Arithmetic SD = 9,600

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.14	0.082	–	–	–	–	1569.41	1574.02
Lognormal	0.0049	0.00071	–	–	–	–	1575.1	1579.71
Gamma	–	–	0.1147	0.106	0.9414	0.751	1570.8	1575.4

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in LBC−Iron

Media:
Waterway Sediment (All Samples)

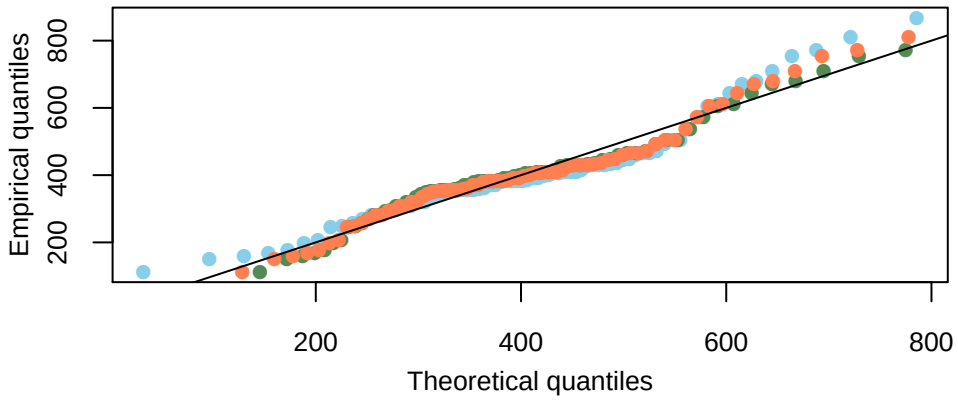
Exposure Unit:
LBC

Chemical (mg/kg):
Manganese

Legend

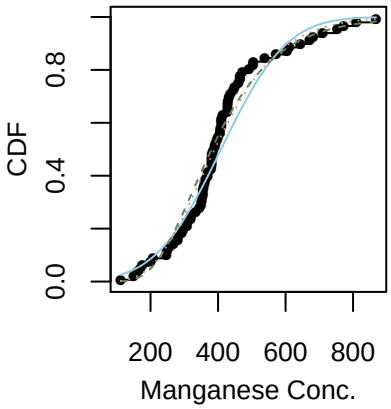
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

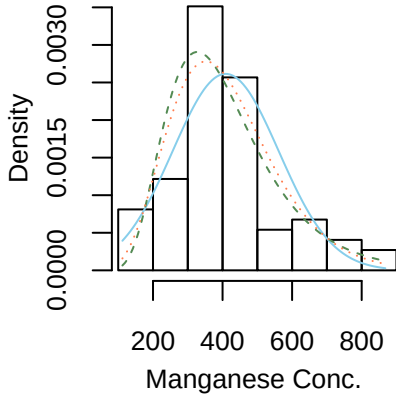


ECDF, Histogram & Q−Q (Detects Only)

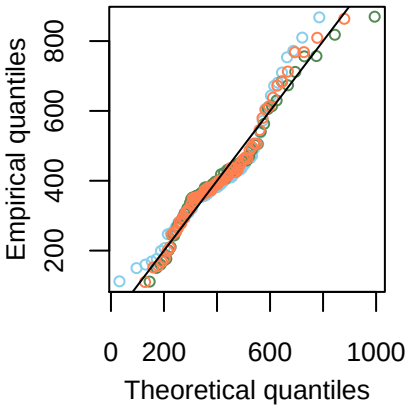
ECDF



Histogram



Q−Q



N = 74	FOD = 100%	Min (detect) = 110 J	Arithmetic Mean = 410
N (detect) = 74	SD (log detect) = 0.39	Max (detect) = 870 J	Arithmetic SD = 150

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00084	0.00046	–	–	–	–	958.087	962.695
Lognormal	0.012	0.0032	–	–	–	–	953.607	958.215
Gamma	–	–	0.1058	0.107	1.071	0.754	950.913	955.521

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in LBC−Manganese

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **299**

Media:
Waterway Sediment (All Samples)

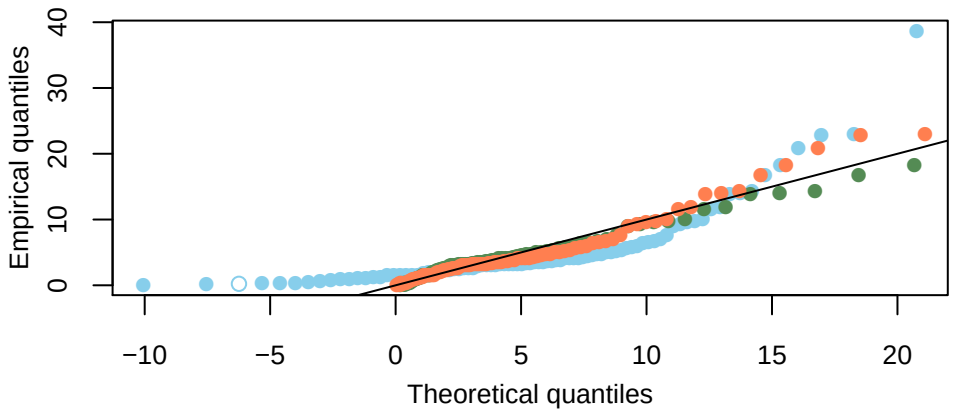
Exposure Unit:
LBC

Chemical (mg/kg):
Mercury

Legend

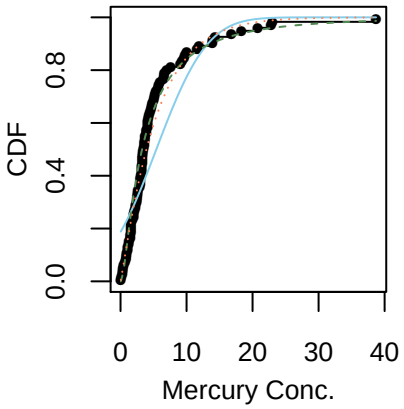
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

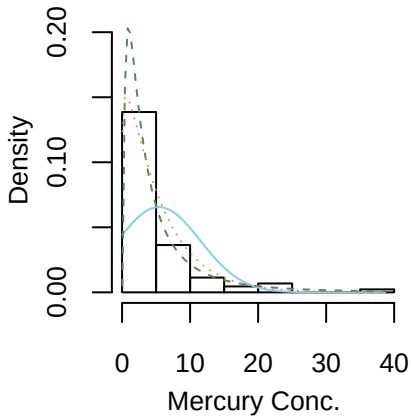


ECDF, Histogram & Q−Q (Detects Only)

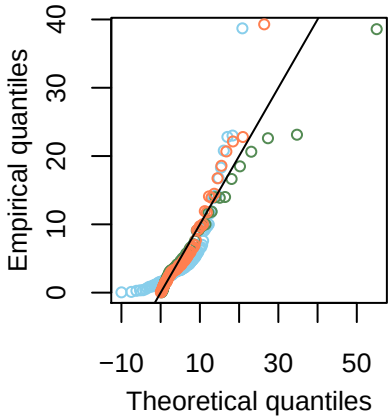
ECDF



Histogram



Q−Q



N = 89	FOD = 99%	Min (detect) = 0.046 J	Kaplan Meier Mean = 5
N (detect) = 88	SD (log detect) = 1.1	Max (detect) = 39 J	Kaplan Meier SD = 6

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.3e−12	–	–	–	–	577.806	582.783
Lognormal	0.0014	0.0089	–	–	–	–	485.71	490.687
Gamma	–	–	0.1039	0.103	1.103	0.782	480.611	485.588

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.5e−12	–	–	–	–	571.637	576.591
Lognormal	0.0014	0.015	–	–	–	–	481.127	486.082
Gamma	–	–	0.1073	0.103	1.178	0.782	476.82	481.775

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in LBC−Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **300**

Media:
Waterway Sediment (All Samples)

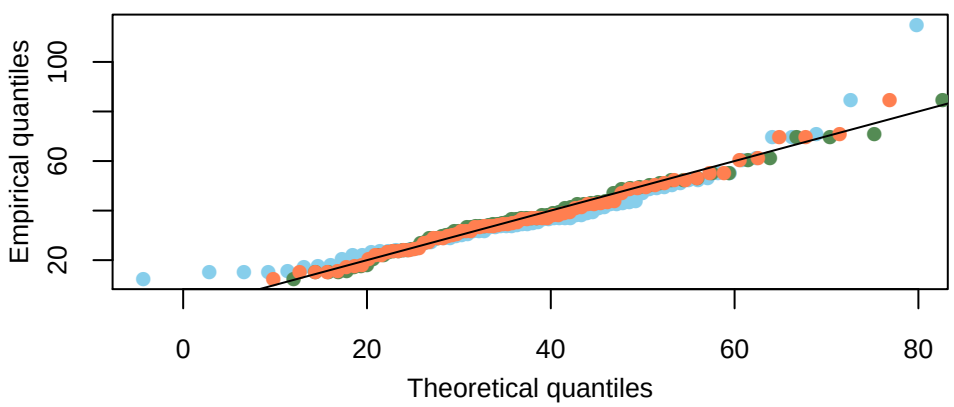
Exposure Unit:
LBC

Chemical (mg/kg):
Nickel

Legend

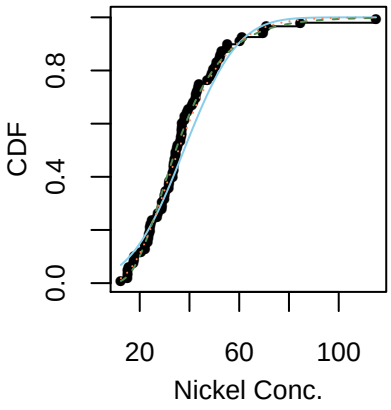
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

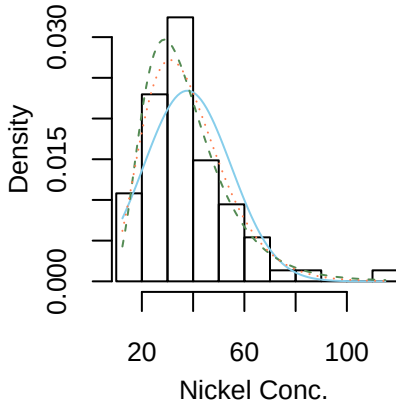


ECDF, Histogram & Q−Q (Detects Only)

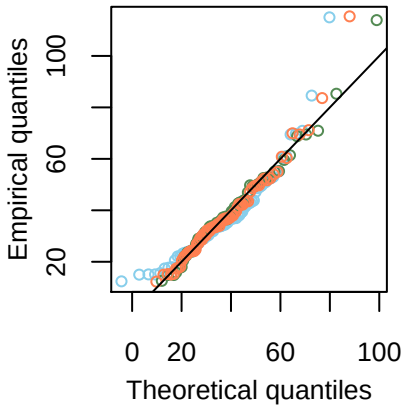
ECDF



Histogram



Q−Q



N = 74	FOD = 100%	Min (detect) = 12 J	Arithmetic Mean = 38
N (detect) = 74	SD (log detect) = 0.43	Max (detect) = 120 J	Arithmetic SD = 17

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.0041	–	–	–	–	633.615	638.224
Lognormal	0.71	0.42	–	–	–	–	611.961	616.569
Gamma	–	–	0.07213	0.107	0.3686	0.754	614.12	618.728

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in LBC−Nickel

Media:
Waterway Sediment (All Samples)

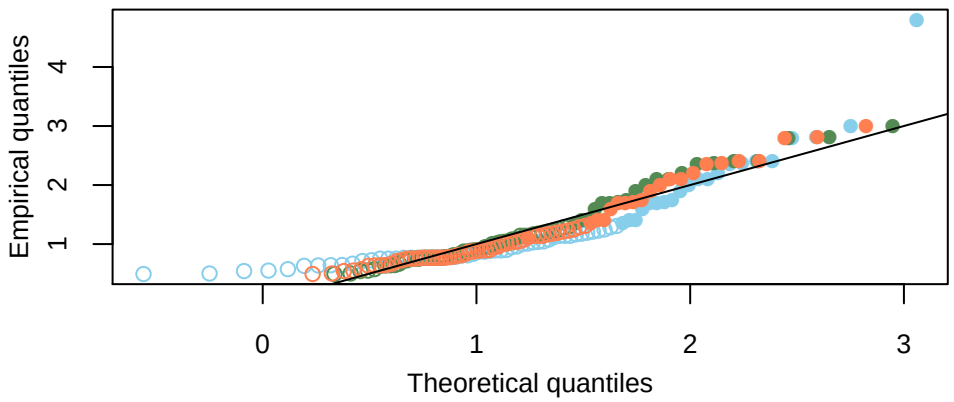
Exposure Unit:
LBC

Chemical (mg/kg):
Thallium

Legend

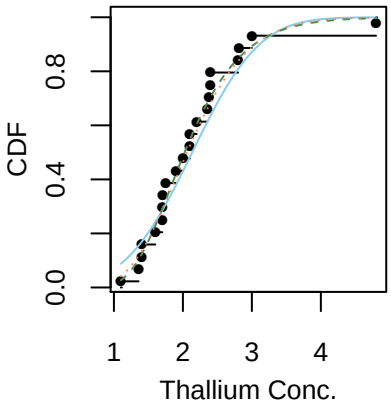
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

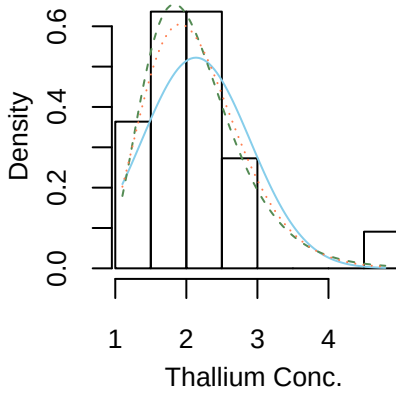


ECDF, Histogram & Q−Q (Detects Only)

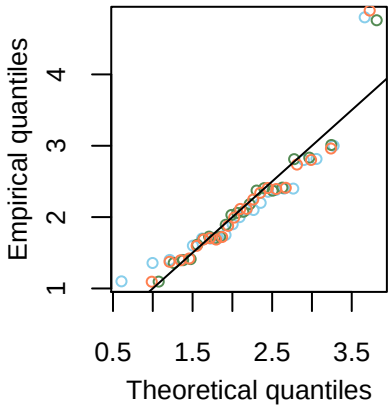
ECDF



Histogram



Q−Q



N = 74	FOD = 30%	Min (detect) = 1 J	Kaplan Meier Mean = 1
N (detect) = 22	SD (log detect) = 0.32	Max (detect) = 4 J	Kaplan Meier SD = 0.77

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.5e−07	–	–	–	–	167.92	172.528
Lognormal	0.0064	0.035	–	–	–	–	119.897	124.506
Gamma	–	–	0.1252	0.108	2.092	0.763	130.592	135.2

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0028	0.048	–	–	–	–	54.5844	56.7665
Lognormal	0.65	0.59	–	–	–	–	46.858	49.04
Gamma	–	–	0.135	0.186	0.3629	0.746	48.5588	50.7409

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in LBC−Thallium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **302**

Media:
Waterway Sediment (All Samples)

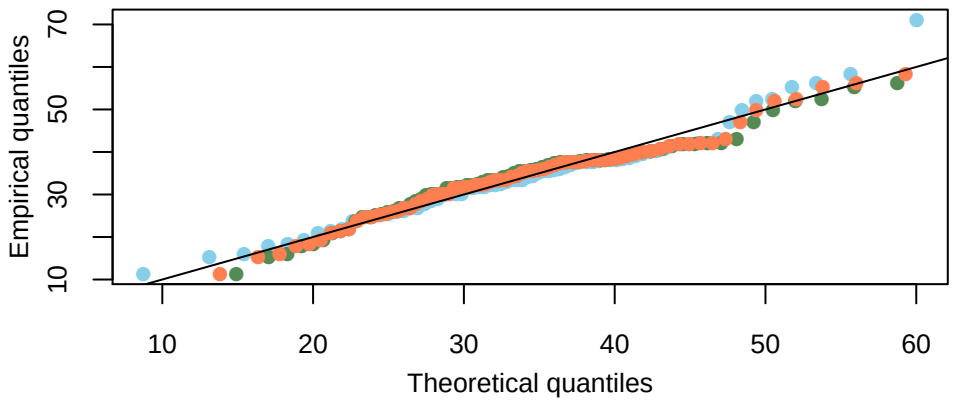
Exposure Unit:
LBC

Chemical (mg/kg):
Vanadium

Legend

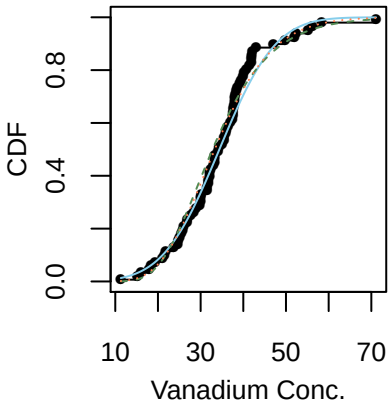
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

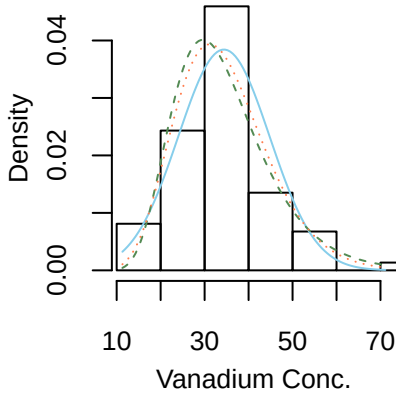


ECDF, Histogram & Q−Q (Detects Only)

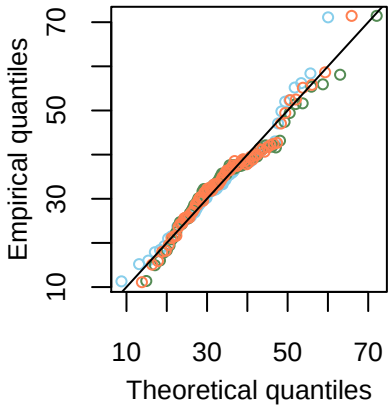
ECDF



Histogram



Q−Q



N = 74	FOD = 100%	Min (detect) = 11	Arithmetic Mean = 34
N (detect) = 74	SD (log detect) = 0.32	Max (detect) = 71	Arithmetic SD = 10

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.038	0.033	–	–	–	–	560.331	564.939
Lognormal	0.03	0.021	–	–	–	–	561.441	566.049
Gamma	–	–	0.09446	0.106	0.6913	0.751	558.085	562.693

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in LBC−Vanadium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **303**

Media:
Waterway Sediment (All Samples)

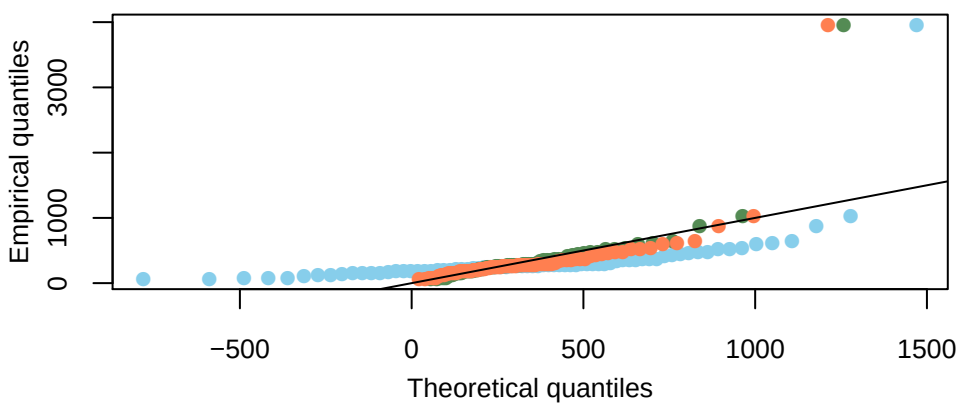
Exposure Unit:
LBC

Chemical (mg/kg):
Zinc

Legend

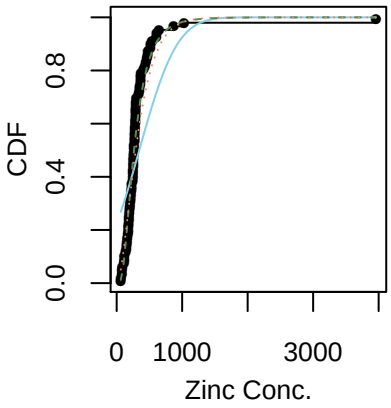
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

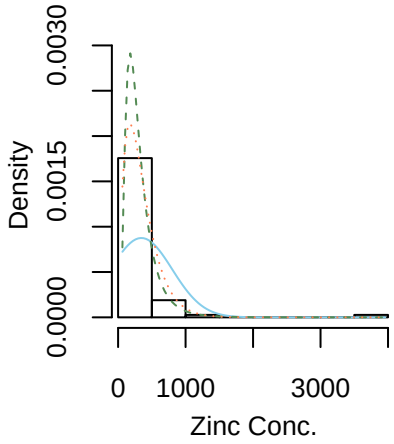


ECDF, Histogram & Q−Q (Detects Only)

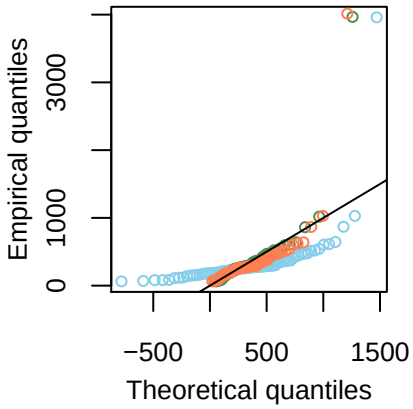
ECDF



Histogram



Q−Q



N = 74	FOD = 100%	Min (detect) = 64	Arithmetic Mean = 350
N (detect) = 74	SD (log detect) = 0.64	Max (detect) = 4,000	Arithmetic SD = 460

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.1e−15	–	–	–	–	1120.04	1124.65
Lognormal	0.00098	0.011	–	–	–	–	971.524	976.133
Gamma	–	–	0.1805	0.108	3.02	0.763	998.869	1003.48

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in LBC−Zinc

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **304**

Media:
Waterway Sediment (All Samples)

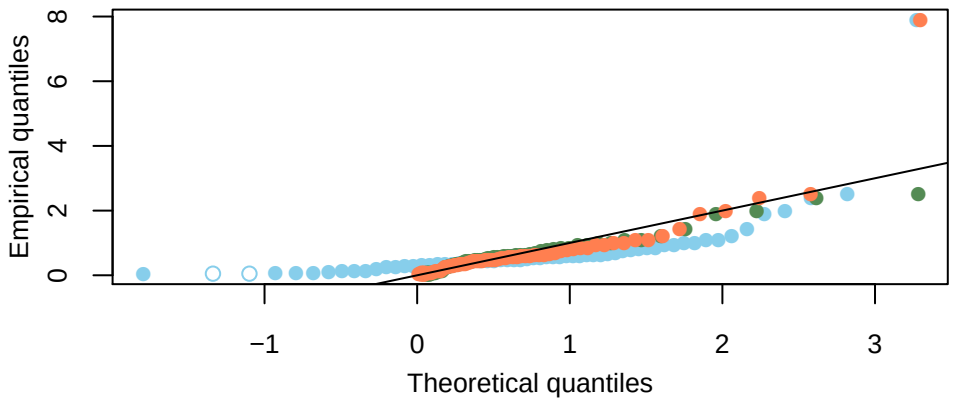
Exposure Unit:
LBC

Chemical (mg/kg):
Benzo[a]pyrene

Legend

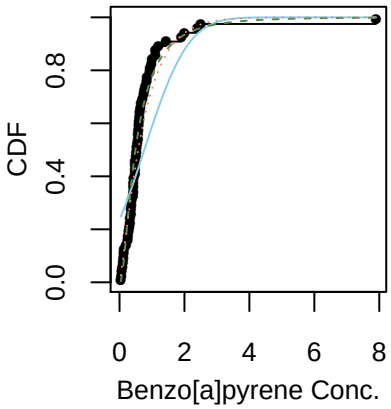
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

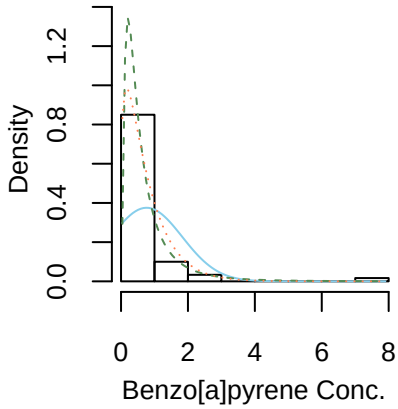


ECDF, Histogram & Q−Q (Detects Only)

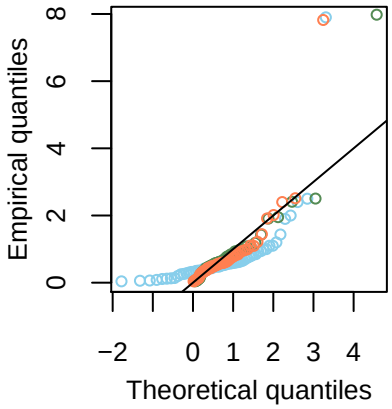
ECDF



Histogram



Q−Q



N = 62	FOD = 97%	Min (detect) = 0.04	Kaplan Meier Mean = 0.74
N (detect) = 60	SD (log detect) = 0.94	Max (detect) = 7 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.6e−11	–	–	–	–	186.356	190.61
Lognormal	0.018	0.012	–	–	–	–	82.5659	86.8202
Gamma	–	–	0.1174	0.118	1.33	0.779	89.869	94.1233

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.4e−11	–	–	–	–	181.578	185.767
Lognormal	0.049	0.037	–	–	–	–	80.3767	84.5654
Gamma	–	–	0.1269	0.118	1.466	0.779	89.6671	93.8558

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in LBC−Benzo[a]pyrene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **305**

Media:
Waterway Sediment (All Samples)

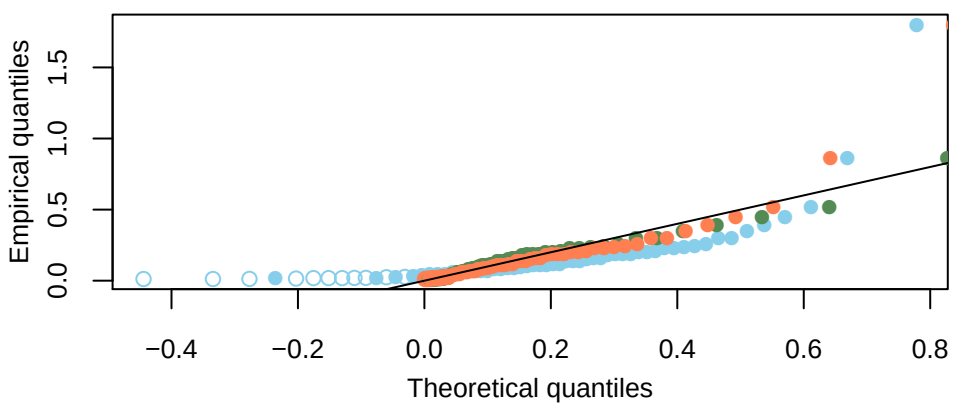
Exposure Unit:
LBC

Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

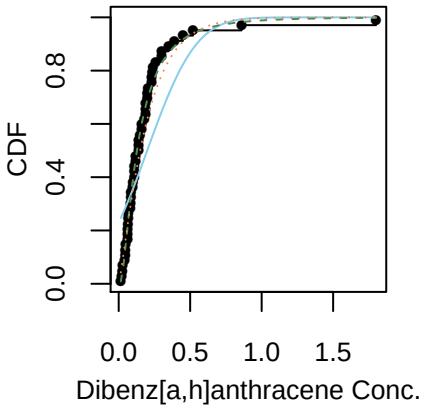
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

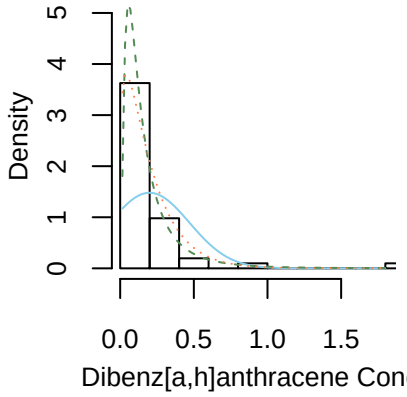


ECDF, Histogram & Q−Q (Detects Only)

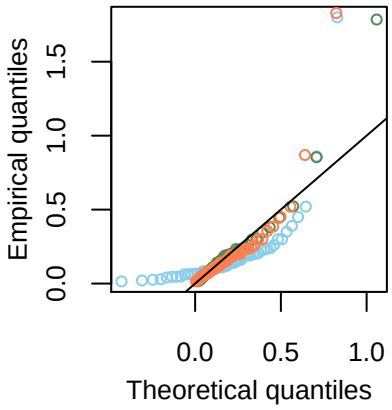
ECDF



Histogram



Q−Q



N = 62	FOD = 82%	Min (detect) = 0.015 J	Kaplan Meier Mean = 0.17
N (detect) = 51	SD (log detect) = 0.92	Max (detect) = 1 J	Kaplan Meier SD = 0.25

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.8e−12	–	–	–	–	10.1025	14.3568
Lognormal	0.14	0.37	–	–	–	–	−104.478	−100.224
Gamma	–	–	0.09356	0.121	0.8786	0.816	−93.8897	−89.6354

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.2e−09	–	–	–	–	15.0301	18.8938
Lognormal	0.87	0.79	–	–	–	–	−71.2636	−67.3999
Gamma	–	–	0.1285	0.129	1.035	0.78	−59.9695	−56.1059

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in LBC−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **306**

Media:
Waterway Sediment (All Samples)

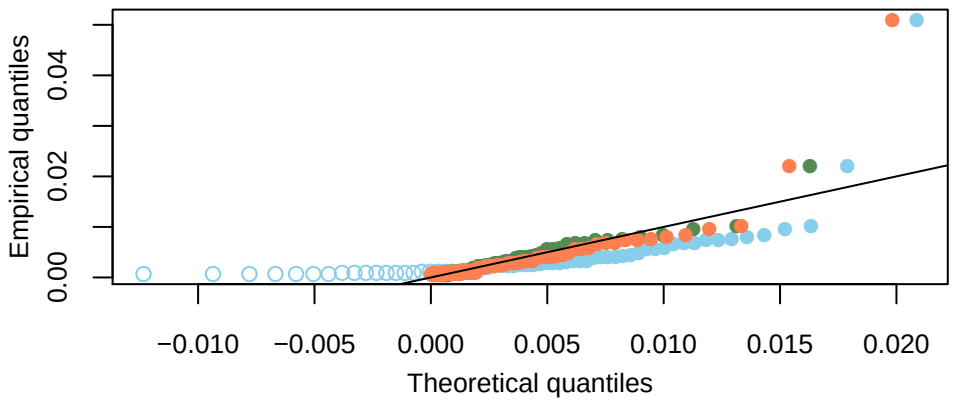
Exposure Unit:
LBC

Chemical (mg/kg):
Aldrin

Legend

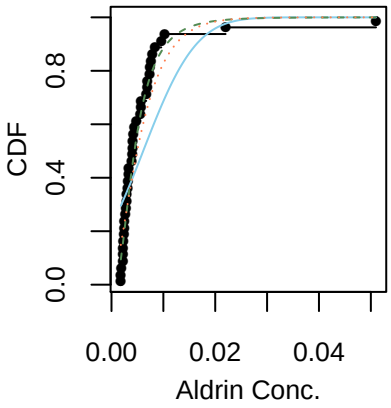
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

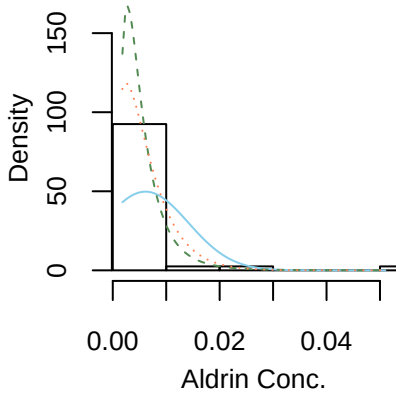


ECDF, Histogram & Q−Q (Detects Only)

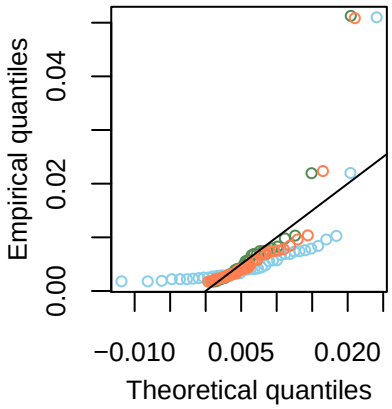
ECDF



Histogram



Q−Q



N = 62	FOD = 65%	Min (detect) = 0.0018 J	Kaplan Meier Mean = 0.004
N (detect) = 40	SD (log detect) = 0.69	Max (detect) = 0.051 J	Kaplan Meier SD = 0.007

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	9.9e−16	–	–	–	–	−437.03	−432.776
Lognormal	0.0046	0.0012	–	–	–	–	−569.302	−565.048
Gamma	–	–	0.1372	0.118	1.938	0.779	−548.87	−544.615

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.1e−09	–	–	–	–	−268.585	−265.207
Lognormal	0.0018	0.22	–	–	–	–	−346.74	−343.363
Gamma	–	–	0.1553	0.144	2.225	0.779	−329.424	−326.046

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in LBC−Aldrin

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **307**

Media:
Waterway Sediment (All Samples)

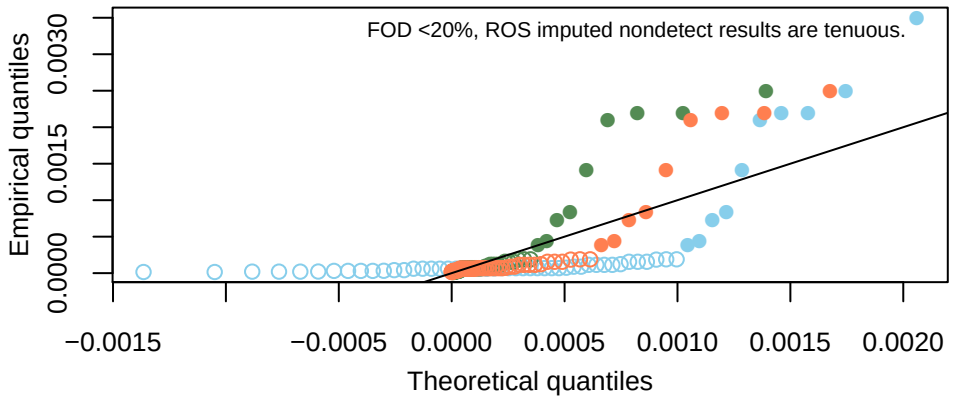
Exposure Unit:
LBC

Chemical (mg/kg):
Heptachlor

Legend

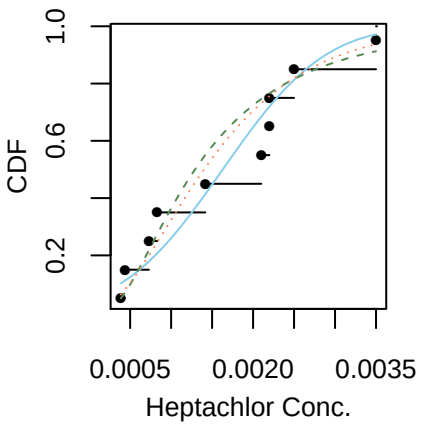
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

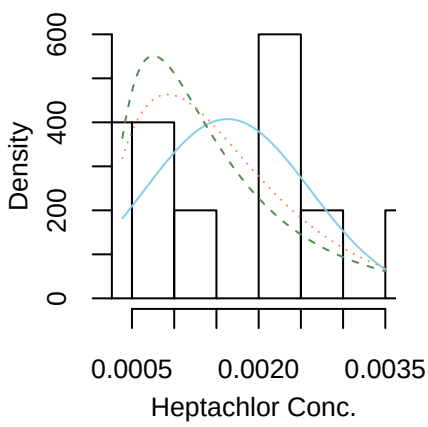


ECDF, Histogram & Q−Q (Detects Only)

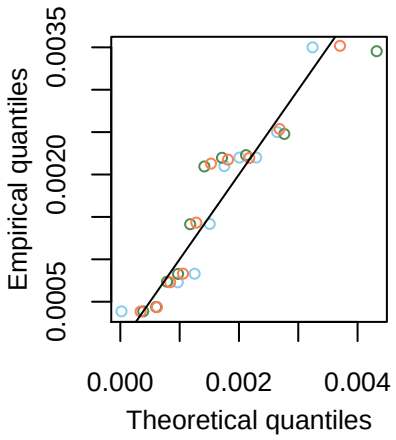
ECDF



Histogram



Q−Q



N = 57	FOD = 18%	Min (detect) = 0.00039 J	Kaplan Meier Mean = 0.00041
N (detect) = 10	SD (log detect) = 0.77	Max (detect) = 0.0035 J	Kaplan Meier SD = 7e−04

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.9e−27	–	–	–	–	−659.014	−654.928
Lognormal	1e−05	3.4e−06	–	–	–	–	−845.7	−841.614
Gamma	–	–	0.2936	0.132	6.864	0.814	−810.412	−806.326

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.39	0.47	–	–	–	–	−106.194	−105.589
Lognormal	0.25	0.12	–	–	–	–	−106.837	−106.232
Gamma	–	–	0.2316	0.27	0.4327	0.736	−107.557	−106.951

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in LBC−Heptachlor

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **308**

Media:
Waterway Sediment (All Samples)

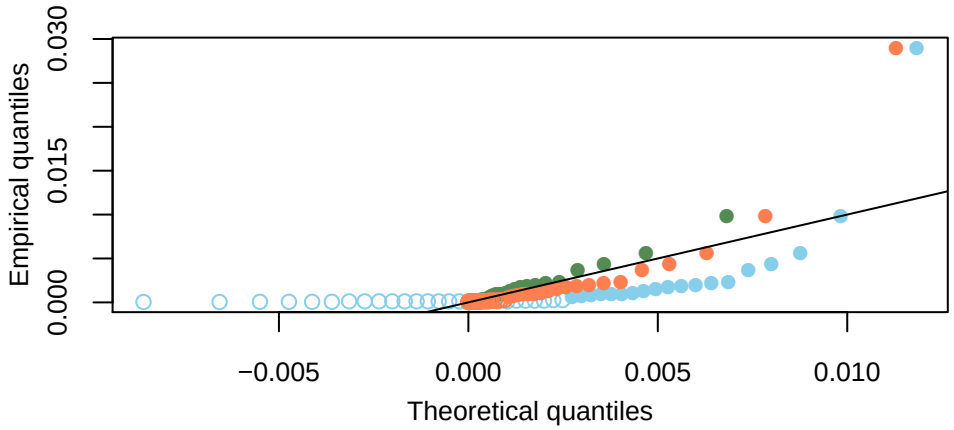
Exposure Unit:
LBC

Chemical (mg/kg):
Heptachlor Epoxide

Legend

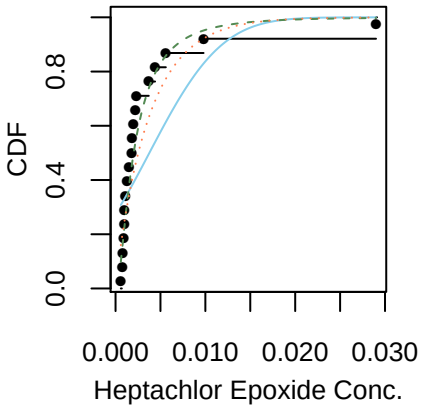
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

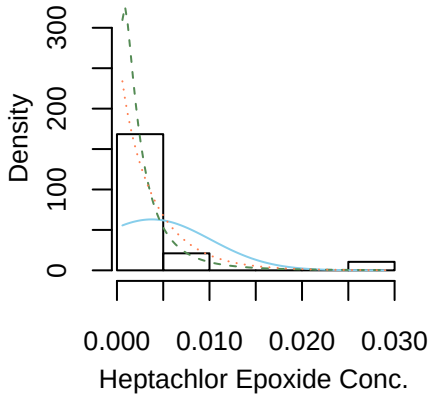


ECDF, Histogram & Q−Q (Detects Only)

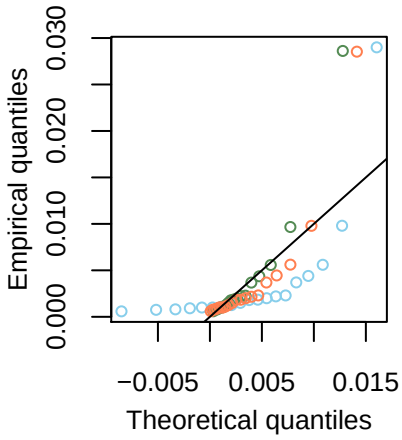
ECDF



Histogram



Q−Q



N = 46	FOD = 41%	Min (detect) = 0.00059 J	Kaplan Meier Mean = 0.0016
N (detect) = 19	SD (log detect) = 0.98	Max (detect) = 0.029 J	Kaplan Meier SD = 0.0044

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	6.8e−17	–	–	–	–	−363.685	−360.027
Lognormal	0.00075	5.7e−06	–	–	–	–	−548.738	−545.081
Gamma	–	–	0.2471	0.1466	3.593	0.9114	−523.471	−519.813

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1e−05	–	–	–	–	−134.434	−132.545
Lognormal	0.047	0.095	–	–	–	–	−179.789	−177.9
Gamma	–	–	0.2681	0.21	1.561	0.803	−170.167	−168.278

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in LBC−Heptachlor Epoxide

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

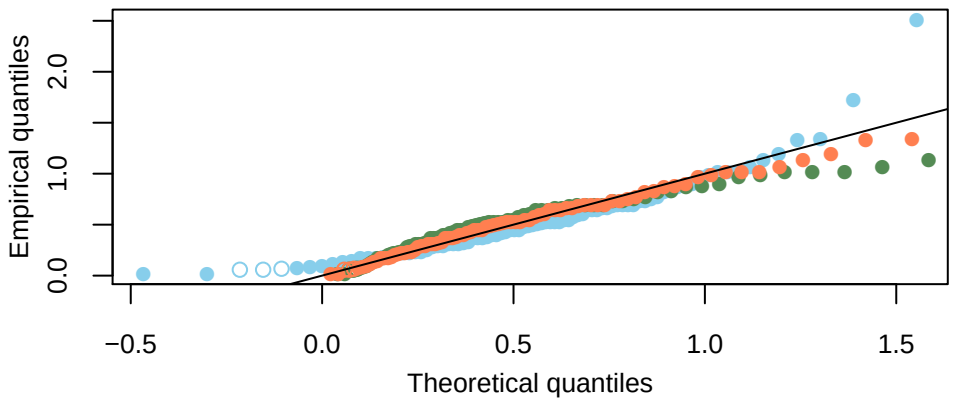
Figure **309**

Media:
Waterway Sediment (All Samples)
Exposure Unit:
LBC
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

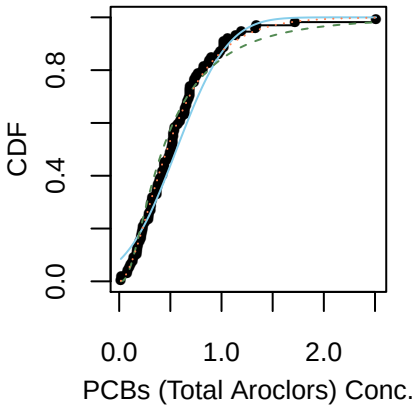
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

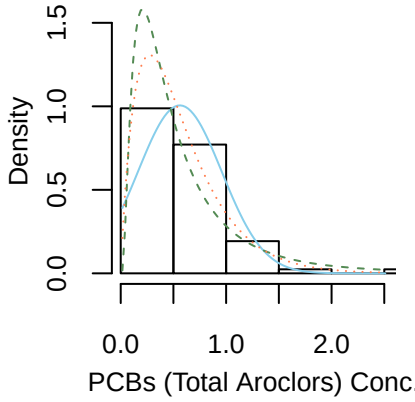


ECDF, Histogram & Q−Q (Detects Only)

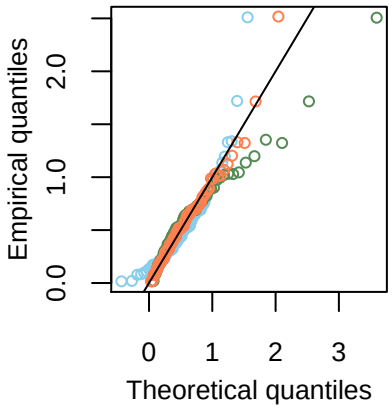
ECDF



Histogram



Q−Q



N = 86	FOD = 97%	Min (detect) = 0.016 J	Kaplan Meier Mean = 0.54
N (detect) = 83	SD (log detect) = 0.86	Max (detect) = 2 J	Kaplan Meier SD = 0.4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.011	–	–	–	–	90.613	95.5216
Lognormal	0.00013	0.0079	–	–	–	–	72.86	77.7687
Gamma	–	–	0.05932	0.103	0.3749	0.782	57.5004	62.4091

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.0065	–	–	–	–	86.0672	90.9049
Lognormal	6e−05	0.028	–	–	–	–	70.7706	75.6083
Gamma	–	–	0.05144	0.103	0.3081	0.782	55.7819	60.6196

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in LBC−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **310**

Media:
Waterway Sediment (All Samples)
Exposure Unit:
LBC
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 59	FOD = 2%	Min (detect) = 0.0031 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0031 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in LBC−Trichloroethene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **311**

Media:
Waterway Sediment (All Samples)

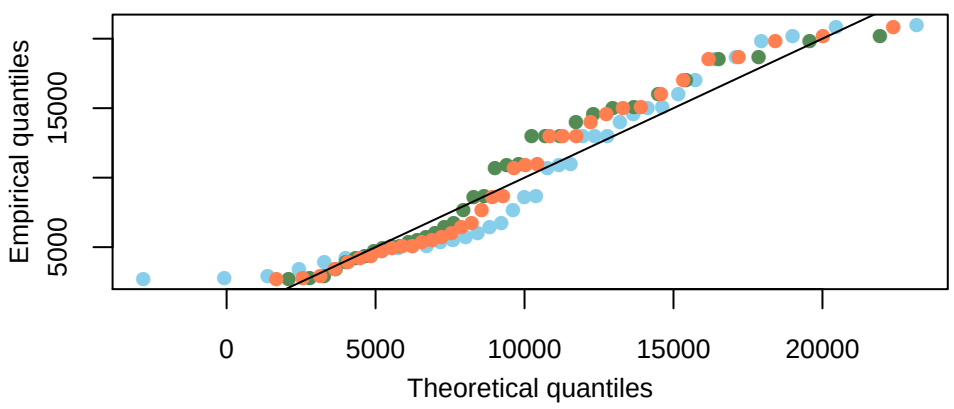
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Aluminum

Legend

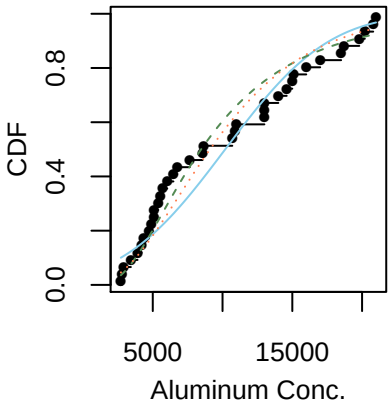
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

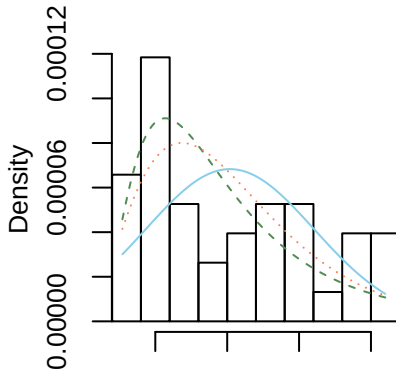


ECDF, Histogram & Q−Q (Detects Only)

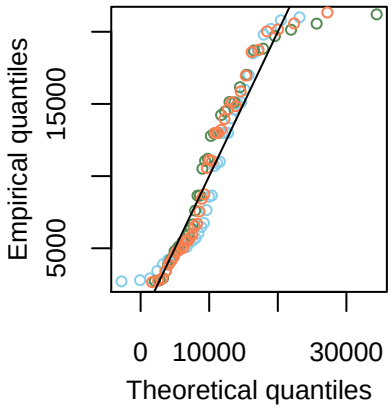
ECDF



Histogram



Q−Q



N = 38	FOD = 100%	Min (detect) = 2,700	Arithmetic Mean = 10,000
N (detect) = 38	SD (log detect) = 0.64	Max (detect) = 21,000 J	Arithmetic SD = 5,900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0037	0.0093	–	–	–	–	770.981	774.257
Lognormal	0.028	0.047	–	–	–	–	764.205	767.48
Gamma	–	–	0.1338	0.151	0.9838	0.76	763.815	767.09

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Reference Sites−Aluminum

Media:
Waterway Sediment (All Samples)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 38	FOD = 5%	Min (detect) = 0.5 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 2 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Reference Sites−Antimony

Media:
Waterway Sediment (All Samples)

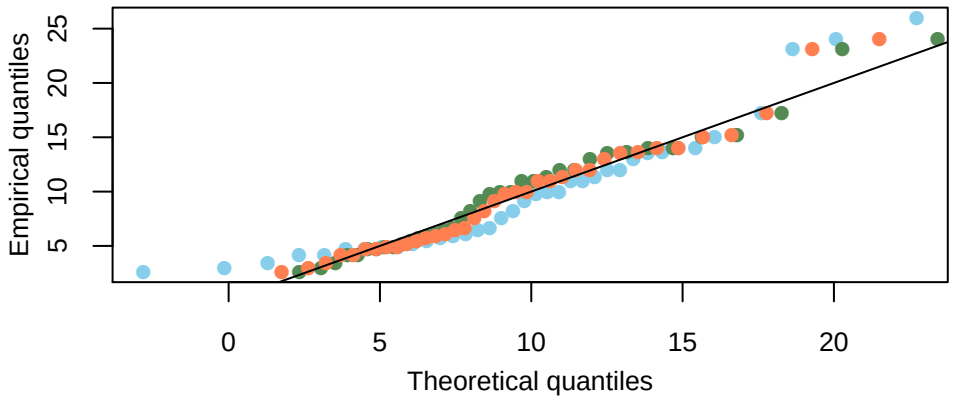
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Arsenic

Legend

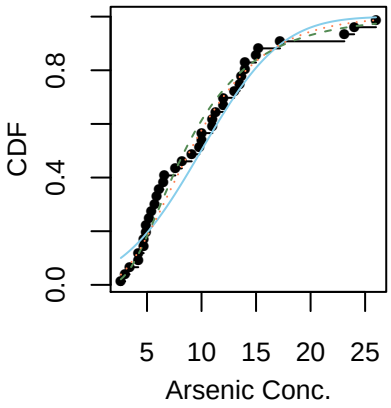
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

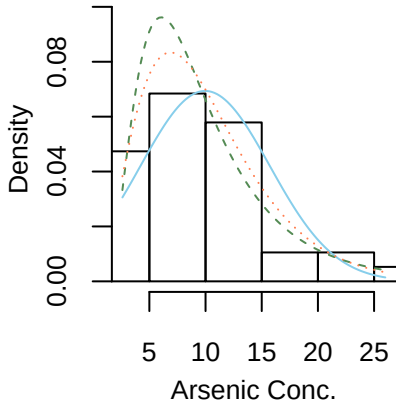


ECDF, Histogram & Q−Q (Detects Only)

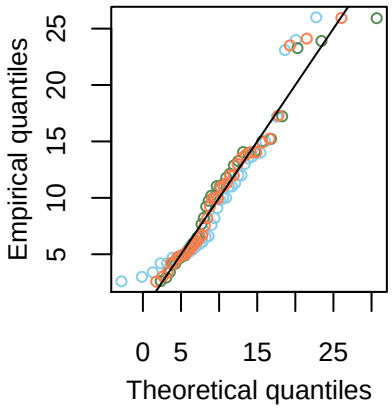
ECDF



Histogram



Q−Q



N = 38	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 10
N (detect) = 38	SD (log detect) = 0.59	Max (detect) = 26 J	Arithmetic SD = 5

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0022	0.061	–	–	–	–	244.794	248.069
Lognormal	0.51	0.47	–	–	–	–	232.708	235.983
Gamma	–	–	0.1124	0.151	0.4305	0.76	233.597	236.872

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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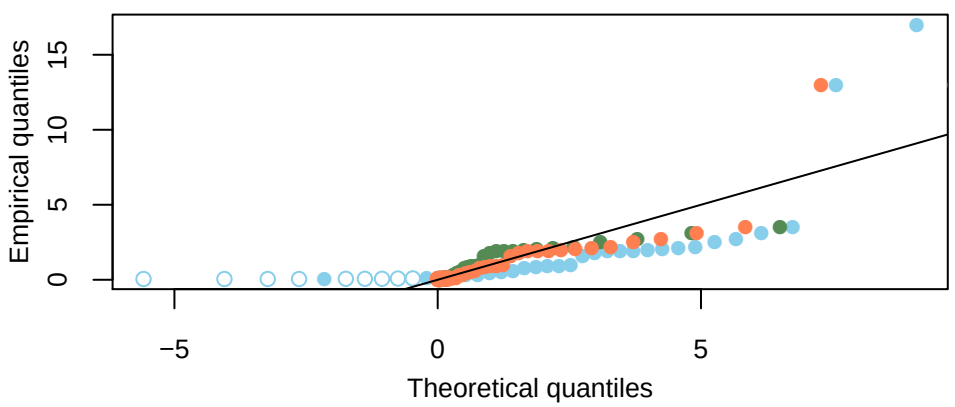
Distribution: Waterway Sediment (All Samples) in Reference Sites−Arsenic

Media:
Waterway Sediment (All Samples)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Cadmium

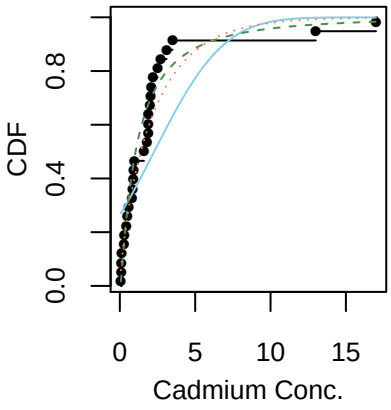
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

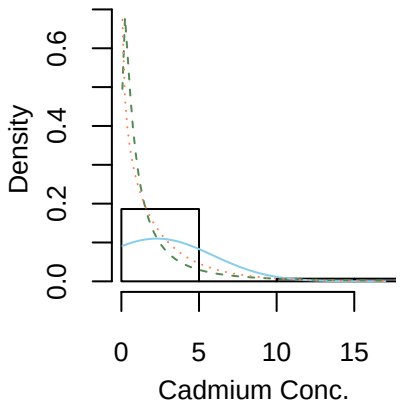


ECDF, Histogram & Q−Q (Detects Only)

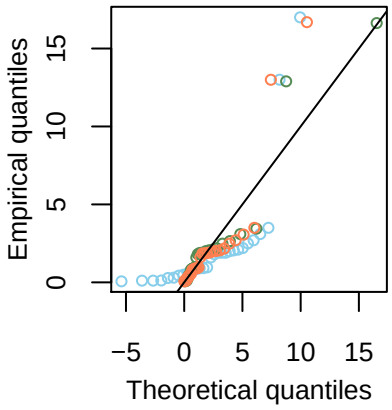
ECDF



Histogram



Q−Q



N = 38	FOD = 76%	Min (detect) = 0.065 J	Kaplan Meier Mean = 1
N (detect) = 29	SD (log detect) = 1.3	Max (detect) = 17 J	Kaplan Meier SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	9.8e−10	–	–	–	–	202.704	205.979
Lognormal	0.0067	0.021	–	–	–	–	102.643	105.918
Gamma	–	–	0.1502	0.157	1.28	0.812	109.386	112.661

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	4.5e−08	–	–	–	–	161.021	163.755
Lognormal	0.18	0.13	–	–	–	–	104.177	106.911
Gamma	–	–	0.159	0.184	0.9574	0.807	108.262	110.997

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Reference Sites−Cadmium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **315**

Media:
Waterway Sediment (All Samples)

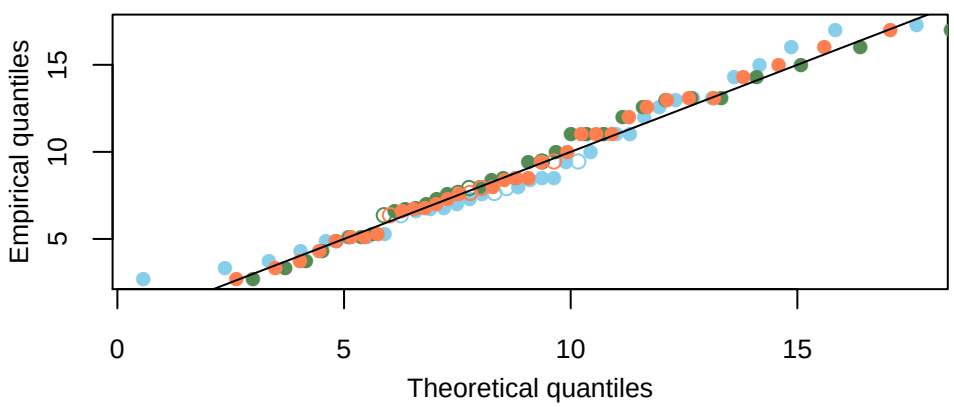
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Cobalt

Legend

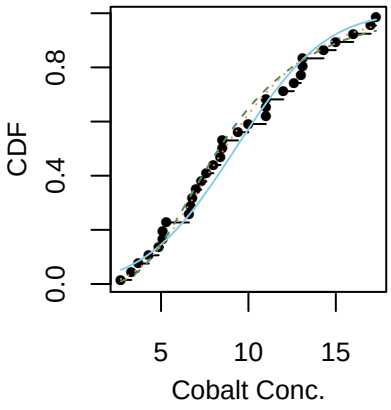
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

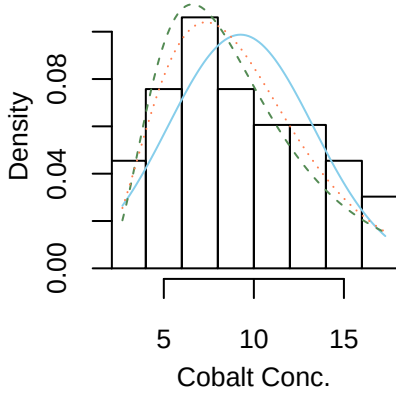


ECDF, Histogram & Q−Q (Detects Only)

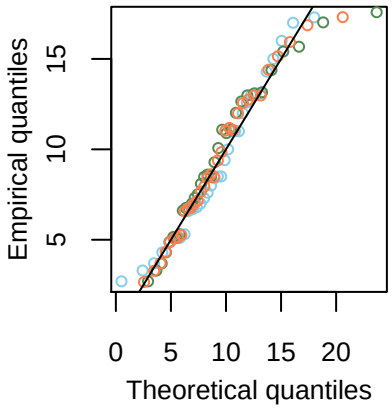
ECDF



Histogram



Q−Q



N = 38	FOD = 87%	Min (detect) = 2 J	Kaplan Meier Mean = 9
N (detect) = 33	SD (log detect) = 0.49	Max (detect) = 17 J	Kaplan Meier SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.23	0.12	–	–	–	–	208.907	212.129
Lognormal	0.46	0.76	–	–	–	–	207.589	210.811
Gamma	–	–	0.07408	0.149	0.1944	0.75	206.091	209.313

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.28	0.28	–	–	–	–	189.805	192.798
Lognormal	0.31	0.4	–	–	–	–	189.436	192.429
Gamma	–	–	0.09928	0.162	0.2547	0.758	187.81	190.803

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Reference Sites−Cobalt

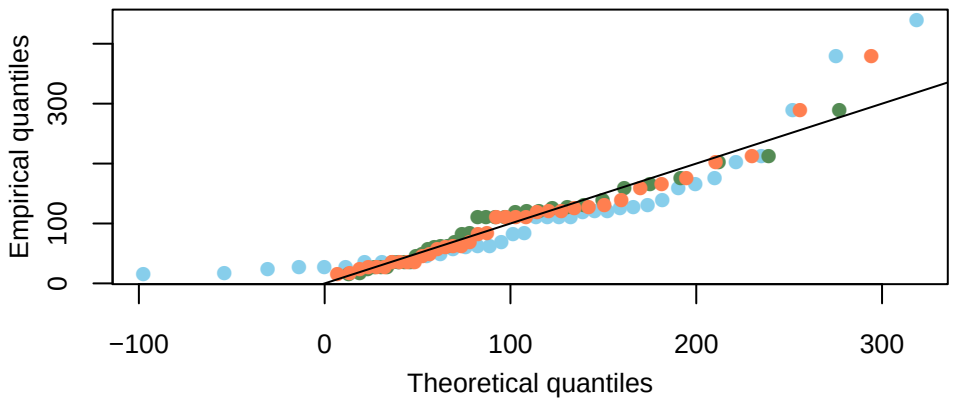
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **316**

Media:
Waterway Sediment (All Samples)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Copper

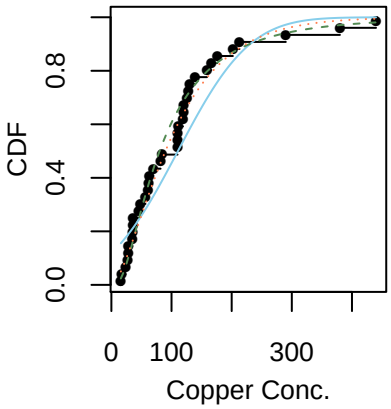
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

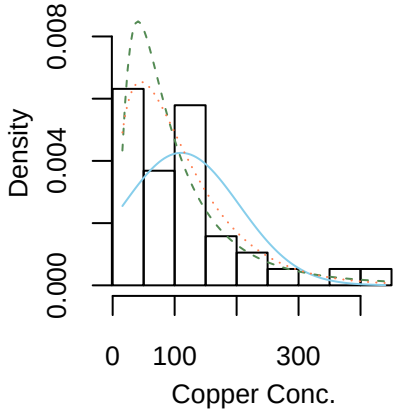


ECDF, Histogram & Q−Q (Detects Only)

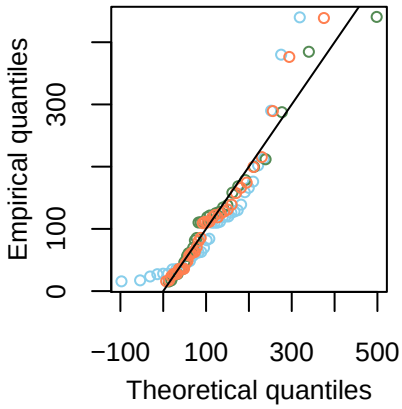
ECDF



Histogram



Q−Q



N = 38	FOD = 100%	Min (detect) = 16	Arithmetic Mean = 110
N (detect) = 38	SD (log detect) = 0.83	Max (detect) = 440 J	Arithmetic SD = 95

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.0026	–	–	–	–	456.871	460.146
Lognormal	0.56	0.035	–	–	–	–	430.166	433.441
Gamma	–	–	0.09901	0.153	0.4374	0.776	432.17	435.445

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Reference Sites−Copper

Media:
Waterway Sediment (All Samples)

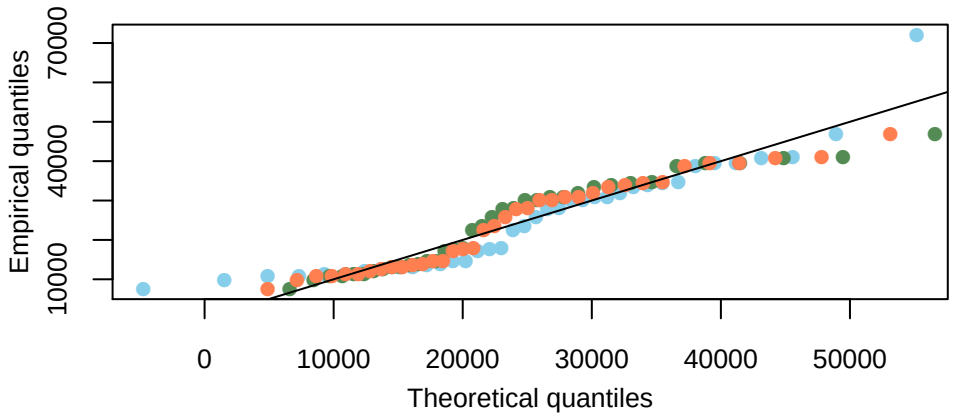
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Iron

Legend

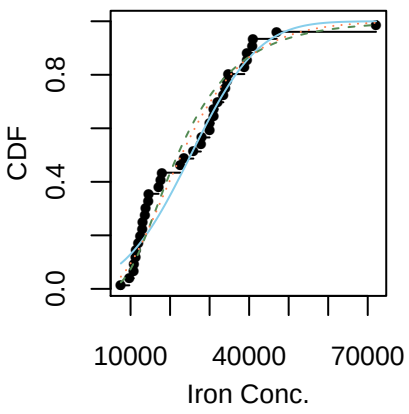
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

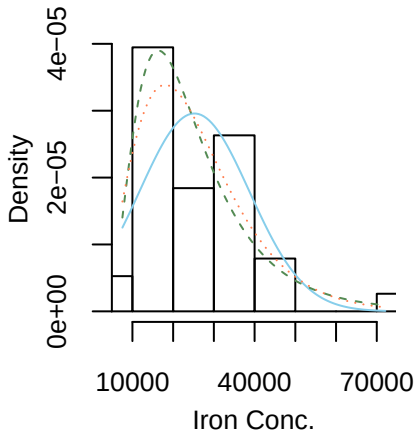


ECDF, Histogram & Q−Q (Detects Only)

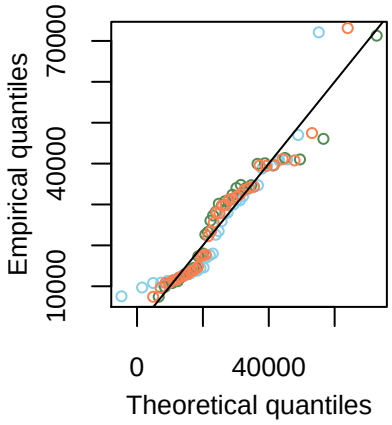
ECDF



Histogram



Q−Q



N = 38	FOD = 100%	Min (detect) = 7,500 J	Arithmetic Mean = 25,000
N (detect) = 38	SD (log detect) = 0.55	Max (detect) = 72,000 J	Arithmetic SD = 14,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0018	0.031	–	–	–	–	834.547	837.822
Lognormal	0.07	0.05	–	–	–	–	824.633	827.908
Gamma	–	–	0.1423	0.151	0.8393	0.76	825.314	828.59

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Reference Sites−Iron

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **318**

Media:
Waterway Sediment (All Samples)

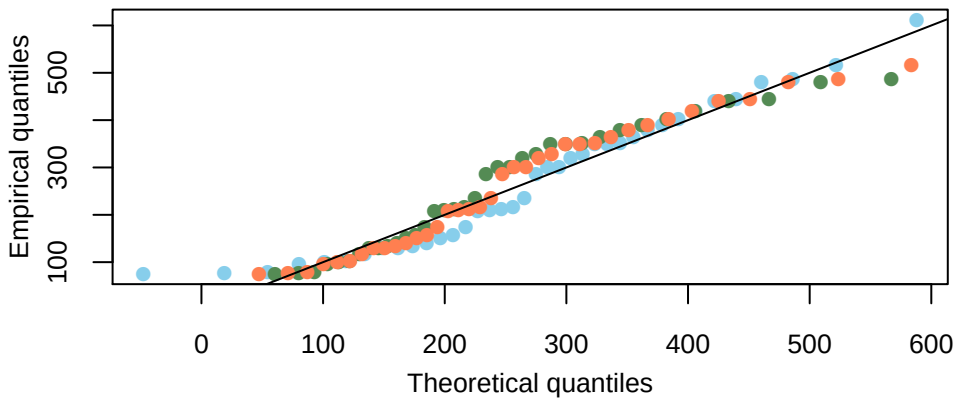
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Manganese

Legend

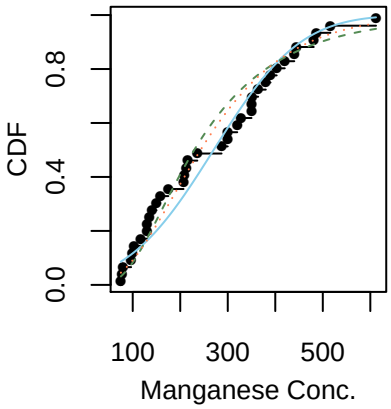
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

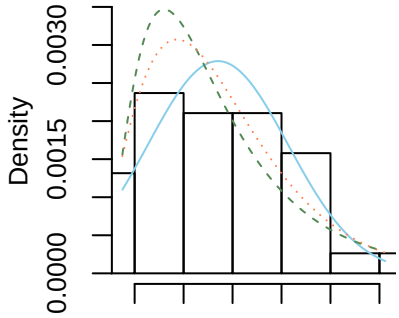


ECDF, Histogram & Q−Q (Detects Only)

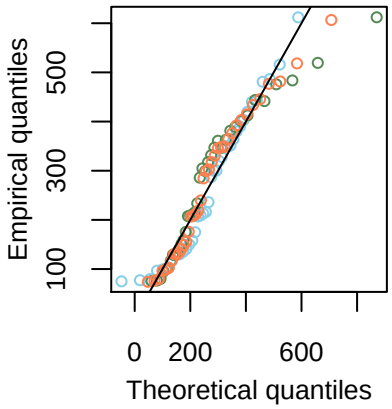
ECDF



Histogram



Q−Q



N = 38	FOD = 100%	Min (detect) = 75 J	Arithmetic Mean = 270
N (detect) = 38	SD (log detect) = 0.61	Max (detect) = 610 J	Arithmetic SD = 150

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.052	0.16	–	–	–	–	489.061	492.336
Lognormal	0.039	0.046	–	–	–	–	486.154	489.429
Gamma	–	–	0.1203	0.151	0.6778	0.76	484.505	487.78

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Reference Sites−Manganese

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **319**

Media:
Waterway Sediment (All Samples)

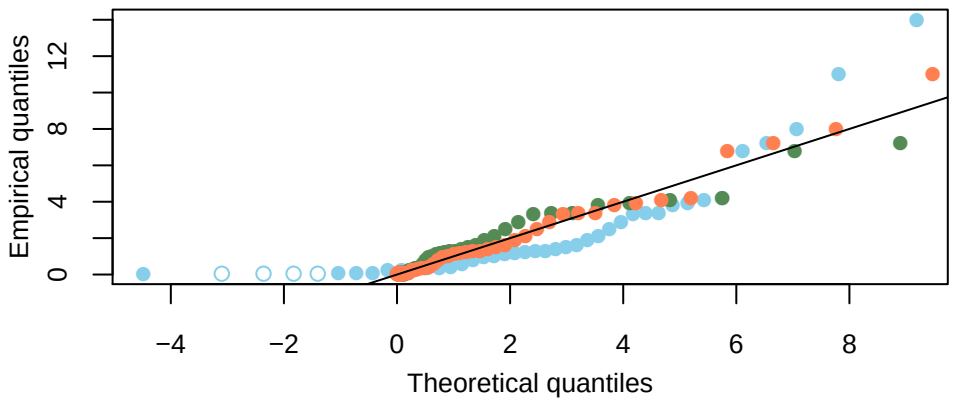
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Mercury

Legend

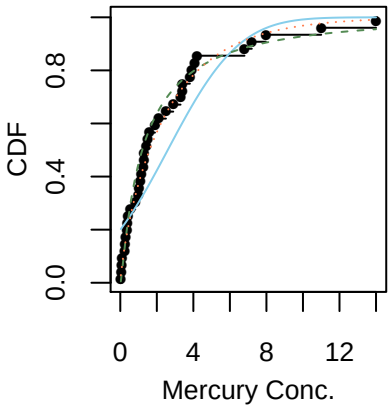
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

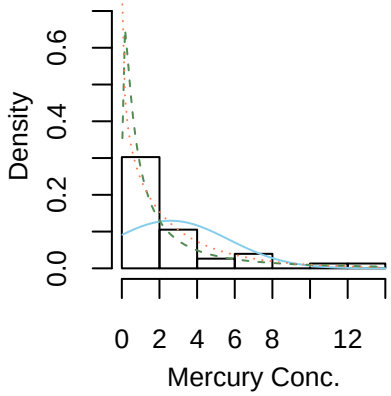


ECDF, Histogram & Q−Q (Detects Only)

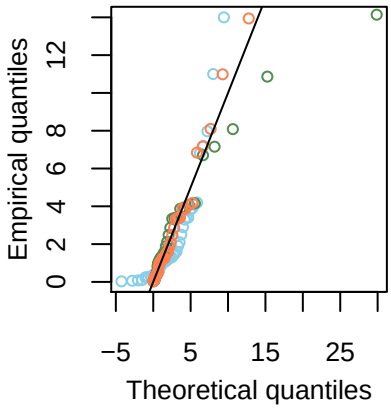
ECDF



Histogram



Q−Q



N = 42	FOD = 90%	Min (detect) = 0.03 J	Kaplan Meier Mean = 2
N (detect) = 38	SD (log detect) = 1.5	Max (detect) = 14 J	Kaplan Meier SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.4e−05	–	–	–	–	216.182	219.657
Lognormal	0.022	0.03	–	–	–	–	155.932	159.408
Gamma	–	–	0.08035	0.148	0.3524	0.813	152.587	156.062

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00032	–	–	–	–	197.376	200.652
Lognormal	0.17	0.12	–	–	–	–	153.876	157.151
Gamma	–	–	0.07899	0.157	0.2198	0.812	150.742	154.018

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Reference Sites−Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **320**

Media:
Waterway Sediment (All Samples)

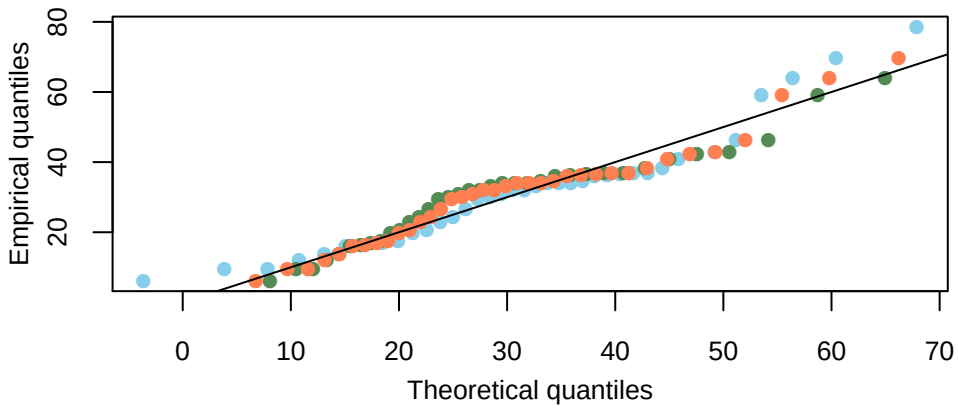
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Nickel

Legend

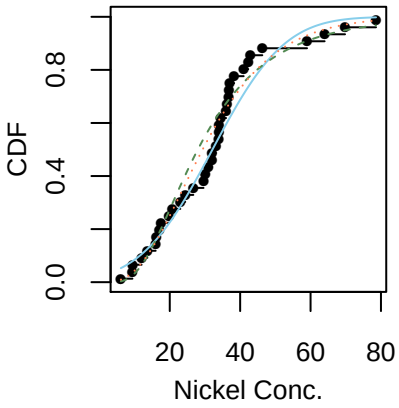
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

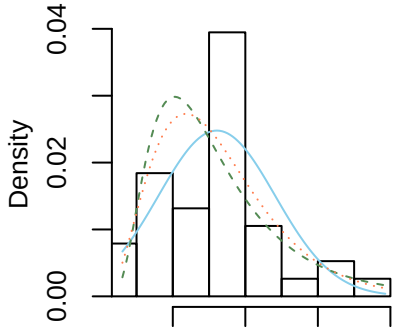


ECDF, Histogram & Q−Q (Detects Only)

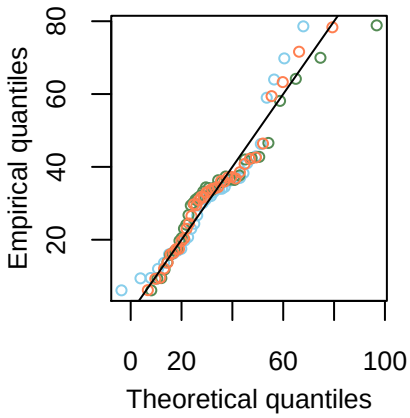
ECDF



Histogram



Q−Q



N = 38	FOD = 100%	Min (detect) = 6 J	Arithmetic Mean = 32
N (detect) = 38	SD (log detect) = 0.57	Max (detect) = 79	Arithmetic SD = 16

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.02	0.04	–	–	–	–	323.013	326.288
Lognormal	0.081	0.0066	–	–	–	–	320.755	324.03
Gamma	–	–	0.1382	0.151	0.588	0.76	317.96	321.235

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Reference Sites−Nickel

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **321**

Media:
Waterway Sediment (All Samples)

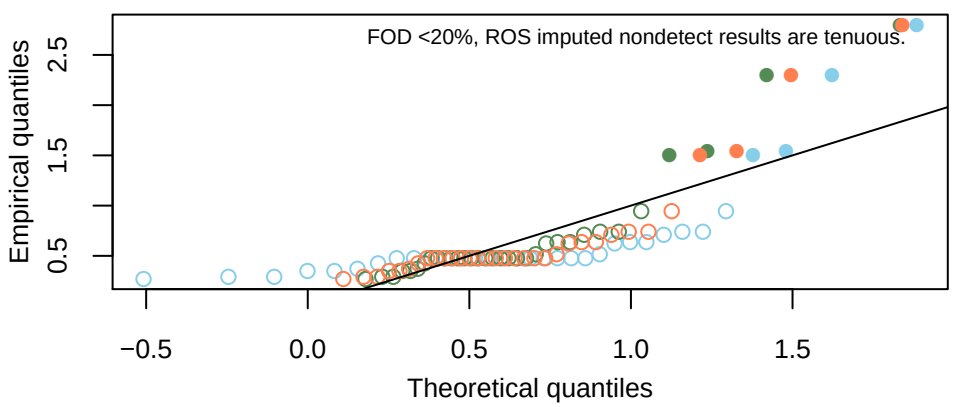
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Thallium

Legend

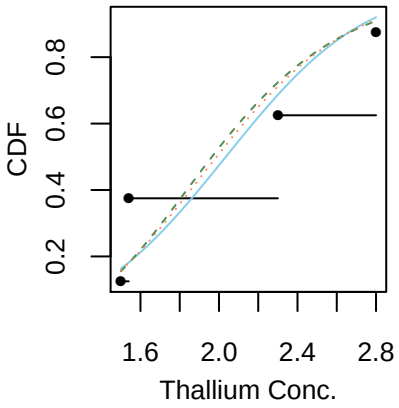
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

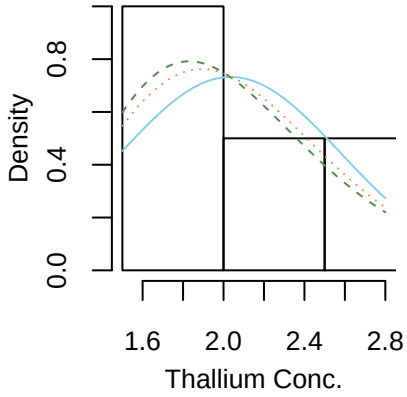


ECDF, Histogram & Q−Q (Detects Only)

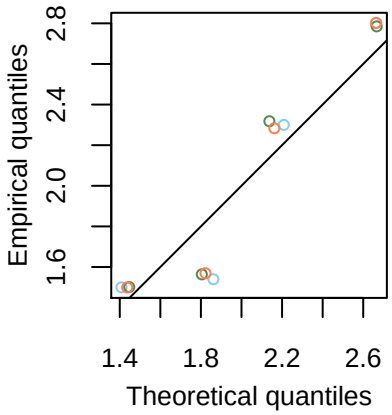
ECDF



Histogram



Q−Q



N = 38	FOD = 11%	Min (detect) = 1	Kaplan Meier Mean = 0.78
N (detect) = 4	SD (log detect) = 0.31	Max (detect) = 2 J	Kaplan Meier SD = 0.52

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.7e−09	–	–	–	–	58.4712	61.4642
Lognormal	0.00011	2.2e−06	–	–	–	–	19.8302	22.8232
Gamma	–	–	0.2849	0.162	3.281	0.758	29.9261	32.9192

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.32	N<5	–	–	–	–	10.491	9.26362
Lognormal	0.3	N<5	–	–	–	–	10.1495	8.92208
Gamma	–	–	NA	NA	NA	NA	10.2237	8.9963

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Reference Sites−Thallium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **322**

Media:
Waterway Sediment (All Samples)

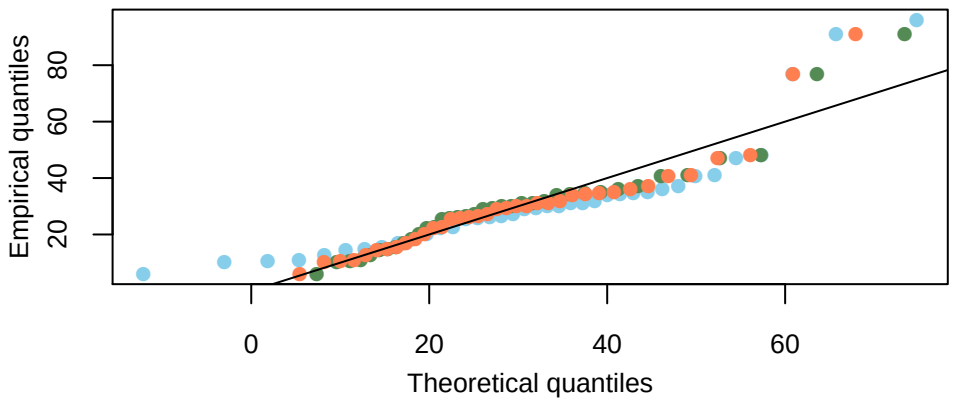
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Vanadium

Legend

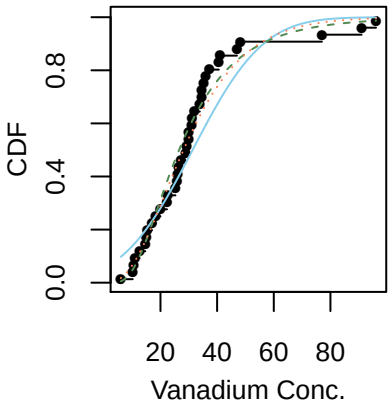
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

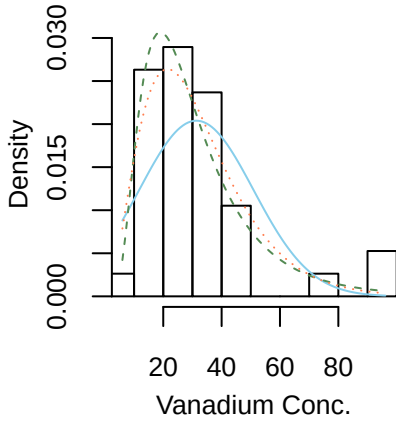


ECDF, Histogram & Q−Q (Detects Only)

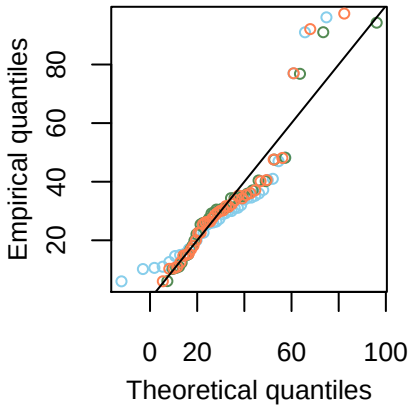
ECDF



Histogram



Q−Q



N = 38	FOD = 100%	Min (detect) = 6 J	Arithmetic Mean = 31
N (detect) = 38	SD (log detect) = 0.59	Max (detect) = 96 J	Arithmetic SD = 20

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.00055	–	–	–	–	337.827	341.102
Lognormal	0.34	0.14	–	–	–	–	319.535	322.811
Gamma	–	–	0.1244	0.151	0.6748	0.76	321.095	324.37

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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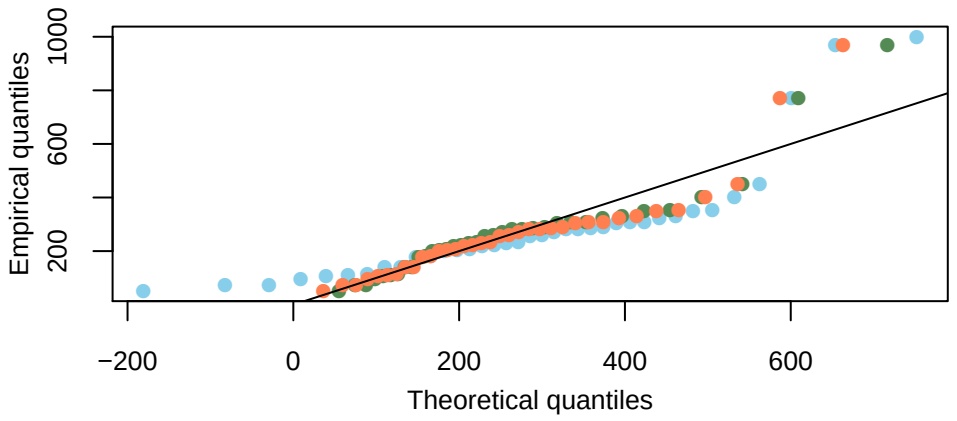
Distribution: Waterway Sediment (All Samples) in Reference Sites−Vanadium

Media:
Waterway Sediment (All Samples)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Zinc

Legend

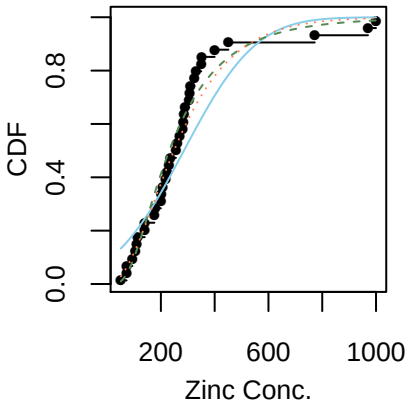
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

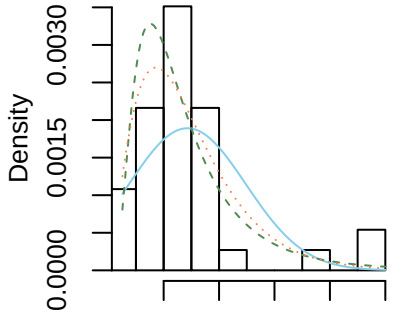


ECDF, Histogram & Q−Q (Detects Only)

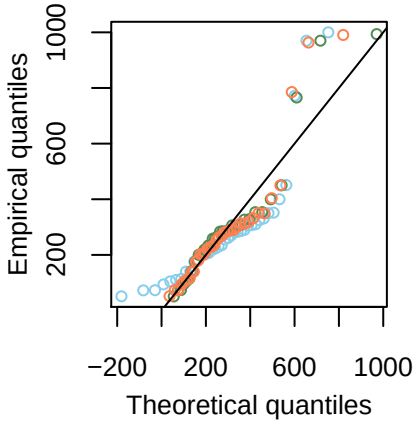
ECDF



Histogram



Q−Q



N = 37	FOD = 100%	Min (detect) = 51 J	Arithmetic Mean = 290
N (detect) = 37	SD (log detect) = 0.66	Max (detect) = 1,000 J	Arithmetic SD = 210

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.4e−06	–	–	–	–	505.02	508.242
Lognormal	0.2	0.15	–	–	–	–	479.757	482.978
Gamma	–	–	0.1558	0.151	0.8805	0.76	482.619	485.84

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Waterway Sediment (All Samples) in Reference Sites−Zinc

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **324**

Media:
Waterway Sediment (All Samples)

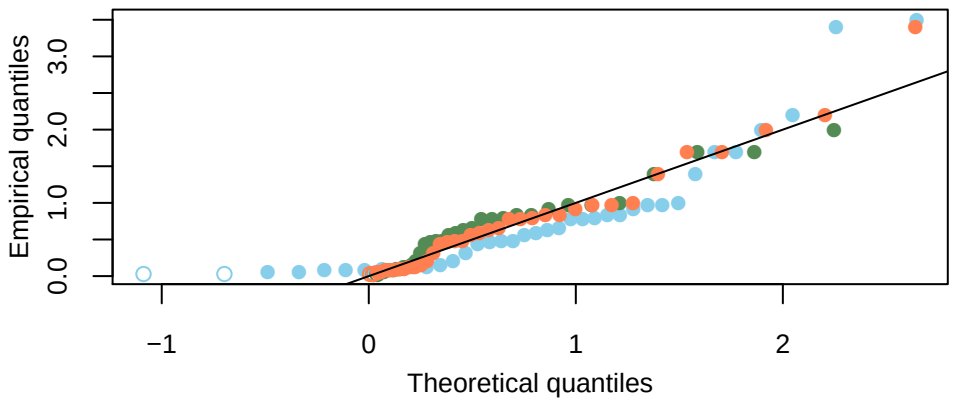
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Benzo[a]pyrene

Legend

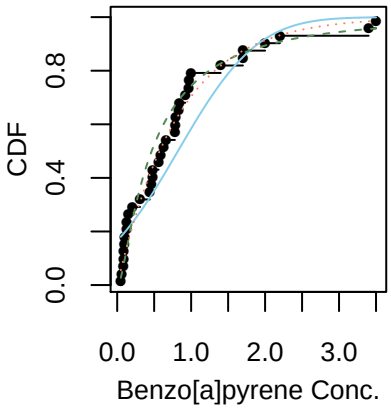
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

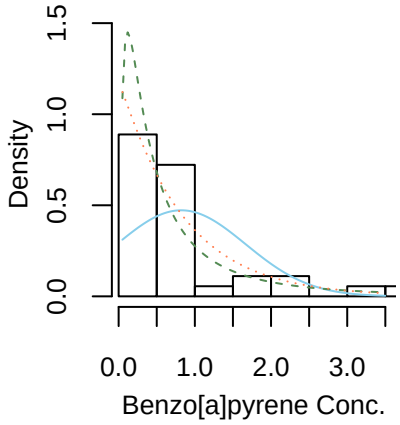


ECDF, Histogram & Q−Q (Detects Only)

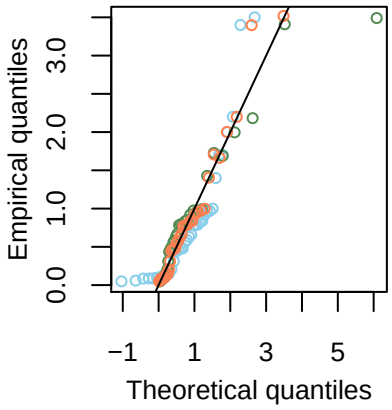
ECDF



Histogram



Q−Q



N = 38	FOD = 95%	Min (detect) = 0.049 J	Kaplan Meier Mean = 0.78
N (detect) = 36	SD (log detect) = 1.2	Max (detect) = 3 J	Kaplan Meier SD = 0.84

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	0.00014	–	–	–	–	98.6508	101.926
Lognormal	0.065	0.017	–	–	–	–	62.3312	65.6064
Gamma	–	–	0.1144	0.157	0.4982	0.812	60.7054	63.9805

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	9.4e−05	–	–	–	–	93.9843	97.1513
Lognormal	0.064	0.047	–	–	–	–	62.3432	65.5102
Gamma	–	–	0.1143	0.153	0.5307	0.776	61.825	64.9921

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Reference Sites−Benzo[a]pyrene

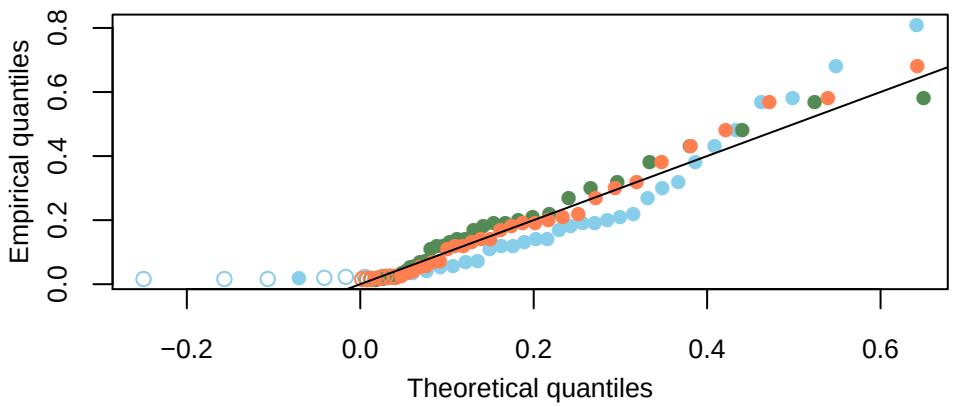
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **325**

Media:
Waterway Sediment (All Samples)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Dibenz[a,h]anthracene

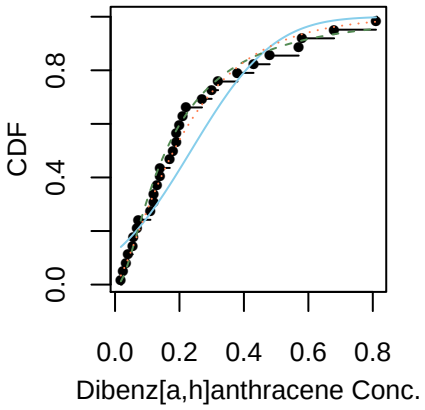
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

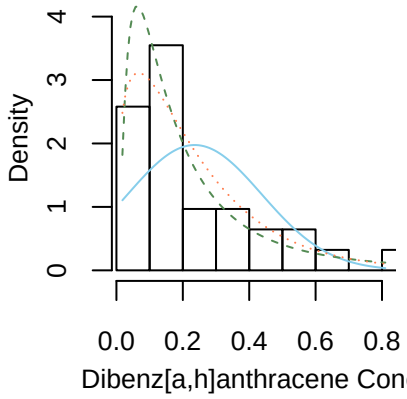


ECDF, Histogram & Q−Q (Detects Only)

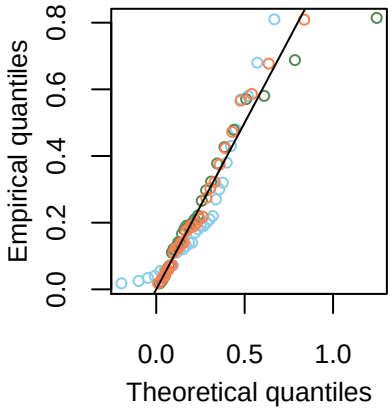
ECDF



Histogram



Q−Q



N = 38	FOD = 82%	Min (detect) = 0.018 J	Kaplan Meier Mean = 0.19
N (detect) = 31	SD (log detect) = 0.98	Max (detect) = 0.81 J	Kaplan Meier SD = 0.2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	3e−05	0.0014	–	–	–	–	−10.2034	−6.92827
Lognormal	0.032	0.16	–	–	–	–	−44.289	−41.0138
Gamma	–	–	0.11	0.157	0.5603	0.812	−43.8984	−40.6232

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00079	0.0015	–	–	–	–	−7.21285	−4.34487
Lognormal	0.61	0.61	–	–	–	–	−24.649	−21.781
Gamma	–	–	0.09576	0.165	0.2173	0.775	−25.4775	−22.6095

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Reference Sites−Dibenz[a,h]anthracene

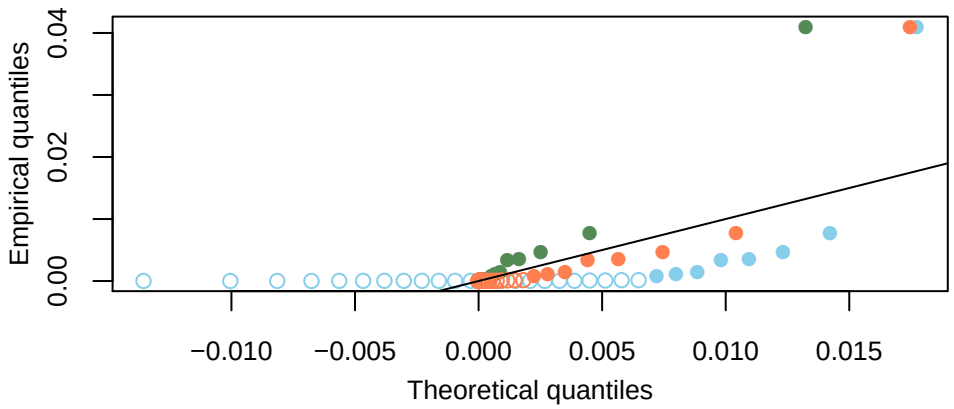
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **326**

Media:
Waterway Sediment (All Samples)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Aldrin

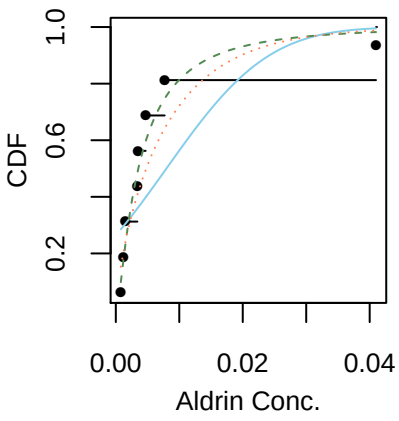
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

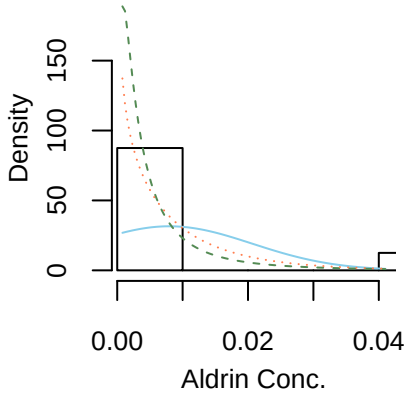


ECDF, Histogram & Q−Q (Detects Only)

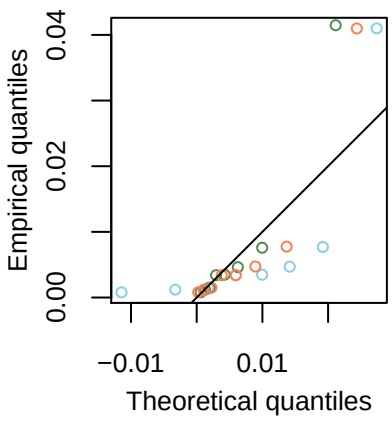
ECDF



Histogram



Q−Q



N = 31	FOD = 26%	Min (detect) = 0.00079 J	Kaplan Meier Mean = 0.0021
N (detect) = 8	SD (log detect) = 1.2	Max (detect) = 0.041 J	Kaplan Meier SD = 0.0073

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.4e−13	–	–	–	–	−212.999	−210.131
Lognormal	0.00017	3.8e−07	–	–	–	–	−423.994	−421.126
Gamma	–	–	NA	NA	NA	NA	−399.409	−396.541

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	6e−05	0.001	–	–	–	–	−43.2069	−43.0481
Lognormal	0.53	0.79	–	–	–	–	−61.138	−60.9791
Gamma	–	–	0.2555	0.309	0.6931	0.762	−57.8476	−57.6888

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Reference Sites−Aldrin

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **327**

Media:
Waterway Sediment (All Samples)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 21	FOD = 5%	Min (detect) = 0.0012 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0012 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Reference Sites−Heptachlor

Media:
Waterway Sediment (All Samples)

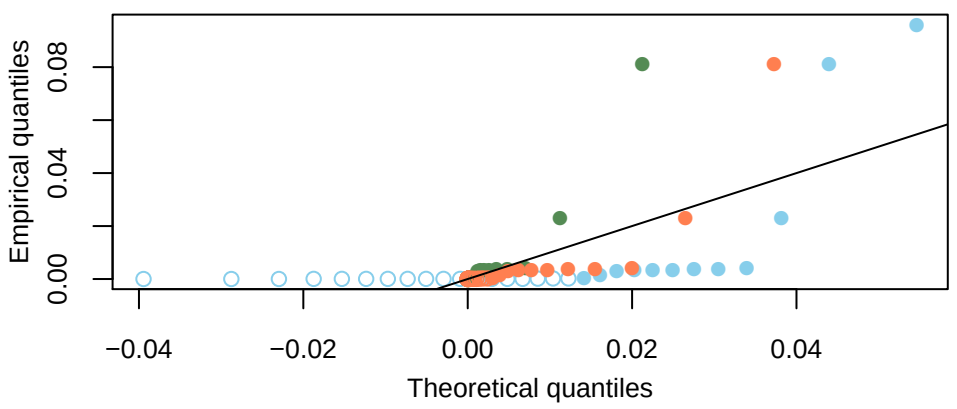
Exposure Unit:
Reference Sites

Chemical (mg/kg):
Heptachlor Epoxide

Legend

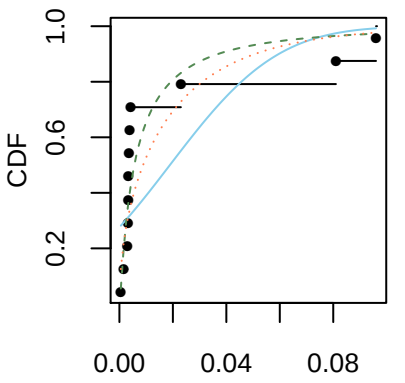
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

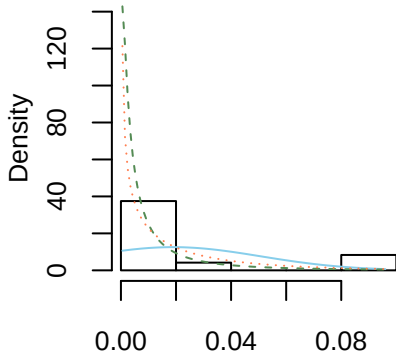


ECDF, Histogram & Q−Q (Detects Only)

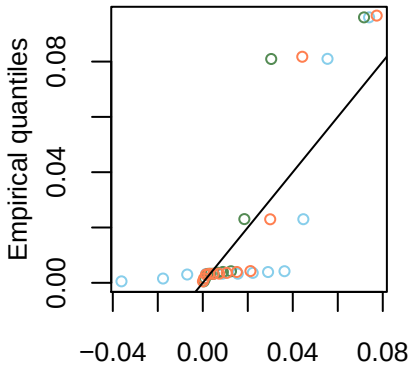
ECDF



Histogram



Q−Q



N = 30	FOD = 40%	Min (detect) = 0.00053 J	Kaplan Meier Mean = 0.0076
N (detect) = 12	SD (log detect) = 1.5	Max (detect) = 0.096 J	Kaplan Meier SD = 0.022

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.2e−18	–	–	–	–	−139.574	−136.772
Lognormal	0.0016	2.1e−05	–	–	–	–	−329.173	−326.371
Gamma	–	–	0.2634	0.1775	3.309	0.9039	−310.01	−307.208

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	7e−05	1.8e−06	–	–	–	–	−44.7216	−43.7518
Lognormal	0.034	0.0011	–	–	–	–	−77.1671	−76.1973
Gamma	–	–	0.3958	0.281	1.569	0.777	−71.8633	−70.8935

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Reference Sites−Heptachlor Epoxide

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **329**

Media:
Waterway Sediment (All Samples)

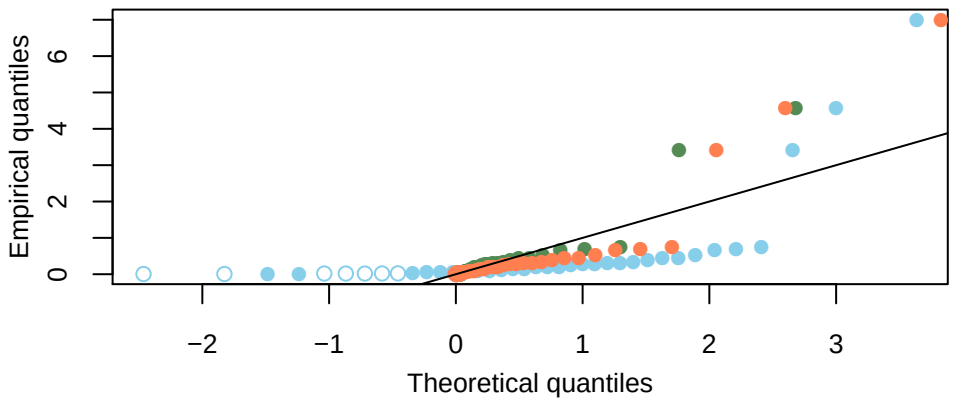
Exposure Unit:
Reference Sites

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

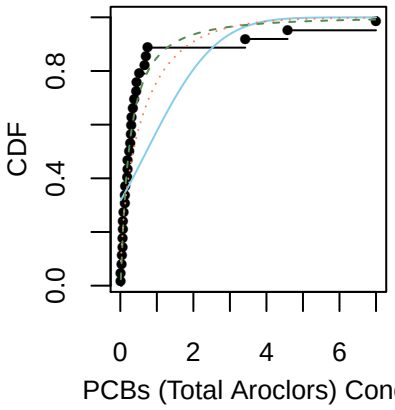
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

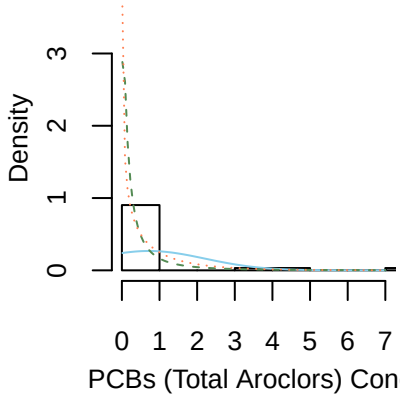


ECDF, Histogram & Q−Q (Detects Only)

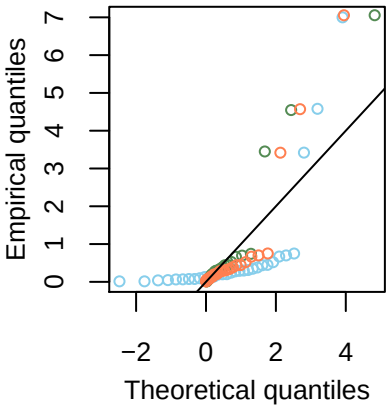
ECDF



Histogram



Q−Q



N = 38	FOD = 82%	Min (detect) = 0.014 J	Kaplan Meier Mean = 0.59
N (detect) = 31	SD (log detect) = 1.4	Max (detect) = 7 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	5.6e−15	–	–	–	–	135.941	139.216
Lognormal	0.4	0.69	–	–	–	–	1.02423	4.29941
Gamma	–	–	0.183	0.1651	1.962	0.9073	15.8268	19.1019

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.1e−13	–	–	–	–	116.716	119.584
Lognormal	0.34	0.45	–	–	–	–	22.5252	25.3931
Gamma	–	–	0.2162	0.169	2.085	0.809	35.7262	38.5941

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Waterway Sediment (All Samples) in Reference Sites−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **330**

Media:
Waterway Sediment (All Samples)
Exposure Unit:
Reference Sites
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 26	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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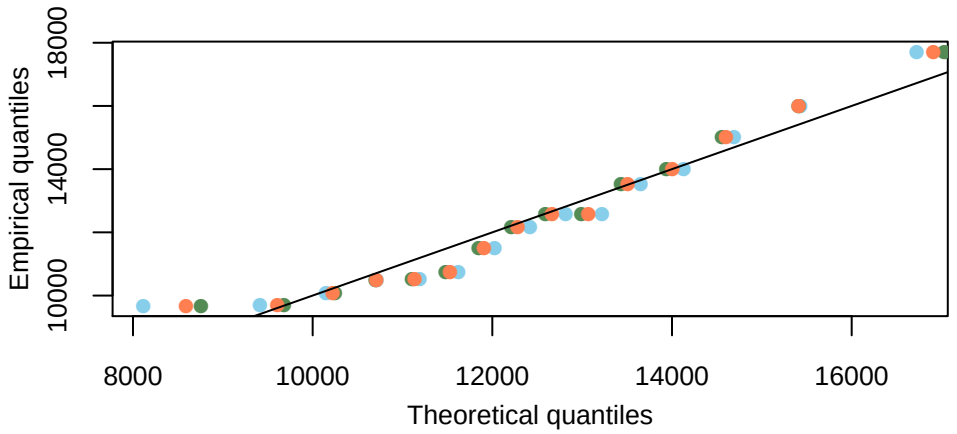
Distribution: Waterway Sediment (All Samples) in Reference Sites−Trichloroethene

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Aluminum

Legend

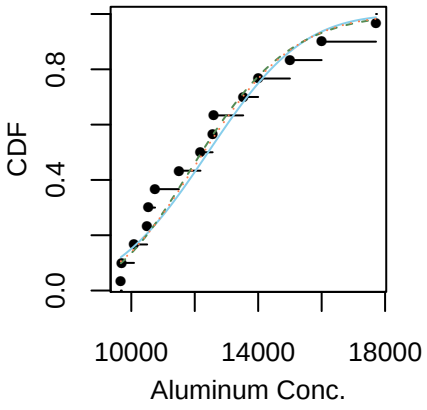
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

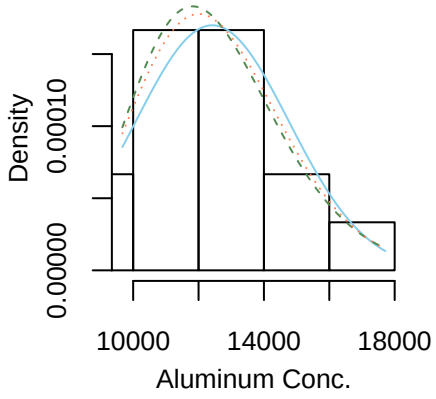


ECDF, Histogram & Q−Q (Detects Only)

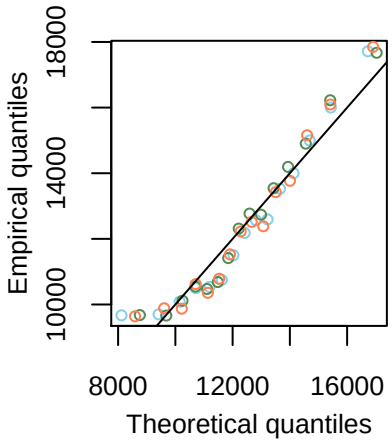
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 9,700 J	Arithmetic Mean = 12,000
N (detect) = 15	SD (log detect) = 0.19	Max (detect) = 18,000 J	Arithmetic SD = 2,400

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.2	0.44	–	–	–	–	279.394	280.81
Lognormal	0.42	0.46	–	–	–	–	277.652	279.069
Gamma	–	–	0.1607	0.221	0.3539	0.735	278.124	279.54

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Aluminum

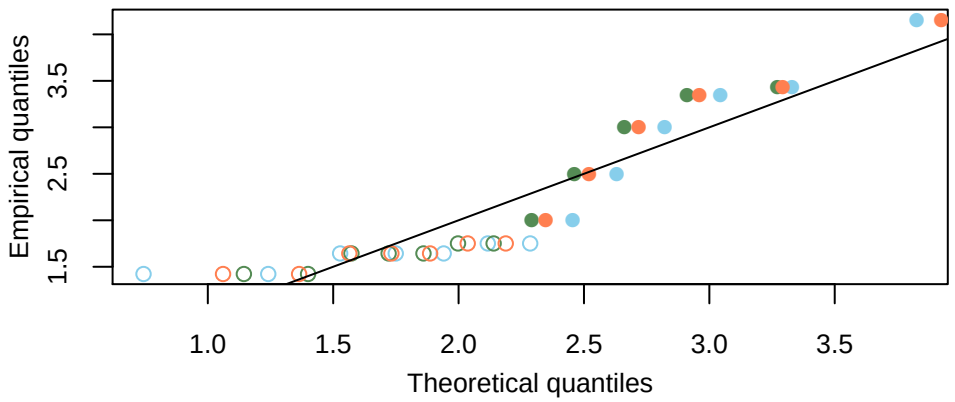
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **332**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Antimony

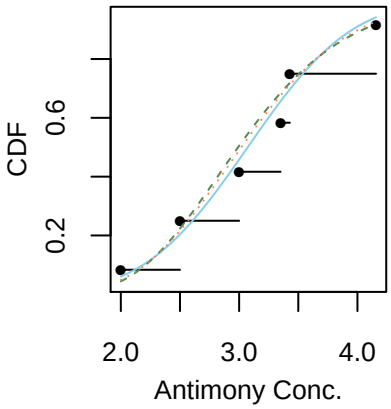
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

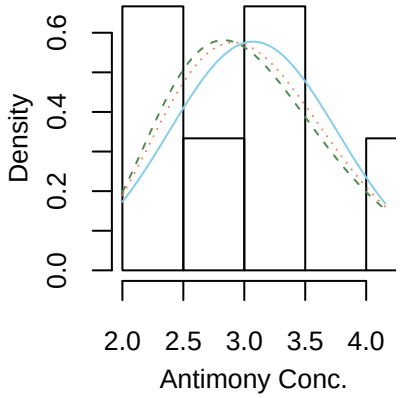


ECDF, Histogram & Q−Q (Detects Only)

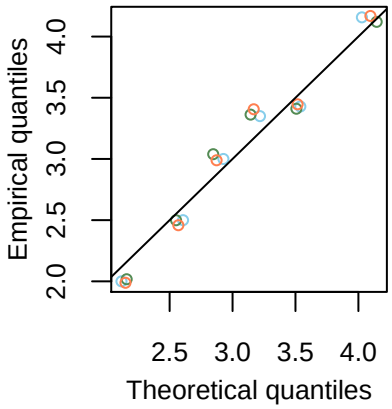
ECDF



Histogram



Q−Q



N = 15	FOD = 40%	Min (detect) = 2 J	Kaplan Meier Mean = 2
N (detect) = 6	SD (log detect) = 0.26	Max (detect) = 4 J	Kaplan Meier SD = 0.91

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.022	0.016	–	–	–	–	37.3235	38.4534
Lognormal	0.063	0.031	–	–	–	–	33.6796	34.8095
Gamma	–	–	NA	NA	NA	NA	34.6109	35.7408

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.97	0.93	–	–	–	–	16.589	16.1725
Lognormal	0.88	0.84	–	–	–	–	16.8453	16.4288
Gamma	–	–	NA	NA	NA	NA	16.6864	16.2699

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

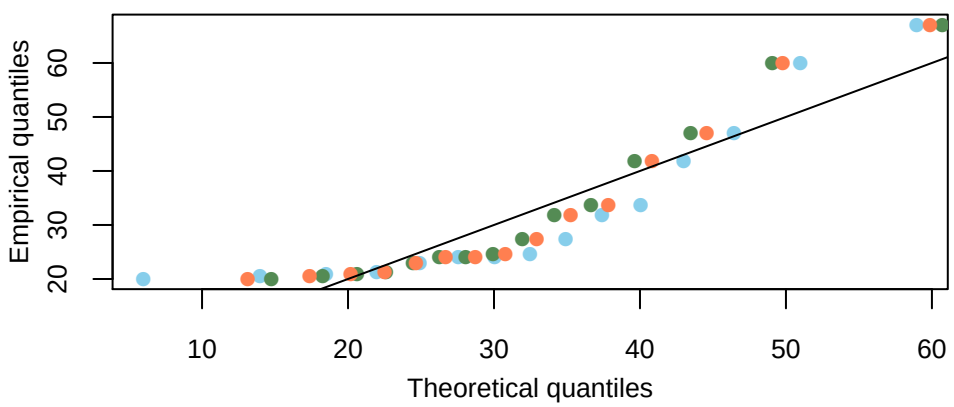
DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Antimony

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Arsenic

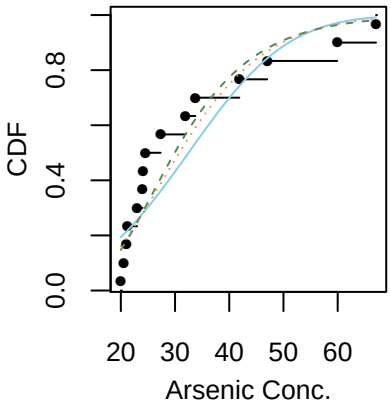
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

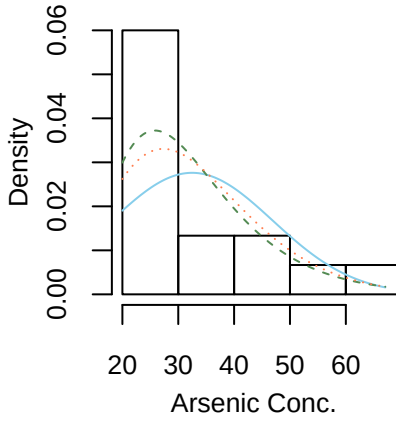


ECDF, Histogram & Q−Q (Detects Only)

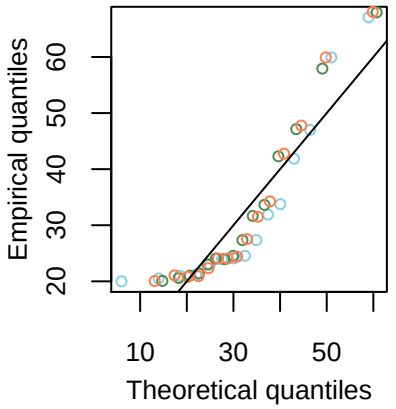
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 20 J	Arithmetic Mean = 32
N (detect) = 15	SD (log detect) = 0.4	Max (detect) = 67 J	Arithmetic SD = 15

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0033	0.025	–	–	–	–	126.676	128.093
Lognormal	0.029	0.042	–	–	–	–	119.947	121.363
Gamma	–	–	0.2367	0.222	0.9606	0.739	121.756	123.172

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

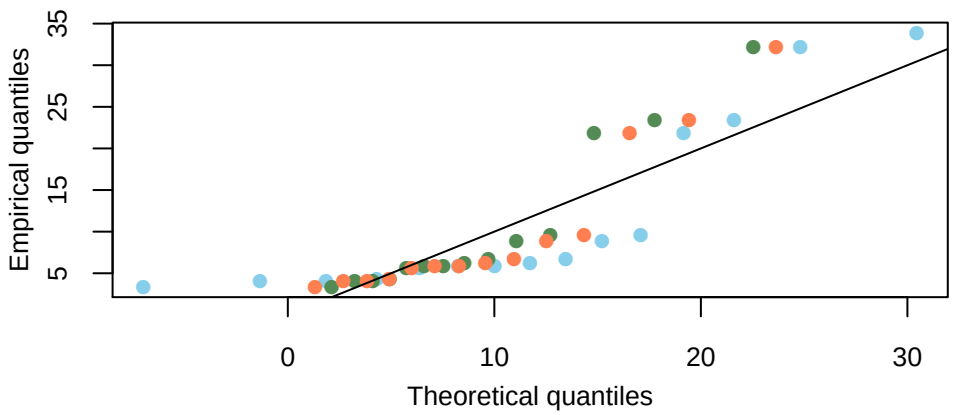
Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Arsenic

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Cadmium

Legend

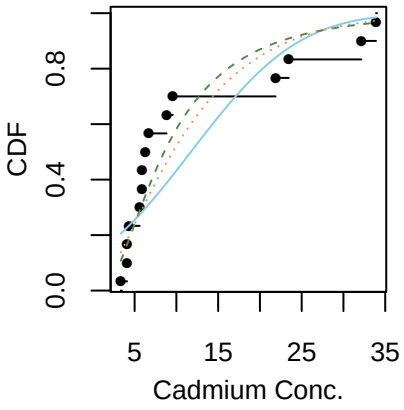
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

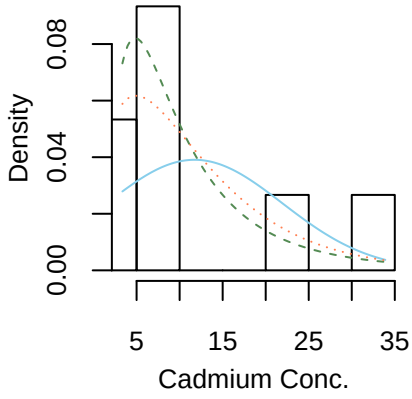


ECDF, Histogram & Q−Q (Detects Only)

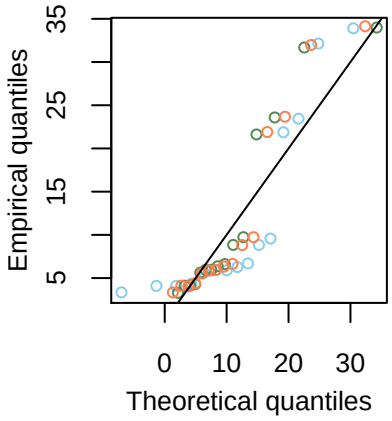
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 3 J	Arithmetic Mean = 12
N (detect) = 15	SD (log detect) = 0.78	Max (detect) = 34 J	Arithmetic SD = 11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00064	3e−04	–	–	–	–	116.265	117.681
Lognormal	0.028	0.045	–	–	–	–	102.571	103.987
Gamma	–	–	0.2581	0.228	1.214	0.763	105.601	107.017

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

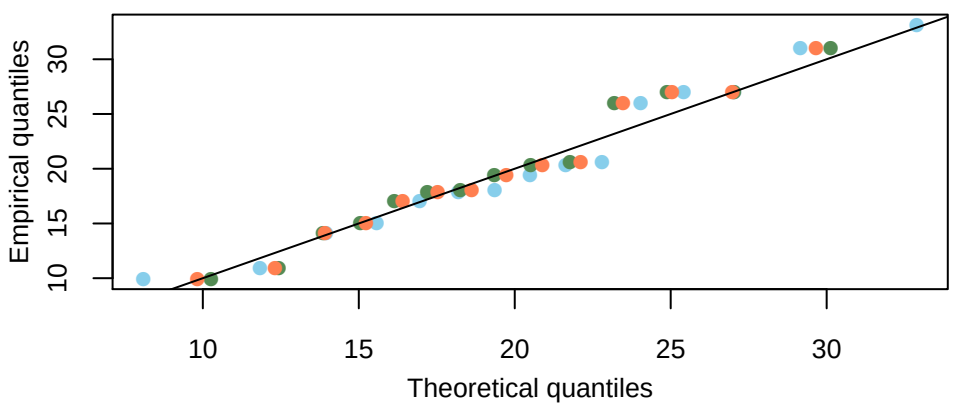
Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Cadmium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Cobalt

Legend

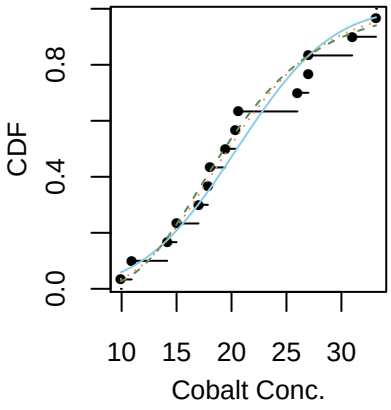
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

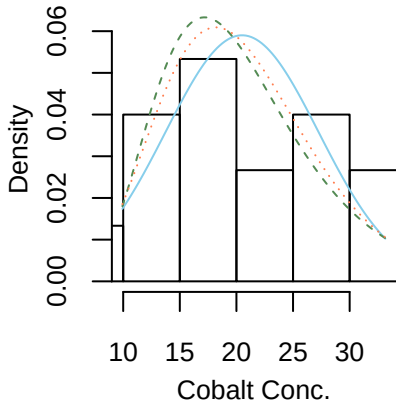


ECDF, Histogram & Q−Q (Detects Only)

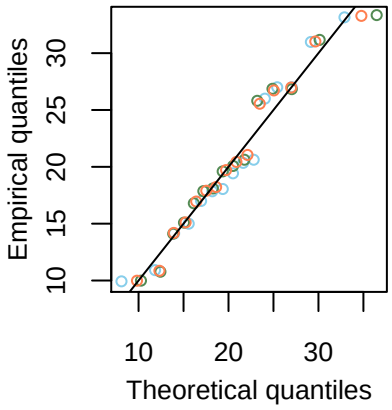
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 9 J	Arithmetic Mean = 20
N (detect) = 15	SD (log detect) = 0.36	Max (detect) = 33 J	Arithmetic SD = 7

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.65	0.39	–	–	–	–	103.897	105.313
Lognormal	0.73	0.72	–	–	–	–	103.577	104.993
Gamma	–	–	0.1351	0.222	0.2315	0.739	103.265	104.681

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

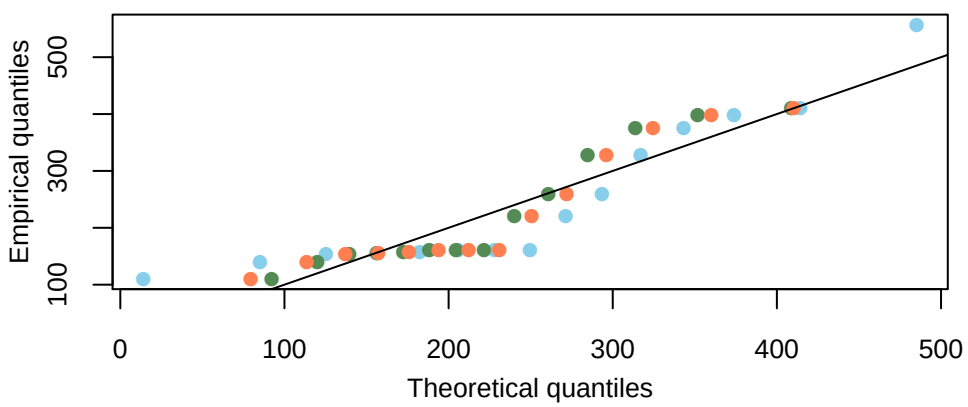
Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Cobalt

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Copper

Legend

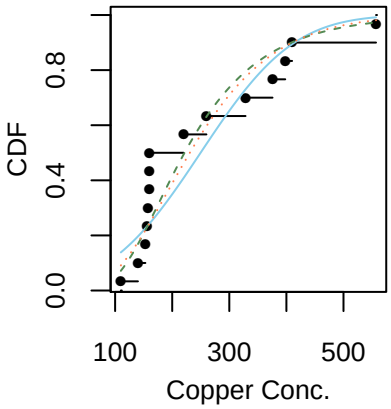
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

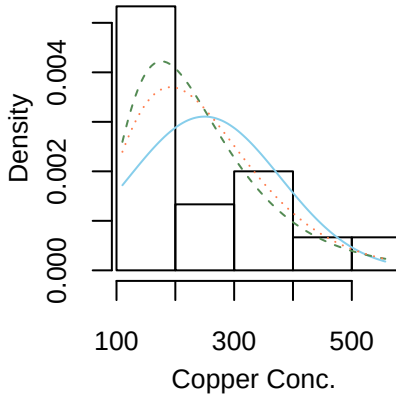


ECDF, Histogram & Q−Q (Detects Only)

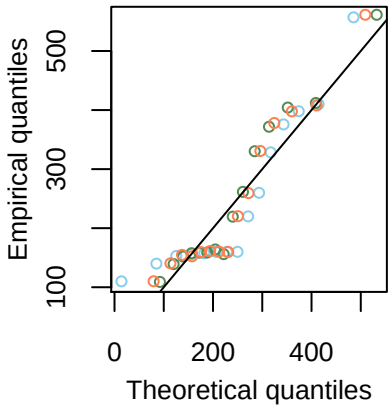
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 110 J	Arithmetic Mean = 250
N (detect) = 15	SD (log detect) = 0.49	Max (detect) = 560 J	Arithmetic SD = 130

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.013	0.002	–	–	–	–	192.235	193.651
Lognormal	0.077	0.0028	–	–	–	–	186.441	187.857
Gamma	–	–	0.2906	0.224	0.922	0.747	187.72	189.136

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

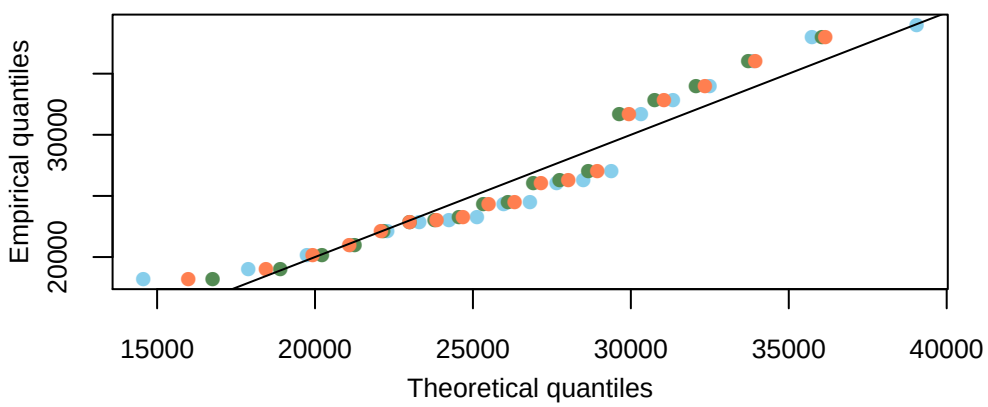
DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Copper

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Iron

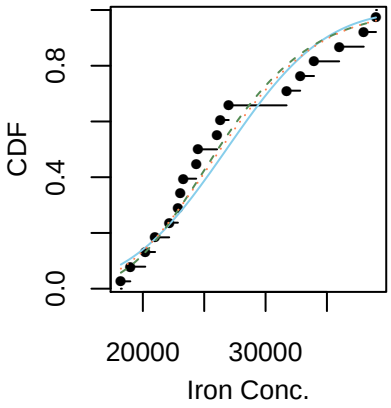
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

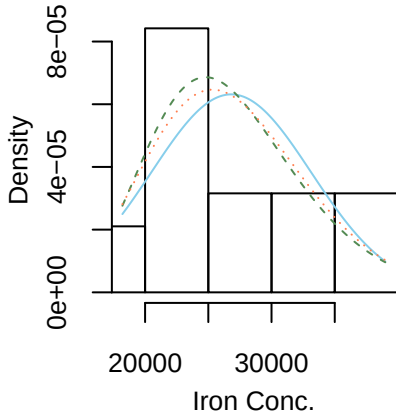


ECDF, Histogram & Q−Q (Detects Only)

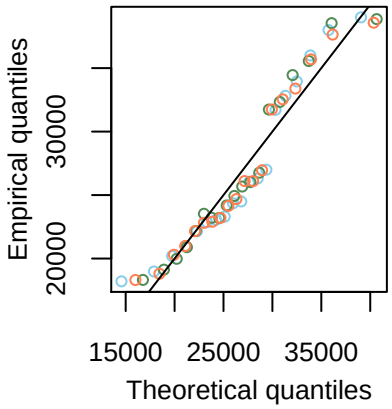
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 18,000 J	Arithmetic Mean = 27,000
N (detect) = 19	SD (log detect) = 0.23	Max (detect) = 39,000 J	Arithmetic SD = 6,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.091	0.14	–	–	–	–	390.461	392.349
Lognormal	0.31	0.5	–	–	–	–	388.294	390.183
Gamma	–	–	0.1435	0.199	0.4732	0.741	388.84	390.729

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Iron

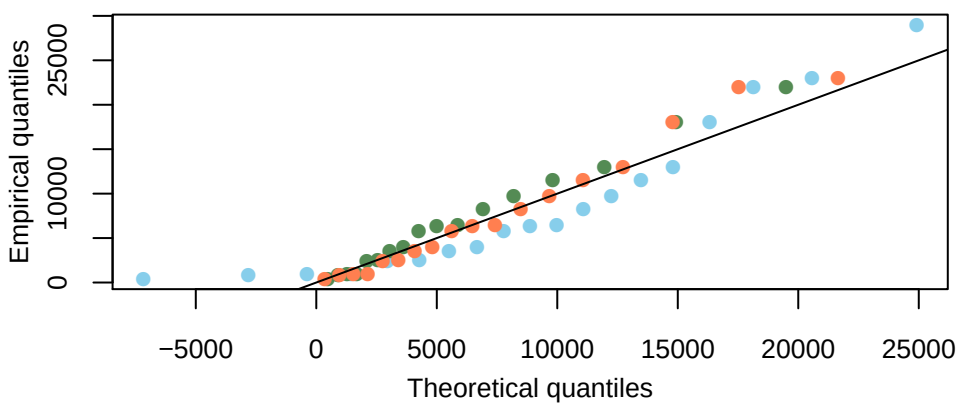
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **338**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Manganese

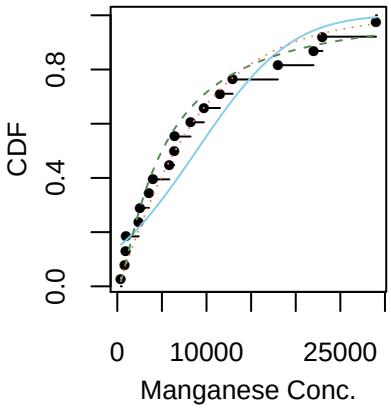
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

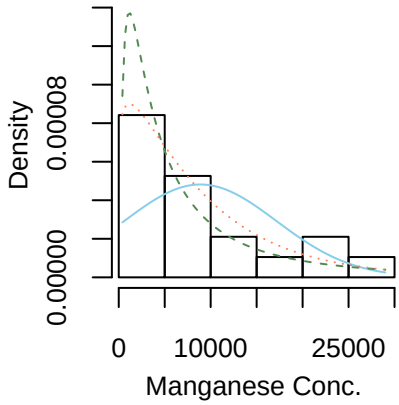


ECDF, Histogram & Q−Q (Detects Only)

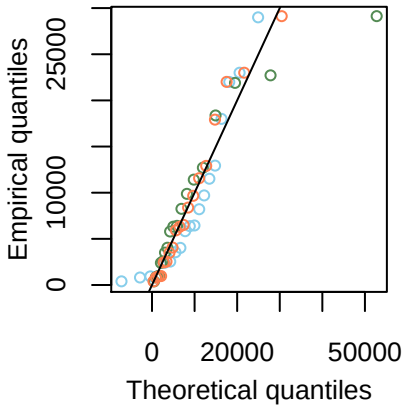
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 400 J	Arithmetic Mean = 8,900
N (detect) = 19	SD (log detect) = 1.2	Max (detect) = 29,000 J	Arithmetic SD = 8,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.011	0.066	–	–	–	–	400.738	402.627
Lognormal	0.39	0.57	–	–	–	–	389	390.889
Gamma	–	–	0.1302	0.204	0.3336	0.769	387.691	389.58

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Manganese

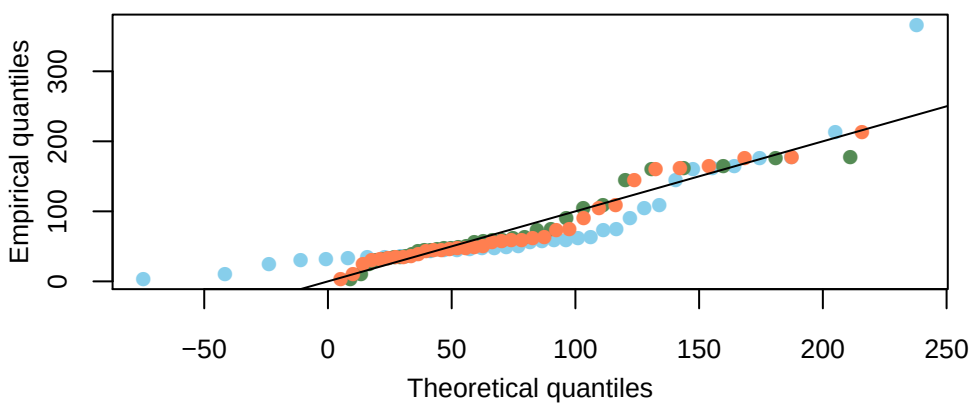
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **339**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Mercury

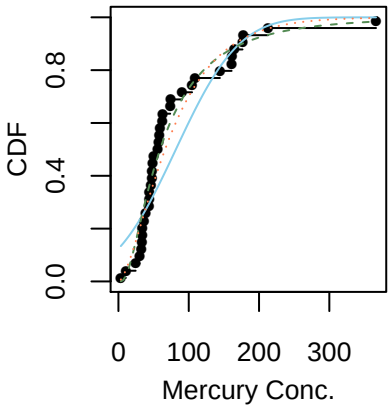
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

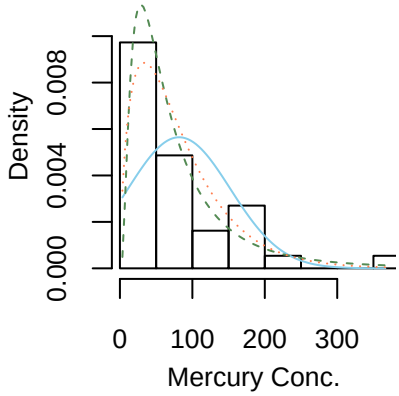


ECDF, Histogram & Q−Q (Detects Only)

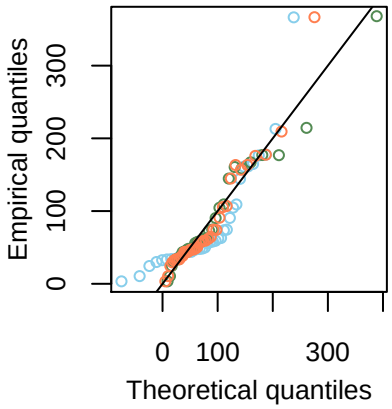
ECDF



Histogram



Q−Q



N = 37	FOD = 100%	Min (detect) = 3	Arithmetic Mean = 82
N (detect) = 37	SD (log detect) = 0.86	Max (detect) = 370 J	Arithmetic SD = 72

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.6e−06	–	–	–	–	424.095	427.317
Lognormal	0.02	0.086	–	–	–	–	399.058	402.279
Gamma	–	–	0.1734	0.153	1.058	0.776	398.493	401.715

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

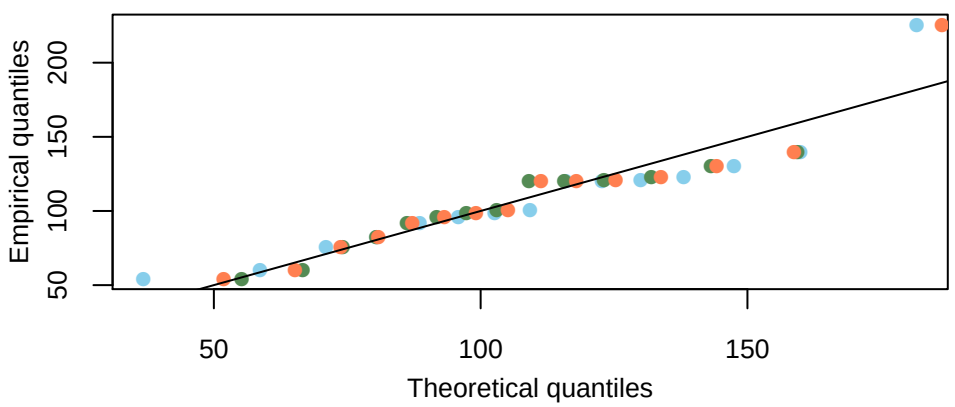
DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Mercury

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Nickel

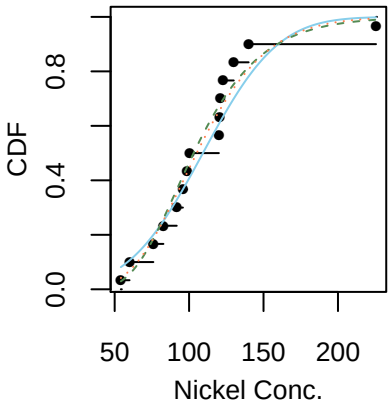
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

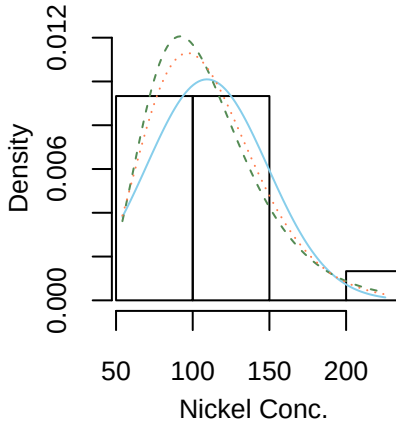


ECDF, Histogram & Q−Q (Detects Only)

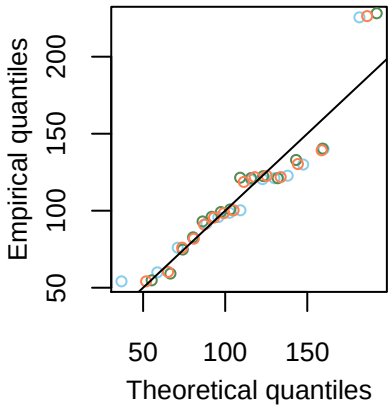
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 54 J	Arithmetic Mean = 110
N (detect) = 15	SD (log detect) = 0.35	Max (detect) = 230 J	Arithmetic SD = 41

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.034	0.26	–	–	–	–	156.869	158.285
Lognormal	0.66	0.66	–	–	–	–	153.268	154.684
Gamma	–	–	0.1285	0.222	0.359	0.739	153.815	155.231

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

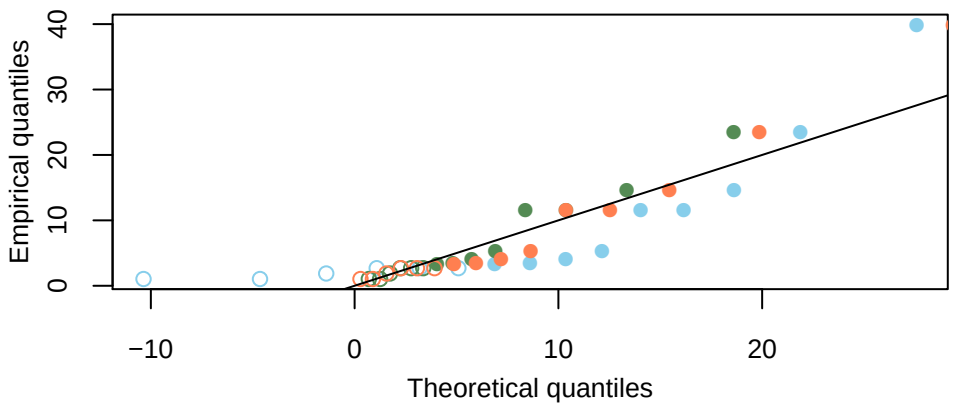
DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Nickel

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Thallium

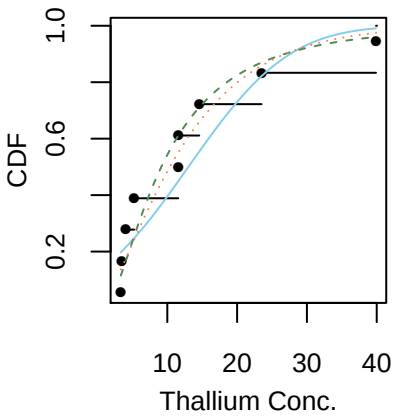
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

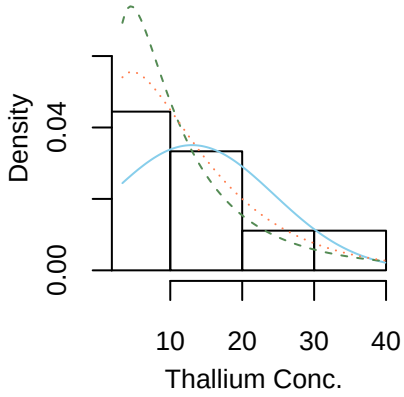


ECDF, Histogram & Q−Q (Detects Only)

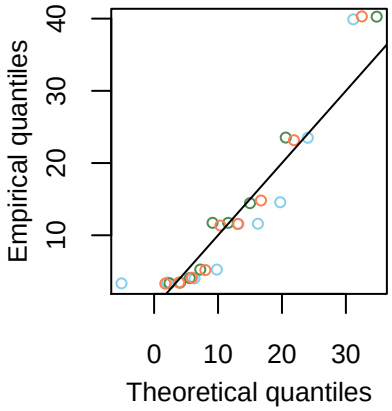
ECDF



Histogram



Q−Q



N = 15	FOD = 60%	Min (detect) = 3 J	Kaplan Meier Mean = 9
N (detect) = 9	SD (log detect) = 0.89	Max (detect) = 40 J	Kaplan Meier SD = 10

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00031	0.0014	–	–	–	–	116.668	118.084
Lognormal	0.41	0.33	–	–	–	–	95.3209	96.737
Gamma	–	–	0.2255	0.234	0.7243	0.793	98.6101	100.026

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.026	0.2	–	–	–	–	73.3138	73.7083
Lognormal	0.38	0.57	–	–	–	–	66.2189	66.6133
Gamma	–	–	0.2029	0.287	0.406	0.743	67.2561	67.6505

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

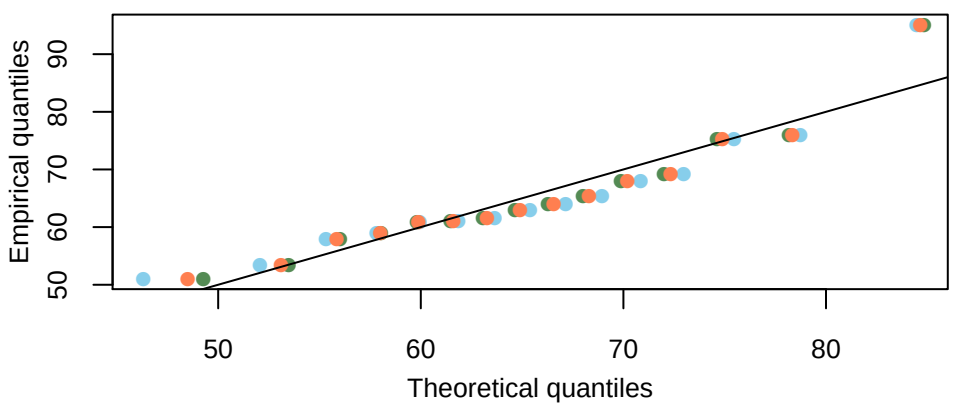
DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Thallium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Vanadium

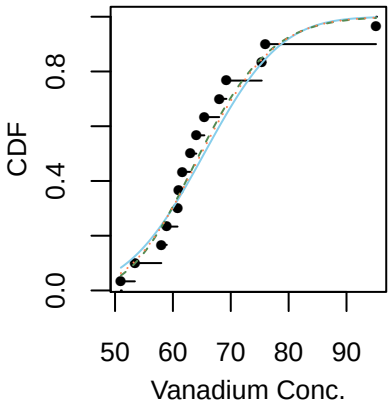
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

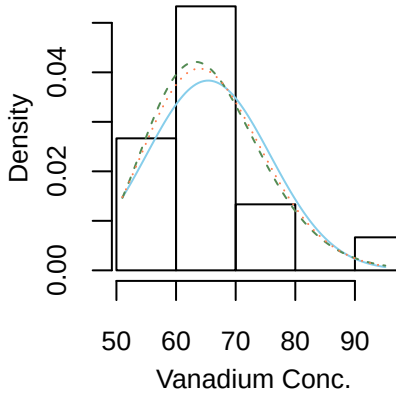


ECDF, Histogram & Q−Q (Detects Only)

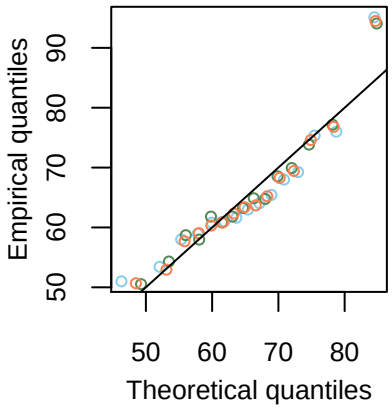
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 51 J	Arithmetic Mean = 65
N (detect) = 15	SD (log detect) = 0.15	Max (detect) = 95 J	Arithmetic SD = 11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.056	0.33	–	–	–	–	116.841	118.257
Lognormal	0.37	0.65	–	–	–	–	114.347	115.764
Gamma	–	–	0.1448	0.221	0.4305	0.735	115.064	116.48

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

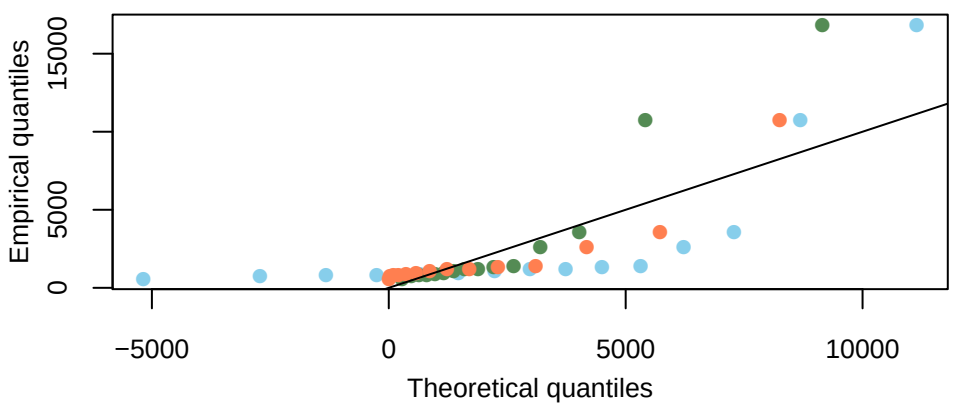
DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Vanadium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Zinc

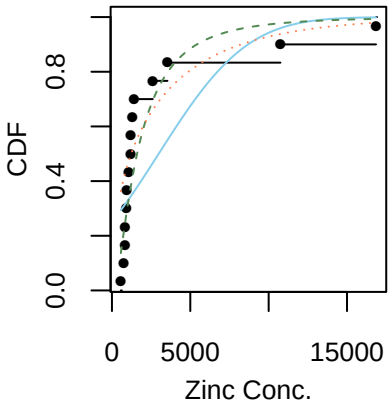
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

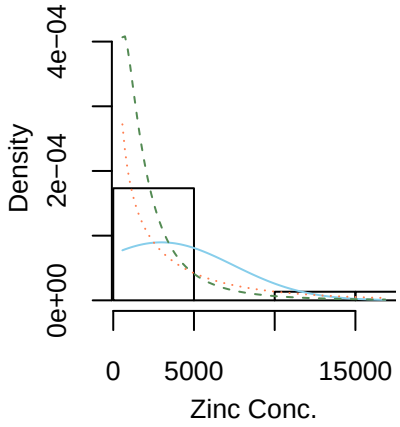


ECDF, Histogram & Q−Q (Detects Only)

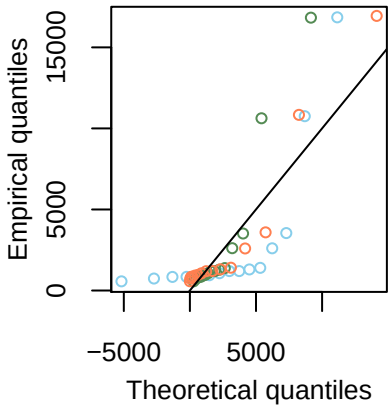
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 570 J	Arithmetic Mean = 3,000
N (detect) = 15	SD (log detect) = 0.98	Max (detect) = 17,000 J	Arithmetic SD = 4,600

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	6.2e−06	–	–	–	–	298.589	300.005
Lognormal	0.004	0.0015	–	–	–	–	266.427	267.843
Gamma	–	–	0.3636	0.2451	2.126	0.8833	278.389	279.805

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Zinc

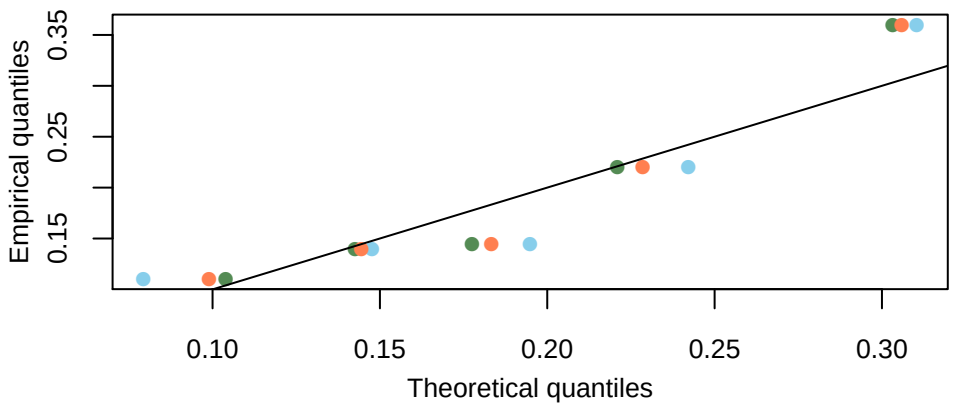
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **344**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Benzo[a]pyrene

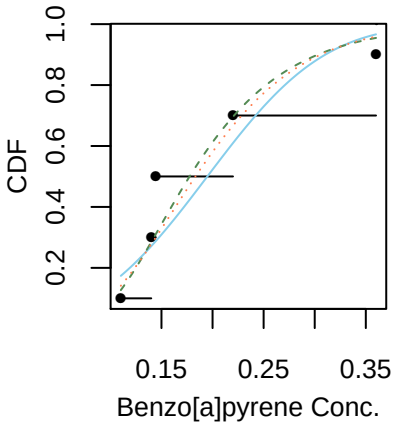
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

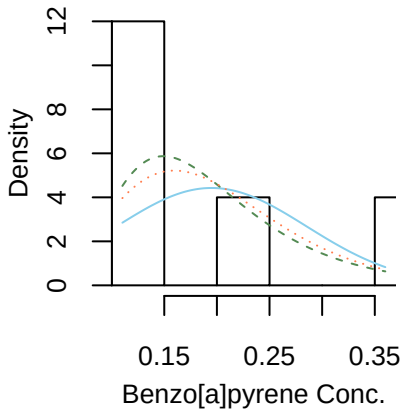


ECDF, Histogram & Q−Q (Detects Only)

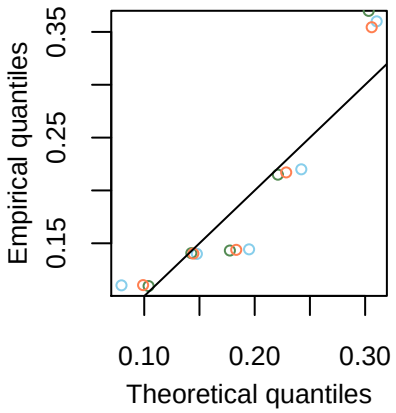
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.11 J	Arithmetic Mean = 0.19
N (detect) = 5	SD (log detect) = 0.47	Max (detect) = 0.36 J	Arithmetic SD = 0.1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.18	N<5	–	–	–	–	−5.87367	−6.65479
Lognormal	0.53	N<5	–	–	–	–	−7.82683	−8.60795
Gamma	–	–	NA	NA	NA	NA	−7.33454	−8.11567

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Benzo[a]pyrene

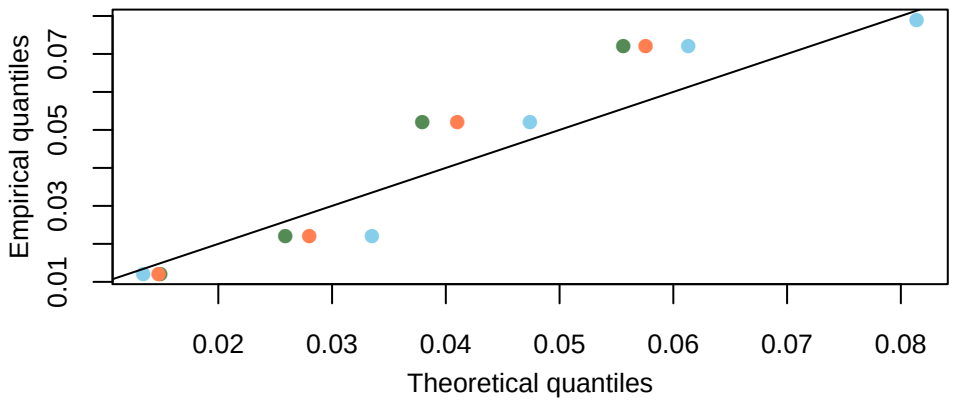
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **345**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Dibenz[a,h]anthracene

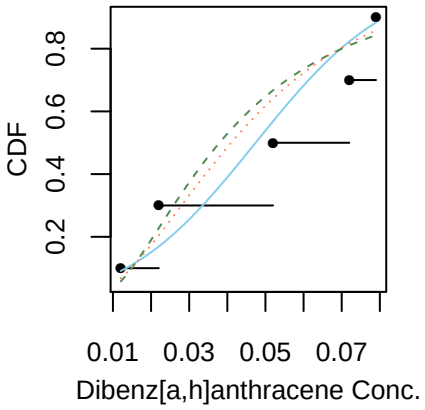
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

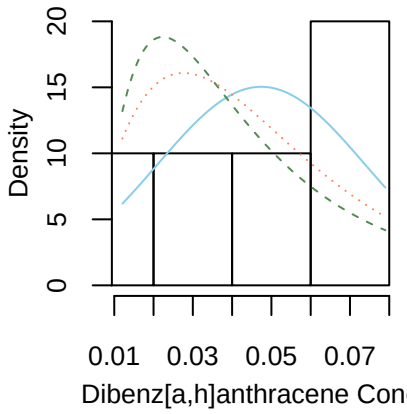


ECDF, Histogram & Q−Q (Detects Only)

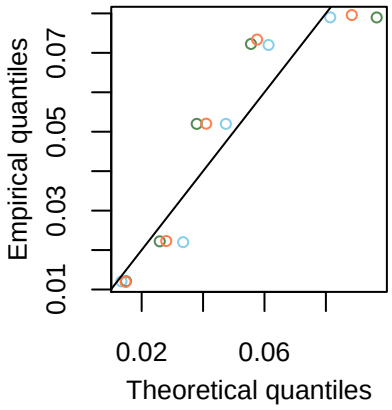
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 0.012 J	Arithmetic Mean = 0.047
N (detect) = 5	SD (log detect) = 0.81	Max (detect) = 0.079 J	Arithmetic SD = 0.03

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.46	N<5	–	–	–	–	−18.1079	−18.8891
Lognormal	0.34	N<5	–	–	–	–	−17.6925	−18.4737
Gamma	–	–	NA	NA	NA	NA	−18.2083	−18.9894

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Dibenz[a,h]anthracene

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 5	FOD = 40%	Min (detect) = 0.0014 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.26 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Aldrin

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 4	FOD = 25%	Min (detect) = 0.21 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.21 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

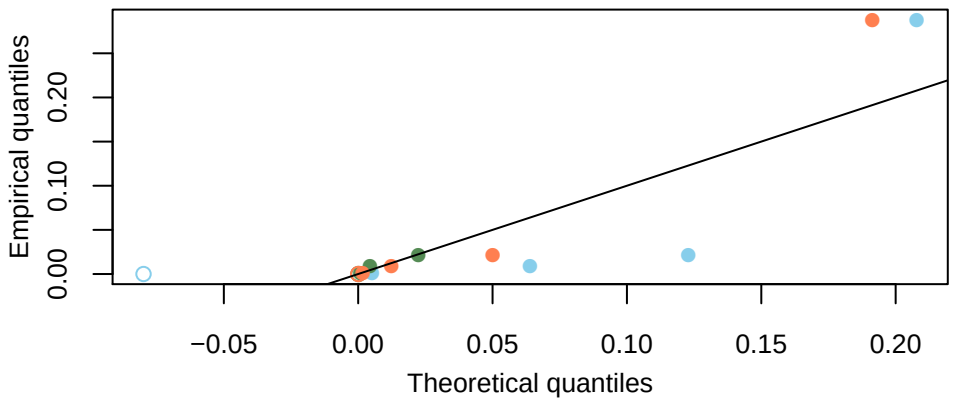
Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Heptachlor

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Heptachlor Epoxide

Legend

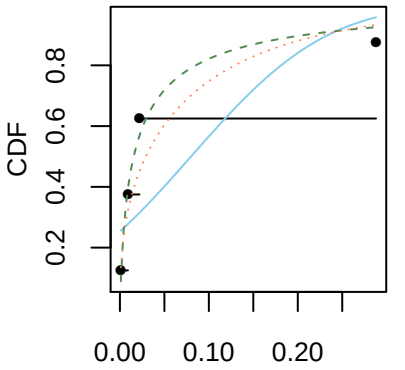
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

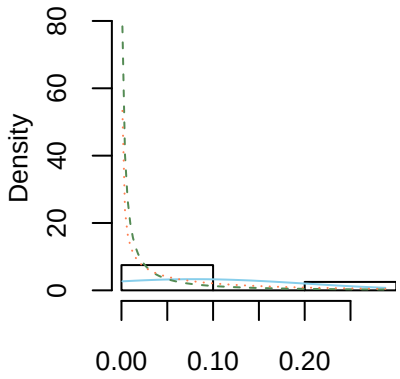


ECDF, Histogram & Q−Q (Detects Only)

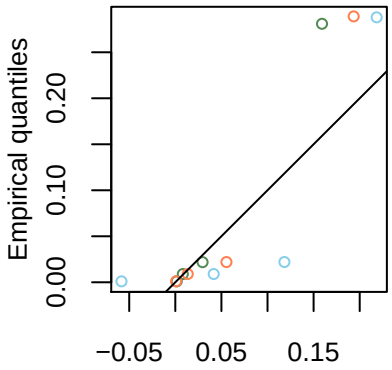
ECDF



Histogram



Q−Q



N = 5	FOD = 80%	Min (detect) = 0.001 J	Kaplan Meier Mean = 0.064
N (detect) = 4	SD (log detect) = 2.3	Max (detect) = 0.29 J	Kaplan Meier SD = 0.11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00091	N<5	–	–	–	–	−3.67882	−4.45995
Lognormal	0.94	N<5	–	–	–	–	−24.7289	−25.51
Gamma	–	–	NA	NA	NA	NA	−24.6978	−25.4789

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.008	N<5	–	–	–	–	−1.58913	−2.81654
Lognormal	0.96	N<5	–	–	–	–	−12.3406	−13.5681
Gamma	–	–	NA	NA	NA	NA	−11.577	−12.8044

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Heptachlor Epoxide

Media:
Marsh Sediment (All Samples)

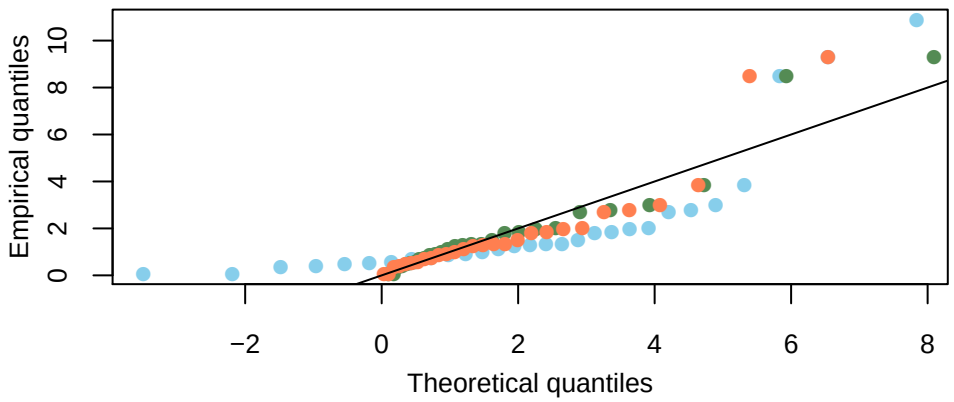
Exposure Unit:
Nevertouch Marsh

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

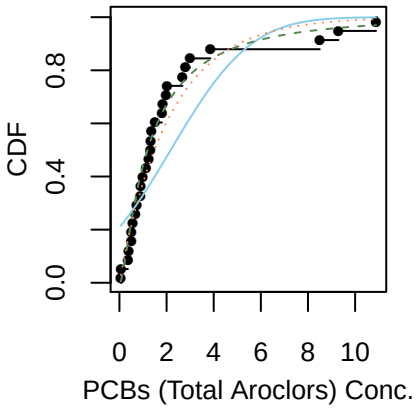
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

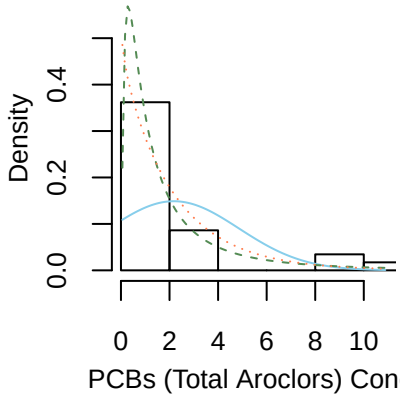


ECDF, Histogram & Q−Q (Detects Only)

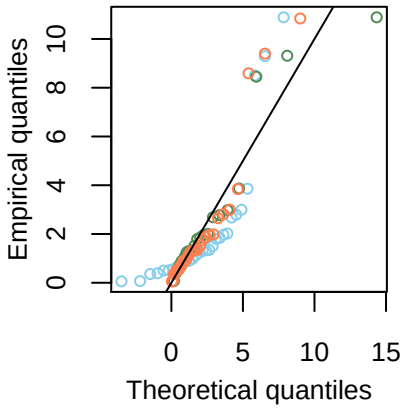
ECDF



Histogram



Q−Q



N = 29	FOD = 100%	Min (detect) = 0.059 J	Arithmetic Mean = 2
N (detect) = 29	SD (log detect) = 1.2	Max (detect) = 11 J	Arithmetic SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	2.9e−06	–	–	–	–	143.469	146.204
Lognormal	0.15	0.69	–	–	–	–	105.843	108.577
Gamma	–	–	0.1502	0.184	0.7684	0.807	107.075	109.81

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **350**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Nevertouch Marsh
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 5	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Nevertouch Marsh−Trichloroethene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

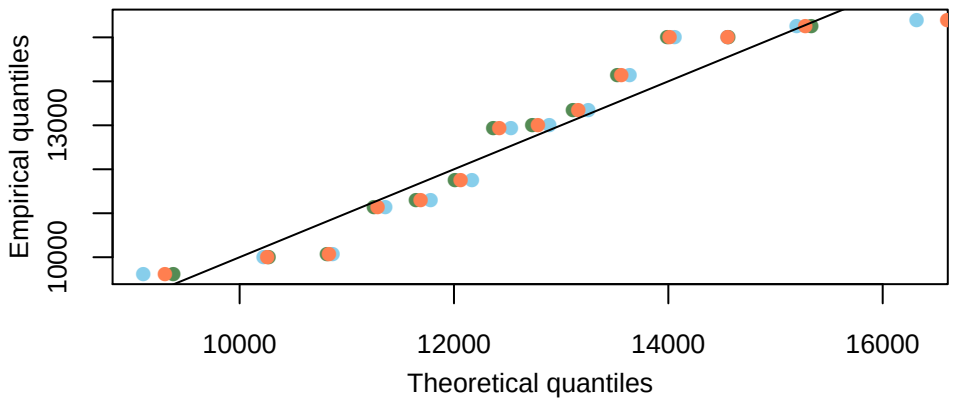
Figure **351**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Aluminum

Legend

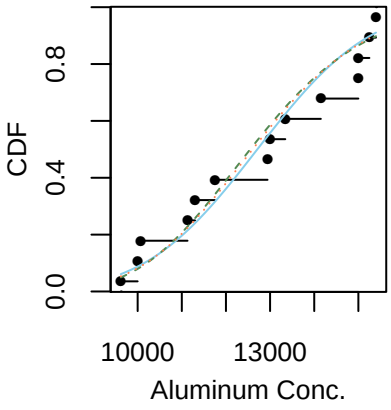
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

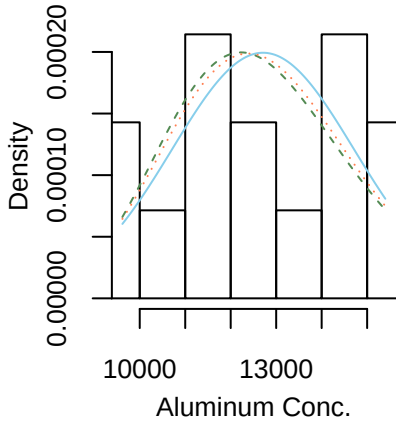


ECDF, Histogram & Q−Q (Detects Only)

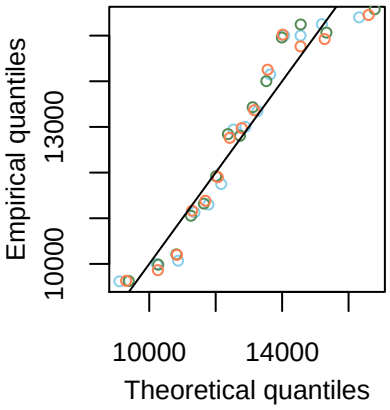
ECDF



Histogram



Q−Q



N = 14	FOD = 100%	Min (detect) = 9,600 J	Arithmetic Mean = 13,000
N (detect) = 14	SD (log detect) = 0.17	Max (detect) = 15,000 J	Arithmetic SD = 2,100

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.18	0.53	–	–	–	–	256.572	257.851
Lognormal	0.16	0.59	–	–	–	–	256.899	258.177
Gamma	–	–	0.1542	0.266	0.4689	0.725	256.726	258.004

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

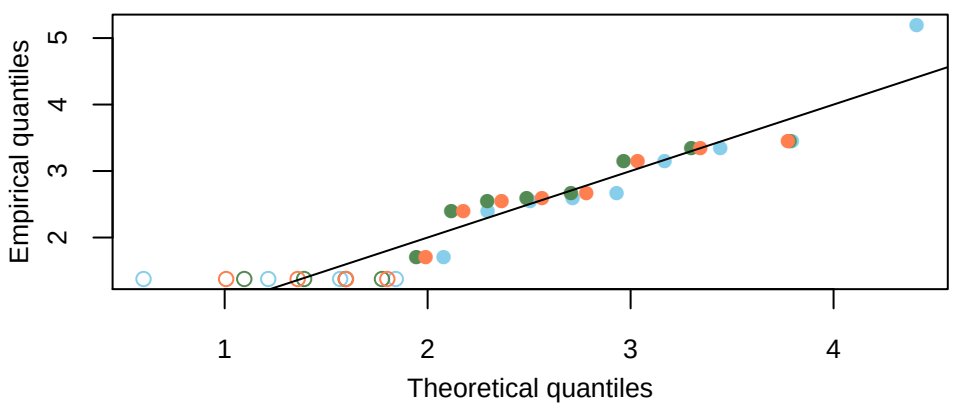
Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Aluminum

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Antimony

Legend

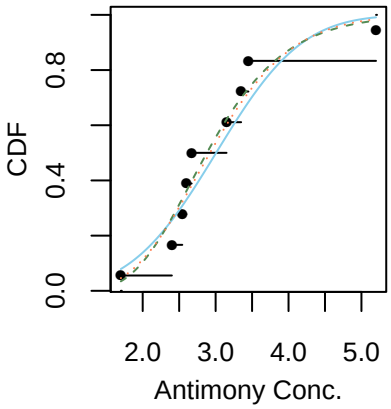
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

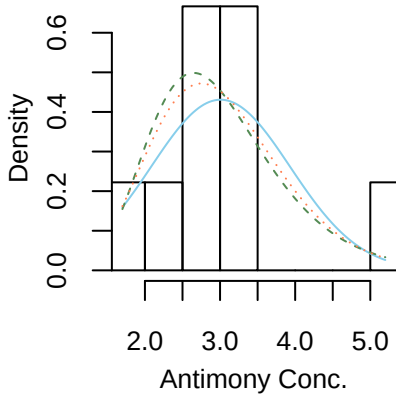


ECDF, Histogram & Q−Q (Detects Only)

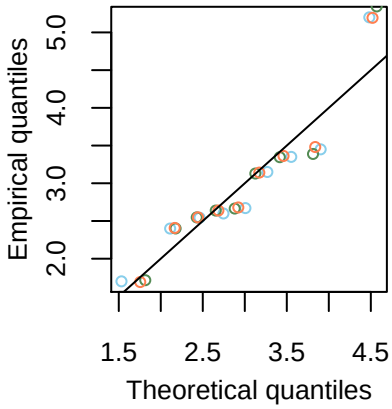
ECDF



Histogram



Q−Q



N = 14	FOD = 64%	Min (detect) = 1 J	Kaplan Meier Mean = 2
N (detect) = 9	SD (log detect) = 0.31	Max (detect) = 5 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.063	0.51	–	–	–	–	42.8211	43.951
Lognormal	0.13	0.24	–	–	–	–	39.7768	40.9067
Gamma	–	–	0.1875	0.267	0.5316	0.729	40.2458	41.3757

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.18	0.27	–	–	–	–	28.1532	28.5476
Lognormal	0.73	0.66	–	–	–	–	26.2828	26.6772
Gamma	–	–	0.1734	0.279	0.3516	0.722	26.6538	27.0483

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Antimony

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

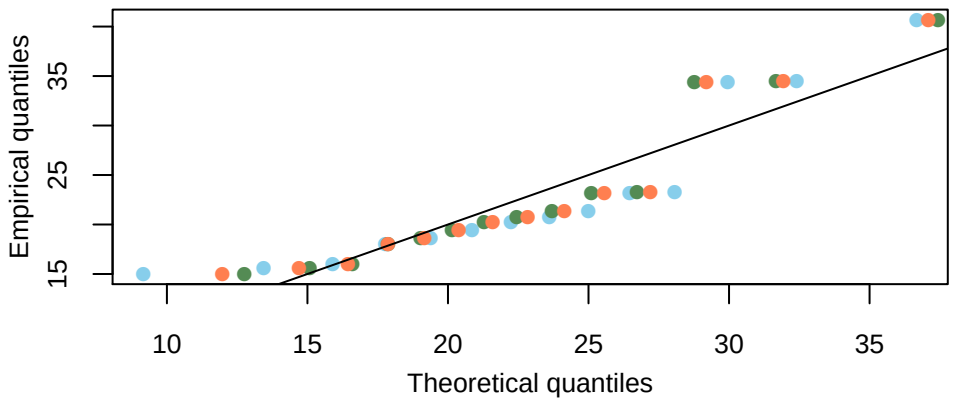
Figure **353**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Arsenic

Legend

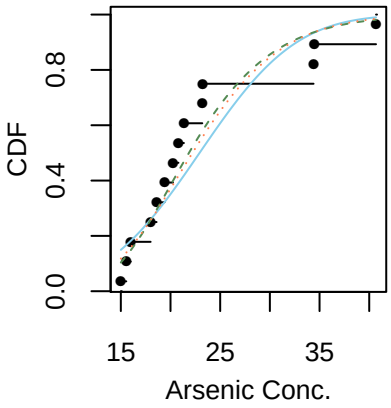
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

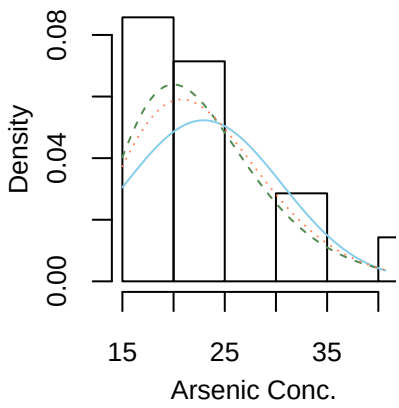


ECDF, Histogram & Q−Q (Detects Only)

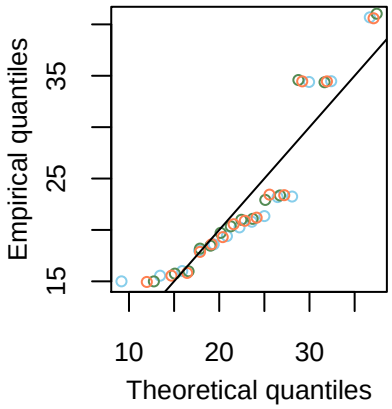
ECDF



Histogram



Q−Q



N = 14	FOD = 100%	Min (detect) = 15 J	Arithmetic Mean = 23
N (detect) = 14	SD (log detect) = 0.31	Max (detect) = 41 J	Arithmetic SD = 7

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.011	0.0069	–	–	–	–	100.633	101.912
Lognormal	0.097	0.11	–	–	–	–	96.2547	97.5328
Gamma	–	–	0.2268	0.267	0.7759	0.725	97.4522	98.7304

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

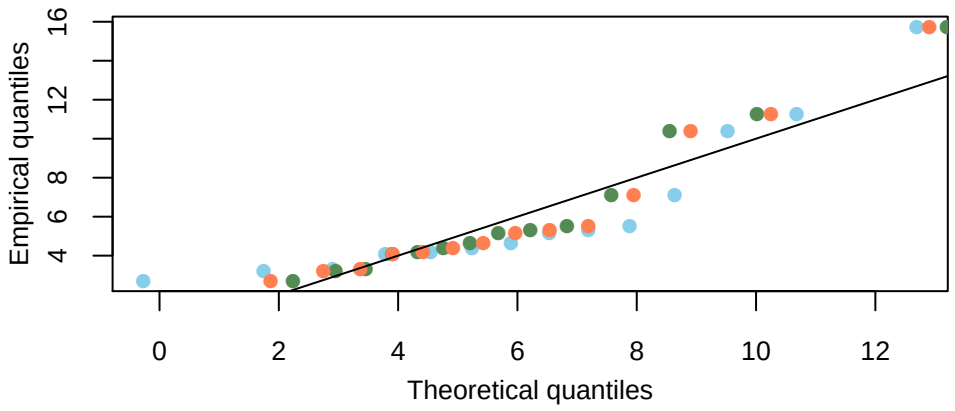
Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Arsenic

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Cadmium

Legend

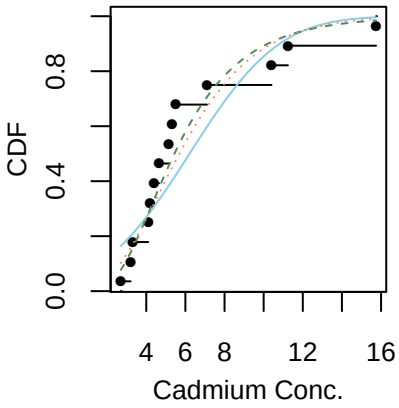
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

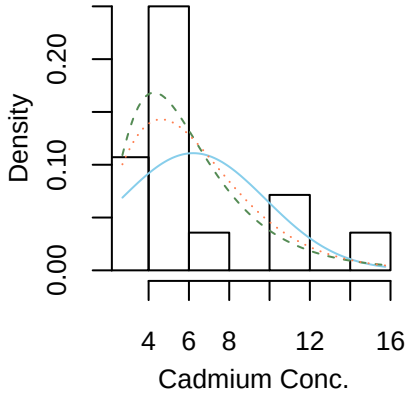


ECDF, Histogram & Q−Q (Detects Only)

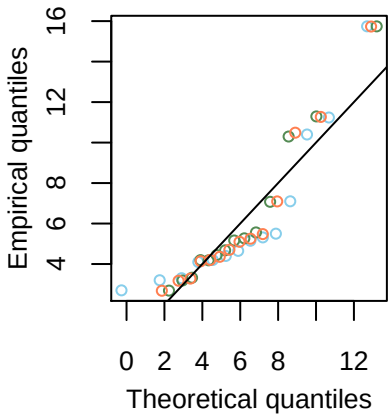
ECDF



Histogram



Q−Q



N = 14	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 6
N (detect) = 14	SD (log detect) = 0.51	Max (detect) = 16 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0052	0.0023	–	–	–	–	79.5616	80.8397
Lognormal	0.29	0.11	–	–	–	–	71.2837	72.5619
Gamma	–	–	0.2402	0.27	0.6894	0.736	73.2619	74.54

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

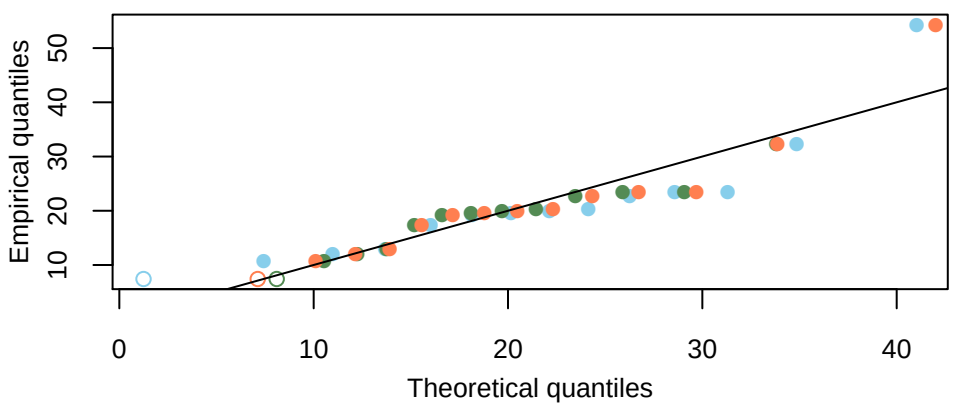
DRAFT

Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Cadmium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Cobalt

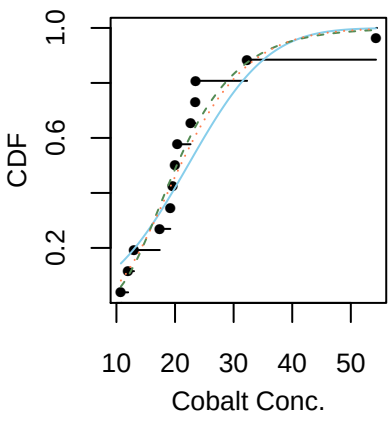
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

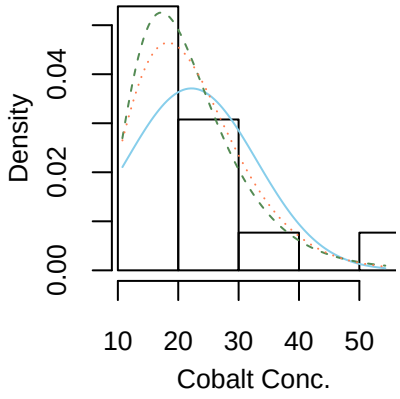


ECDF, Histogram & Q−Q (Detects Only)

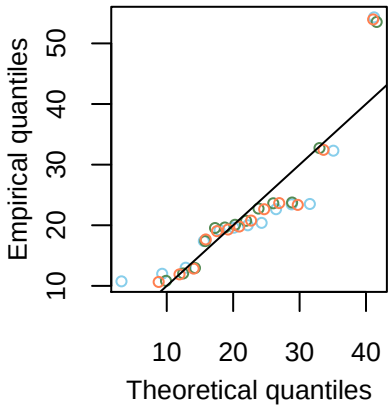
ECDF



Histogram



Q−Q



N = 14	FOD = 93%	Min (detect) = 11 J	Kaplan Meier Mean = 21
N (detect) = 13	SD (log detect) = 0.42	Max (detect) = 54 J	Kaplan Meier SD = 12

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0072	0.0051	–	–	–	–	110.965	112.243
Lognormal	0.7	0.23	–	–	–	–	104.812	106.09
Gamma	–	–	0.2067	0.27	0.446	0.736	105.742	107.02

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0033	0.0023	–	–	–	–	102.642	103.772
Lognormal	0.32	0.12	–	–	–	–	95.7232	96.8531
Gamma	–	–	0.2364	0.267	0.5816	0.729	97.2848	98.4147

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Cobalt

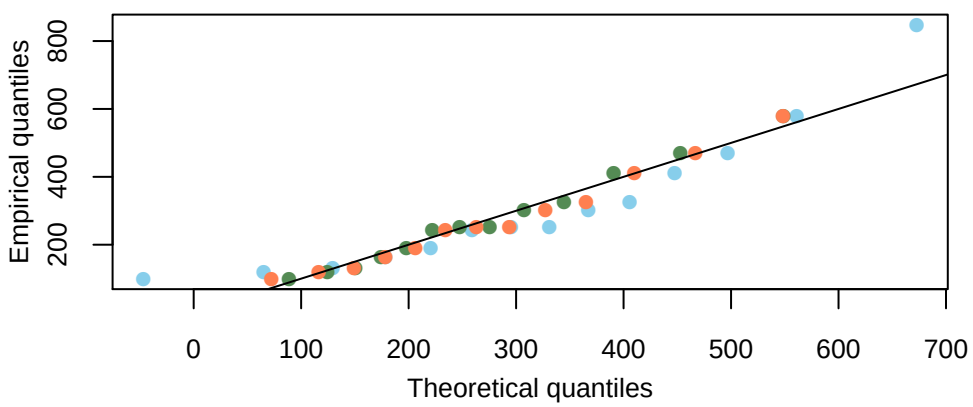
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **356**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Copper

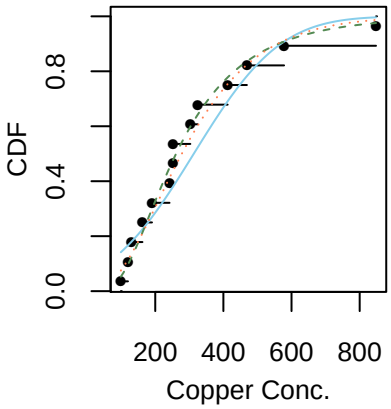
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

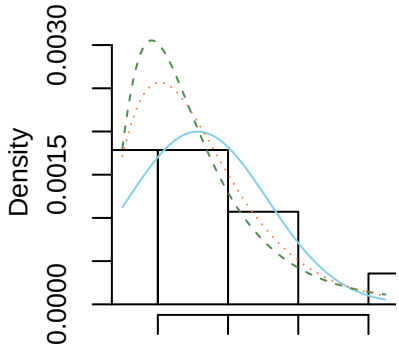


ECDF, Histogram & Q−Q (Detects Only)

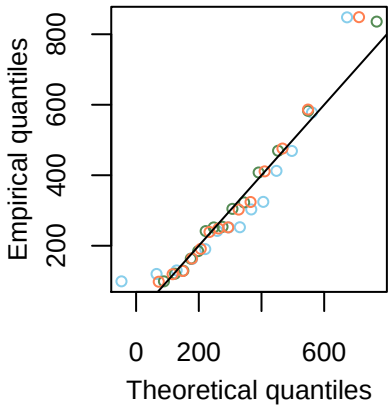
ECDF



Histogram



Q−Q



N = 14	FOD = 100%	Min (detect) = 99 J	Arithmetic Mean = 310
N (detect) = 14	SD (log detect) = 0.62	Max (detect) = 850 J	Arithmetic SD = 210

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.036	0.17	–	–	–	–	192.023	193.301
Lognormal	0.98	0.98	–	–	–	–	185.152	186.43
Gamma	–	–	0.1328	0.27	0.2264	0.736	186.183	187.461

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Copper

Media:
Marsh Sediment (All Samples)

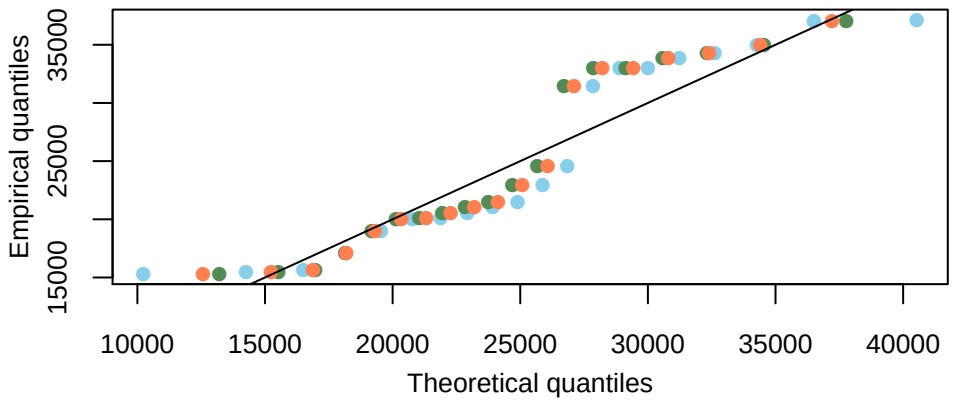
Exposure Unit:
Eight Day Swamp

Chemical (mg/kg):
Iron

Legend

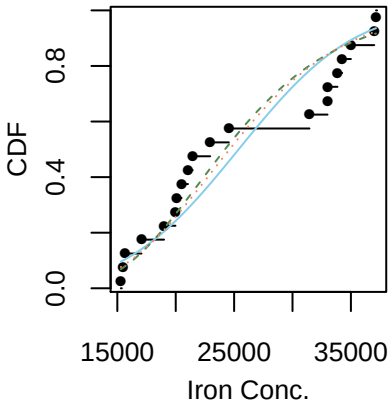
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

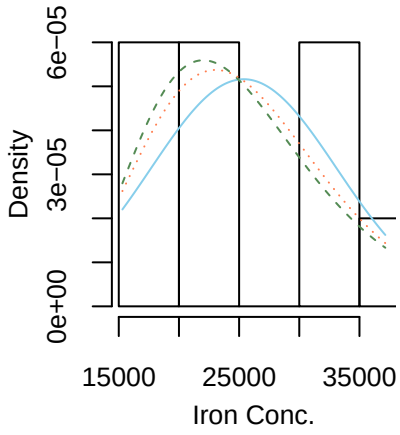


ECDF, Histogram & Q−Q (Detects Only)

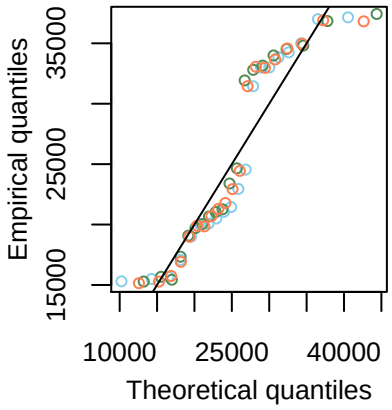
ECDF



Histogram



Q−Q



N = 20	FOD = 100%	Min (detect) = 15,000 J	Arithmetic Mean = 25,000
N (detect) = 20	SD (log detect) = 0.32	Max (detect) = 37,000 J	Arithmetic SD = 7,900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.013	0.056	–	–	–	–	418.867	420.858
Lognormal	0.027	0.044	–	–	–	–	417.565	419.556
Gamma	–	–	0.1965	0.194	0.9464	0.742	417.686	419.677

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Iron

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

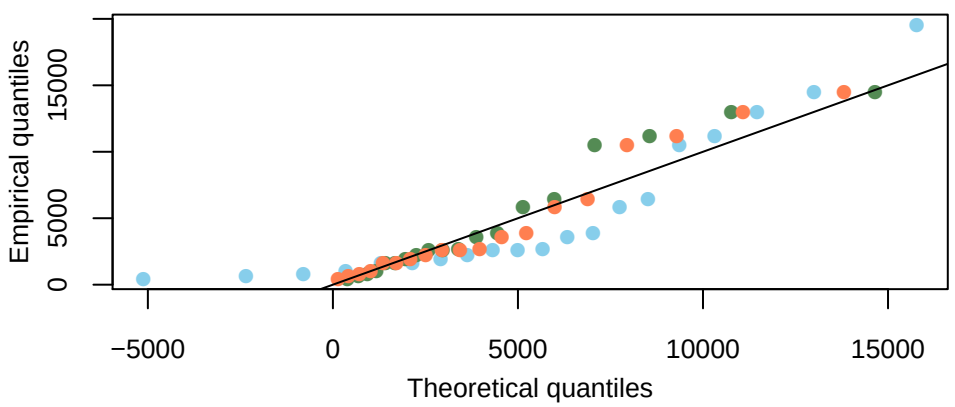
Figure **358**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Manganese

Legend

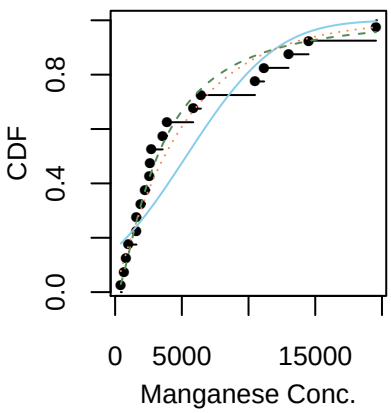
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

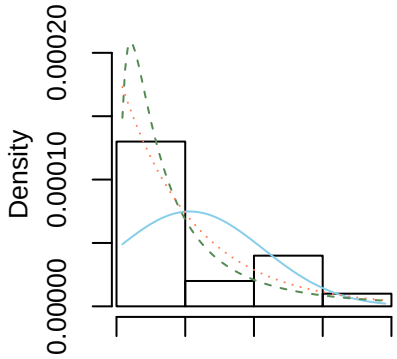


ECDF, Histogram & Q−Q (Detects Only)

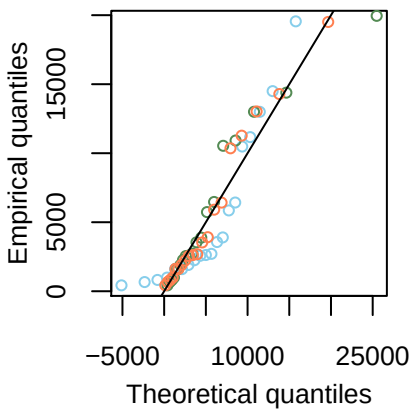
ECDF



Histogram



Q−Q



N = 20	FOD = 100%	Min (detect) = 430 J	Arithmetic Mean = 5,300
N (detect) = 20	SD (log detect) = 1.1	Max (detect) = 20,000 J	Arithmetic SD = 5,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0012	0.0016	–	–	–	–	404.007	405.999
Lognormal	0.75	0.72	–	–	–	–	385.671	387.662
Gamma	–	–	0.1515	0.199	0.4063	0.768	387.253	389.245

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Manganese

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

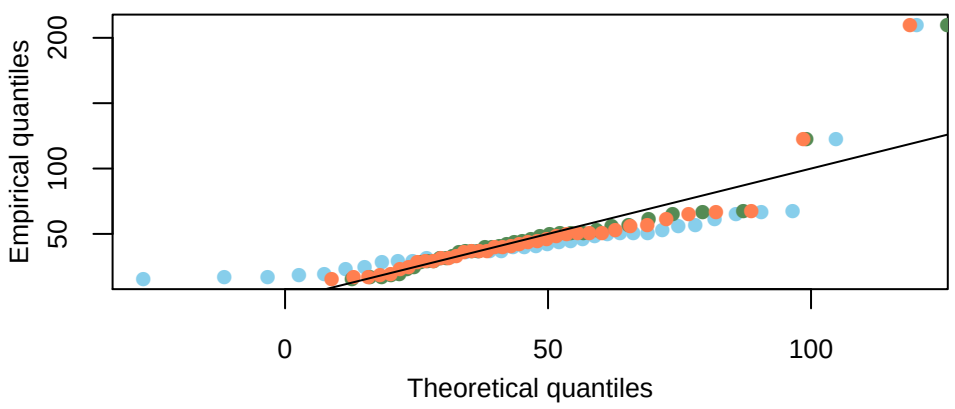
Figure **359**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Mercury

Legend

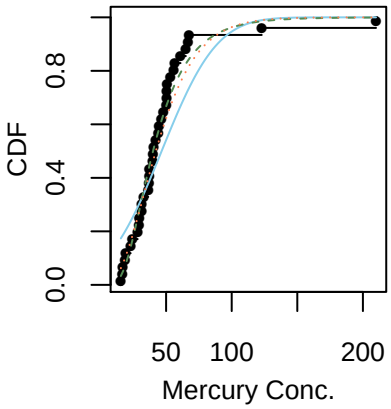
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

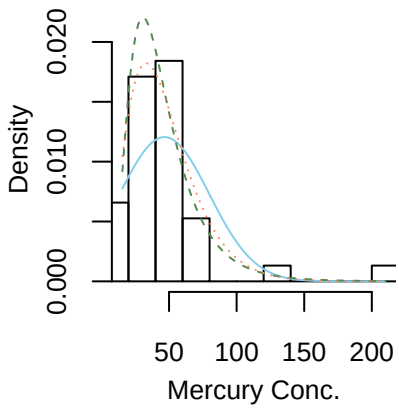


ECDF, Histogram & Q−Q (Detects Only)

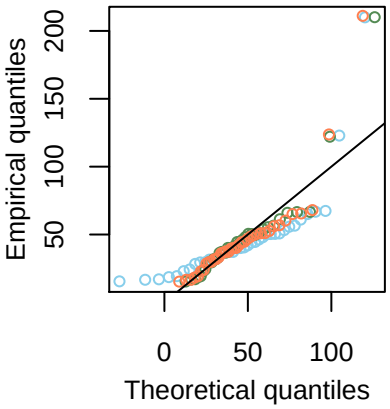
ECDF



Histogram



Q−Q



N = 38	FOD = 100%	Min (detect) = 16 J	Arithmetic Mean = 47
N (detect) = 38	SD (log detect) = 0.52	Max (detect) = 210 J	Arithmetic SD = 34

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.8e−05	–	–	–	–	377.786	381.061
Lognormal	0.059	0.33	–	–	–	–	341.963	345.238
Gamma	–	–	0.1339	0.151	1.006	0.76	348.873	352.148

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

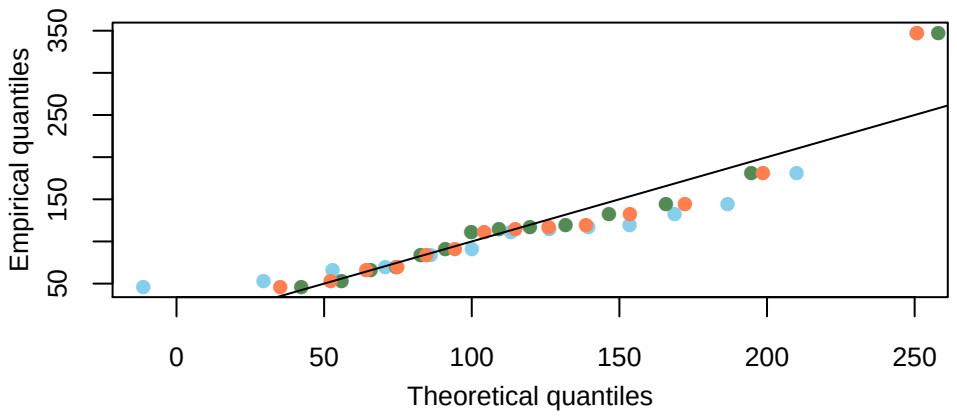
Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Mercury

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Nickel

Legend

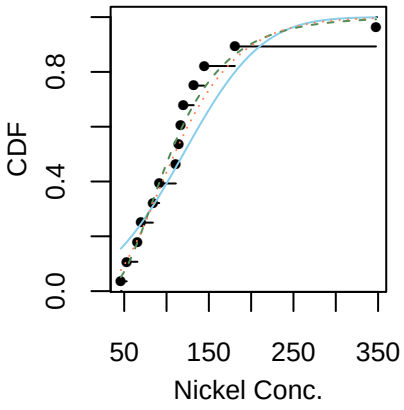
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

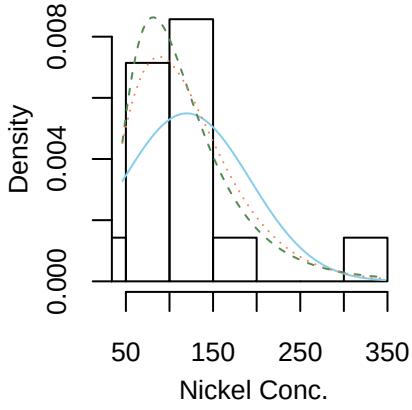


ECDF, Histogram & Q−Q (Detects Only)

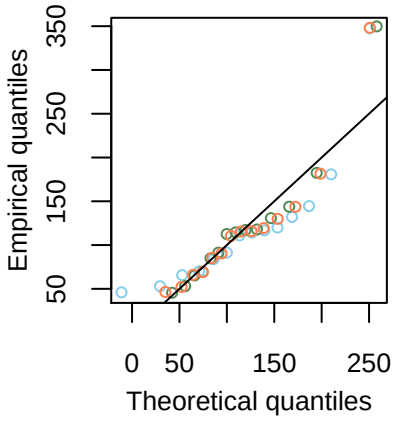
ECDF



Histogram



Q−Q



N = 14	FOD = 100%	Min (detect) = 46 J	Arithmetic Mean = 120
N (detect) = 14	SD (log detect) = 0.52	Max (detect) = 350 J	Arithmetic SD = 75

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0019	0.046	–	–	–	–	163.727	165.005
Lognormal	0.74	0.81	–	–	–	–	154.579	155.857
Gamma	–	–	0.1494	0.27	0.4072	0.736	156.415	157.694

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Nickel

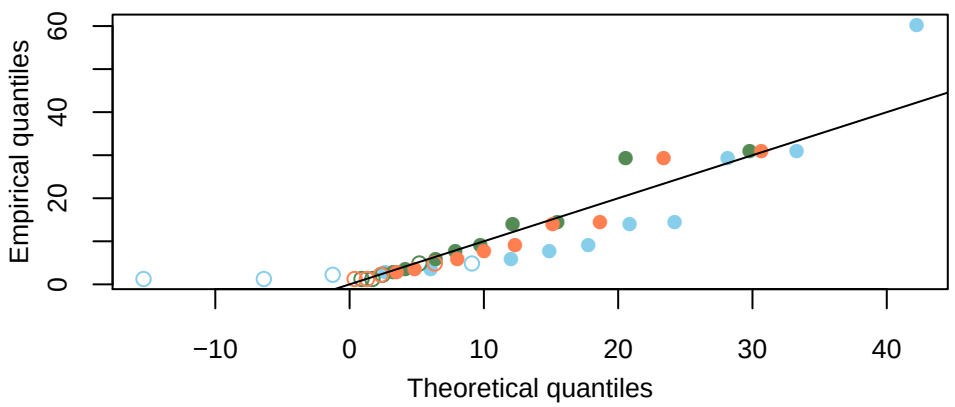
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **361**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Thallium

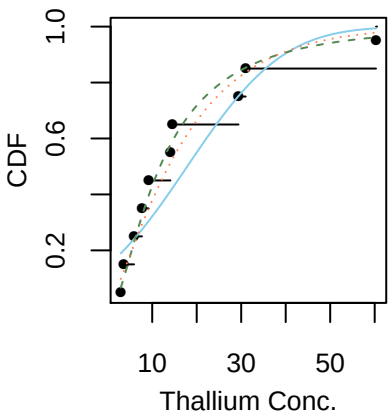
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

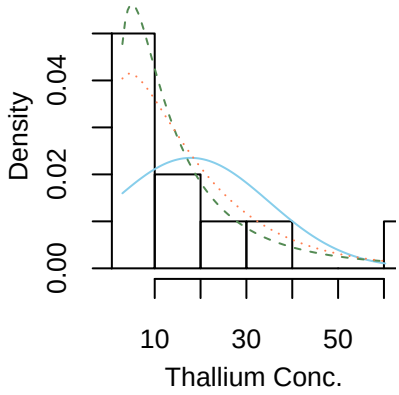


ECDF, Histogram & Q−Q (Detects Only)

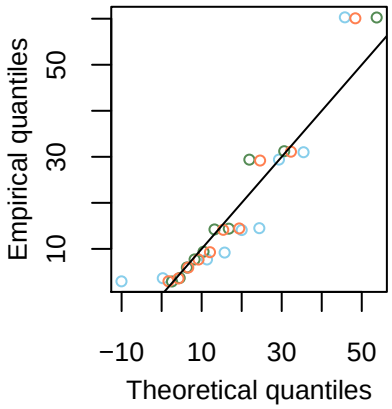
ECDF



Histogram



Q−Q



N = 14	FOD = 71%	Min (detect) = 3 J	Kaplan Meier Mean = 13
N (detect) = 10	SD (log detect) = 0.97	Max (detect) = 60 J	Kaplan Meier SD = 16

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00092	0.011	–	–	–	–	121.312	122.59
Lognormal	0.85	0.98	–	–	–	–	102.656	103.934
Gamma	–	–	0.1351	0.281	0.3716	0.777	104.695	105.973

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.014	0.031	–	–	–	–	89.0008	89.606
Lognormal	0.88	0.92	–	–	–	–	80.0818	80.687
Gamma	–	–	0.1751	0.274	0.3034	0.748	81.1853	81.7905

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Thallium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

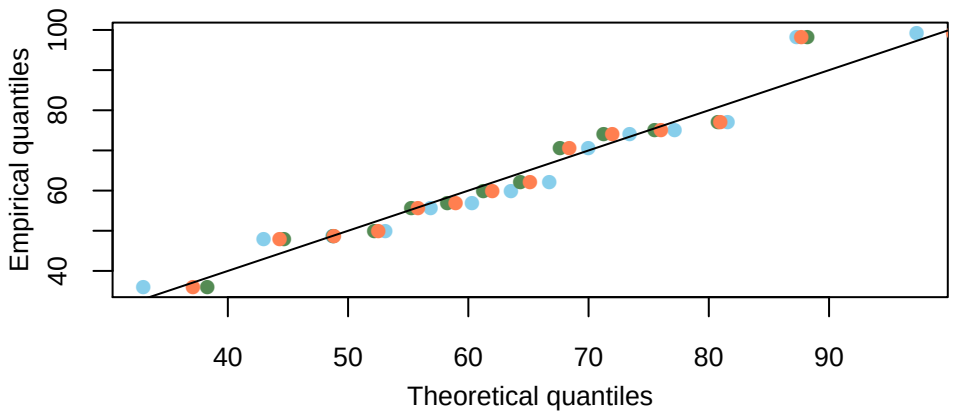
Figure **362**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Vanadium

Legend

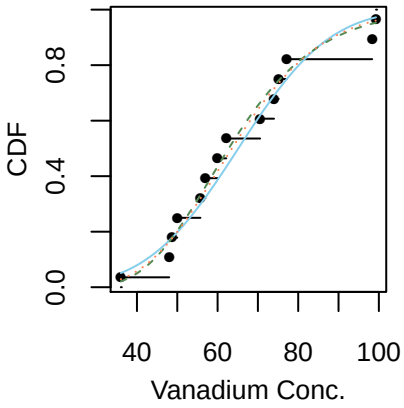
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

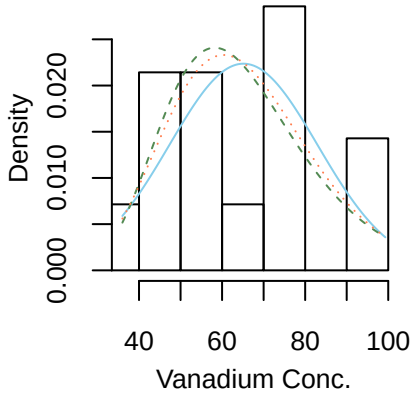


ECDF, Histogram & Q−Q (Detects Only)

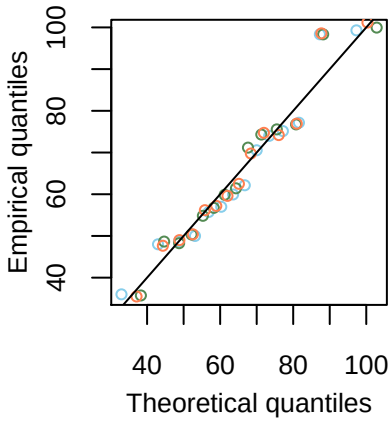
ECDF



Histogram



Q−Q



N = 14	FOD = 100%	Min (detect) = 36 J	Arithmetic Mean = 65
N (detect) = 14	SD (log detect) = 0.28	Max (detect) = 99 J	Arithmetic SD = 19

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.44	0.69	–	–	–	–	124.407	125.685
Lognormal	0.86	0.96	–	–	–	–	123.376	124.654
Gamma	–	–	0.1039	0.267	0.2435	0.725	123.441	124.719

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

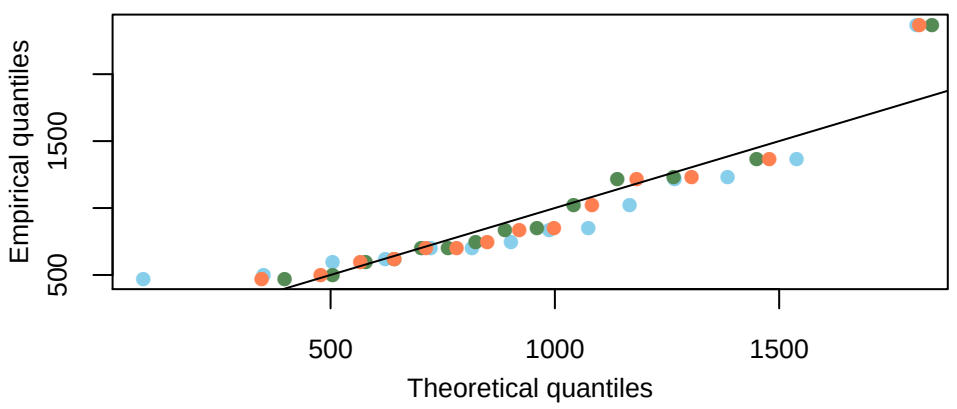
DRAFT

Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Vanadium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Zinc

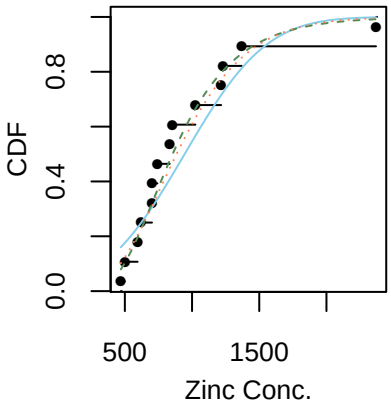
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

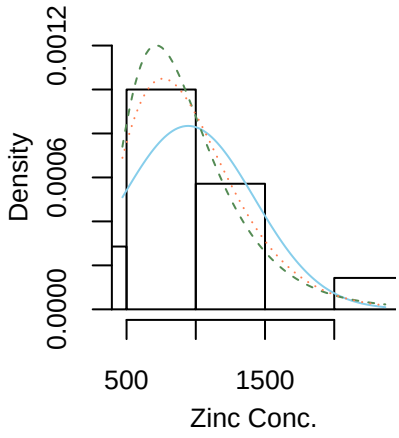


ECDF, Histogram & Q−Q (Detects Only)

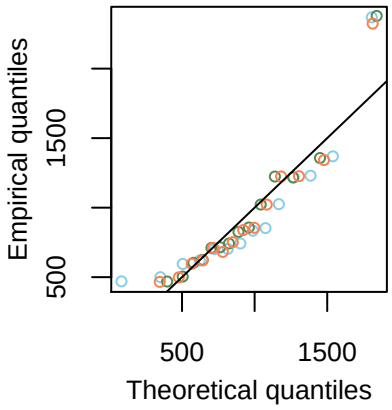
ECDF



Histogram



Q−Q



N = 14	FOD = 100%	Min (detect) = 470 J	Arithmetic Mean = 940
N (detect) = 14	SD (log detect) = 0.44	Max (detect) = 2,400 J	Arithmetic SD = 500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0053	0.075	–	–	–	–	216.487	217.765
Lognormal	0.52	0.58	–	–	–	–	208.817	210.095
Gamma	–	–	0.1752	0.267	0.4451	0.729	210.629	211.907

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

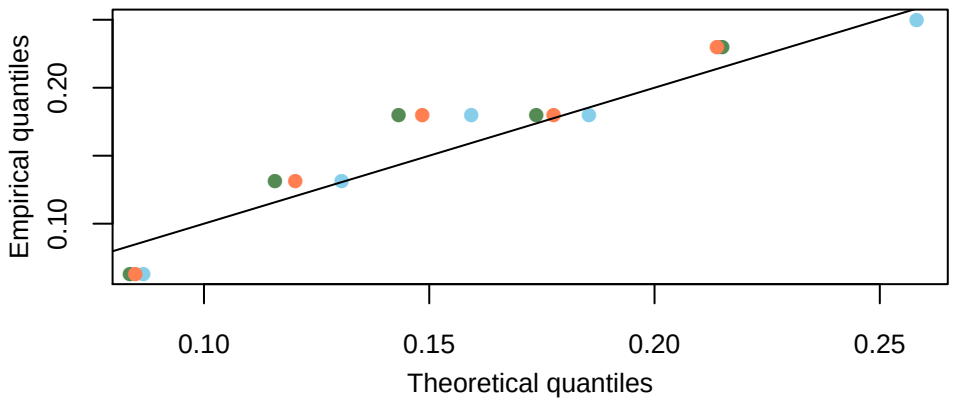
DRAFT

Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Zinc

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Benzo[a]pyrene

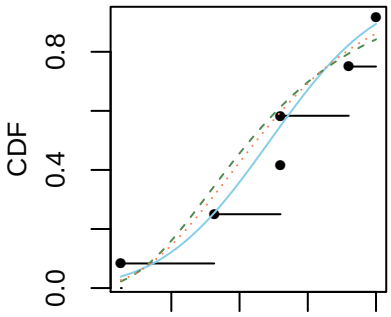
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

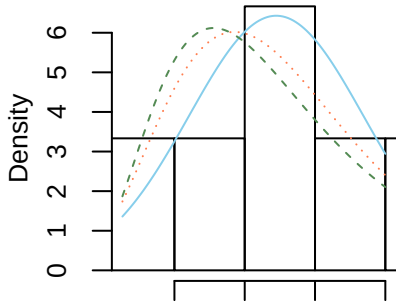


ECDF, Histogram & Q−Q (Detects Only)

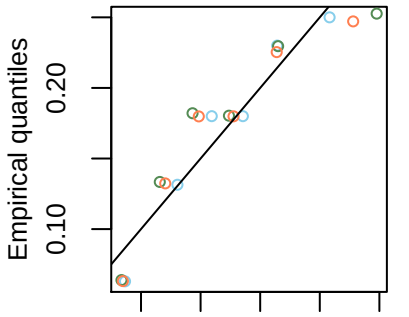
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 0.063 J	Arithmetic Mean = 0.17
N (detect) = 6	SD (log detect) = 0.5	Max (detect) = 0.25 J	Arithmetic SD = 0.068

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.72	0.55	–	–	–	–	−12.3303	−12.7468
Lognormal	0.19	0.19	–	–	–	–	−10.4726	−10.8891
Gamma	–	–	NA	NA	NA	NA	−11.3352	−11.7517

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

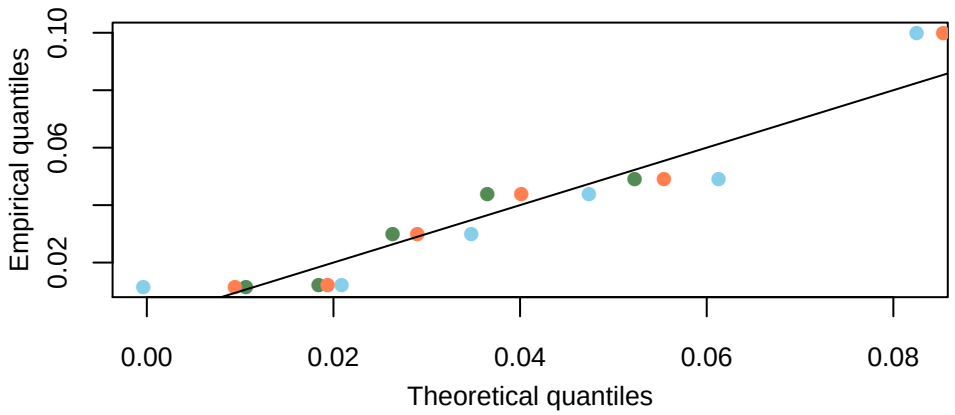
Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Benzo[a]pyrene

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

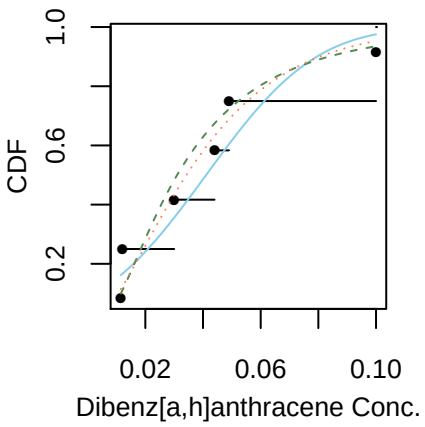
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

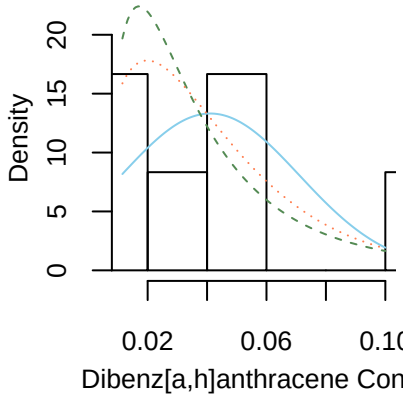


ECDF, Histogram & Q−Q (Detects Only)

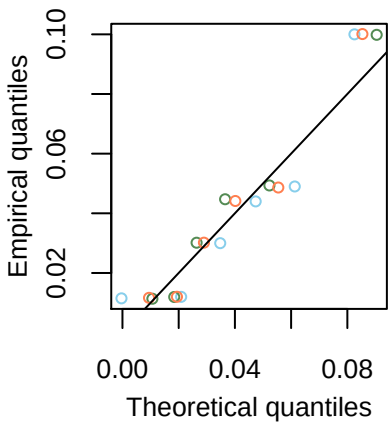
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 0.012 J	Arithmetic Mean = 0.041
N (detect) = 6	SD (log detect) = 0.85	Max (detect) = 0.1 J	Arithmetic SD = 0.033

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.23	0.36	–	–	–	–	−21.0668	−21.4833
Lognormal	0.52	0.62	–	–	–	–	−23.7297	−24.1462
Gamma	–	–	NA	NA	NA	NA	−23.5777	−23.9942

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **366**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 50%	Min (detect) = 0.013 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.02 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Aldrin

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 17%	Min (detect) = 0.012 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.012 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Heptachlor

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 5	FOD = 60%	Min (detect) = 0.0016 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.016 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

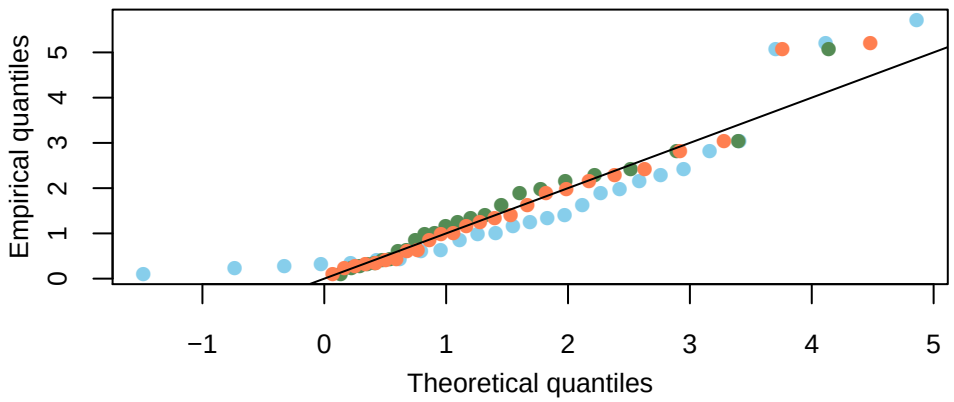
Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Heptachlor Epoxide

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

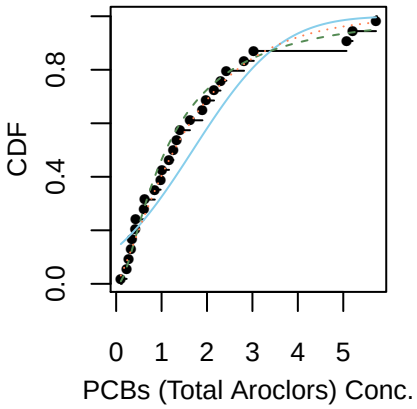
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

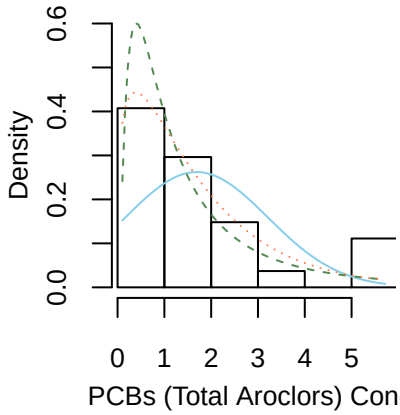


ECDF, Histogram & Q−Q (Detects Only)

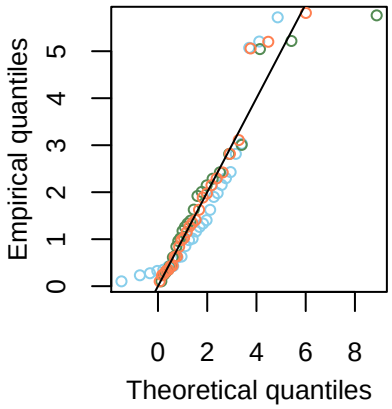
ECDF



Histogram



Q−Q



N = 27	FOD = 100%	Min (detect) = 0.1 J	Arithmetic Mean = 1
N (detect) = 27	SD (log detect) = 1	Max (detect) = 5 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00048	0.056	–	–	–	–	103.287	105.878
Lognormal	0.7	0.87	–	–	–	–	85.7214	88.313
Gamma	–	–	0.08933	0.18	0.224	0.773	85.2937	87.8854

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **370**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Eight Day Swamp
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Eight Day Swamp−Trichloroethene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **371**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Aluminum

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 10,000 J	Arithmetic Mean = 11,000
N (detect) = 3	SD (log detect) = 0	Max (detect) = 11,000 J	Arithmetic SD = 450

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Aluminum

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **372**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 33%	Min (detect) = 3 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 3 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Antimony

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Arsenic

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 16 J	Arithmetic Mean = 25
N (detect) = 3	SD (log detect) = 0	Max (detect) = 40 J	Arithmetic SD = 13

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Arsenic

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **374**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Cadmium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 4 J	Arithmetic Mean = 6
N (detect) = 3	SD (log detect) = 0	Max (detect) = 8 J	Arithmetic SD = 2

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Cadmium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **375**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Cobalt

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 12 J	Arithmetic Mean = 24
N (detect) = 3	SD (log detect) = 0	Max (detect) = 39 J	Arithmetic SD = 14

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Cobalt

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 140 J	Arithmetic Mean = 180
N (detect) = 3	SD (log detect) = 0	Max (detect) = 230 J	Arithmetic SD = 46

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Copper

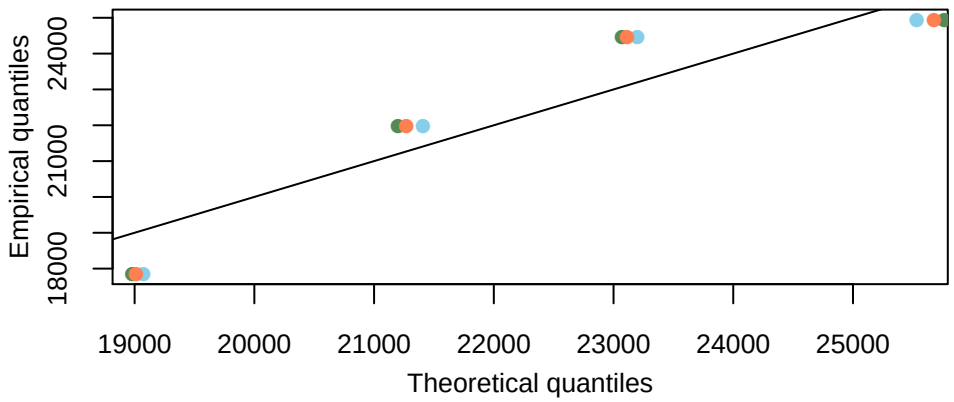
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure
377

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Iron

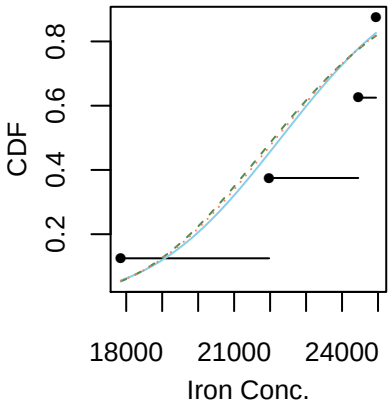
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

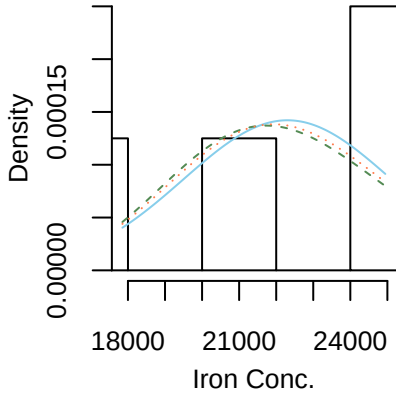


ECDF, Histogram & Q−Q (Detects Only)

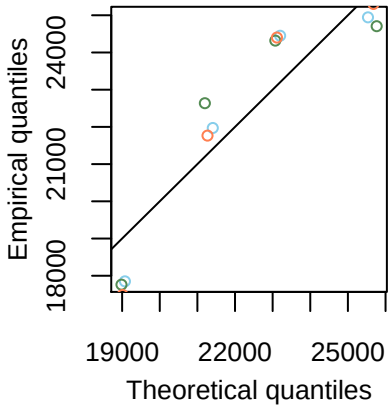
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 18,000 J	Arithmetic Mean = 22,000
N (detect) = 4	SD (log detect) = 0.15	Max (detect) = 25,000 J	Arithmetic SD = 3,200

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.37	N<5	–	–	–	–	78.8716	77.6442
Lognormal	0.3	N<5	–	–	–	–	79.2308	78.0034
Gamma	–	–	NA	NA	NA	NA	79.1004	77.873

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Iron

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

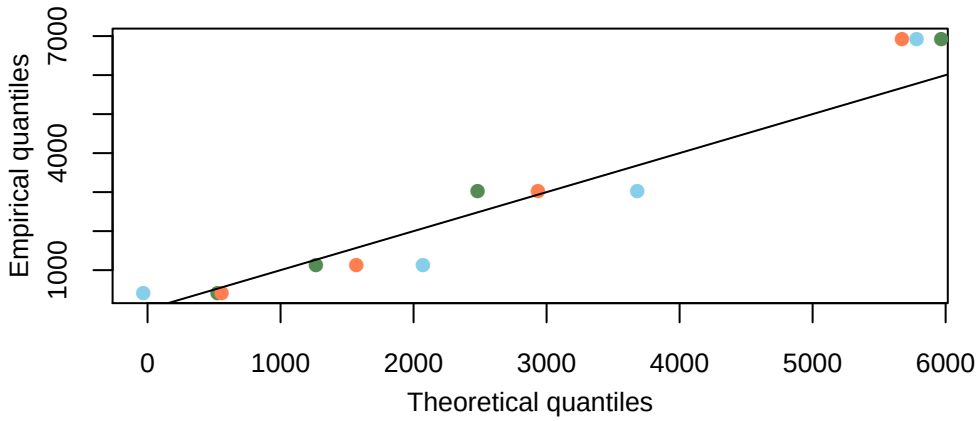
Figure **378**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Manganese

Legend

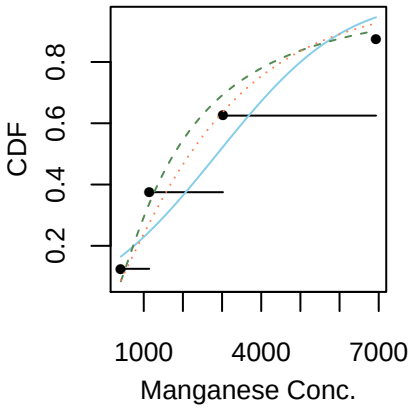
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

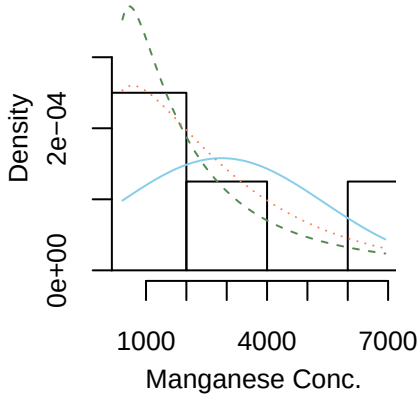


ECDF, Histogram & Q−Q (Detects Only)

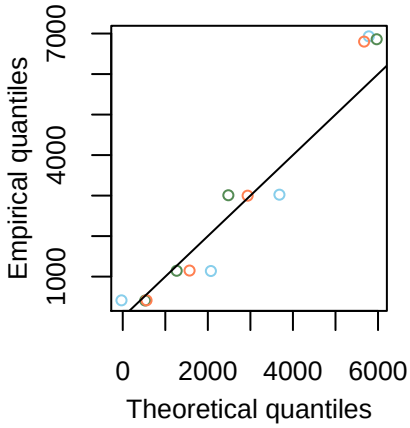
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 410 J	Arithmetic Mean = 2,900
N (detect) = 4	SD (log detect) = 1.2	Max (detect) = 6,900 J	Arithmetic SD = 2,900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.43	N<5	–	–	–	–	78.0301	76.8026
Lognormal	0.95	N<5	–	–	–	–	75.6244	74.397
Gamma	–	–	NA	NA	NA	NA	75.681	74.4536

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Manganese

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **379**

Media:
Marsh Sediment (All Samples)

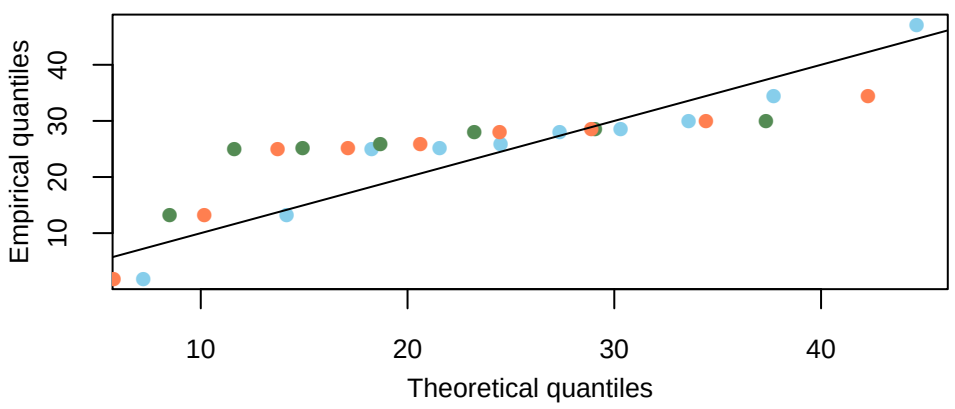
Exposure Unit:
Paterson Plank Marsh

Chemical (mg/kg):
Mercury

Legend

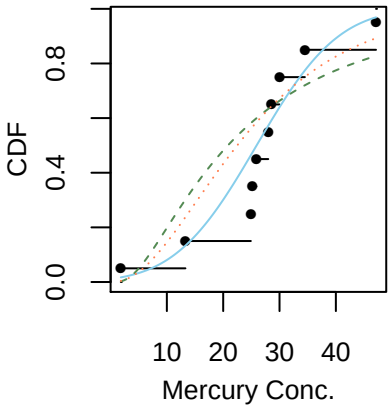
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

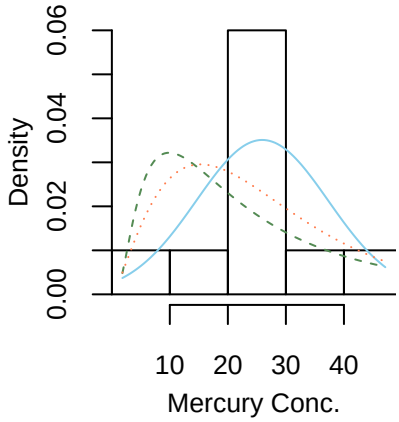


ECDF, Histogram & Q−Q (Detects Only)

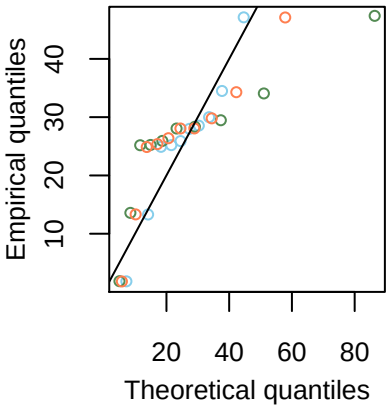
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 1	Arithmetic Mean = 26
N (detect) = 10	SD (log detect) = 0.91	Max (detect) = 47 J	Arithmetic SD = 12

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.39	0.043	–	–	–	–	80.9967	81.6019
Lognormal	0.00037	0.00023	–	–	–	–	90.2013	90.8065
Gamma	–	–	0.3609	0.27	1.11	0.736	85.5479	86.153

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **380**

Media:
Marsh Sediment (All Samples)

Exposure Unit:
Paterson Plank Marsh

Chemical (mg/kg):
Nickel

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 64 J	Arithmetic Mean = 130
N (detect) = 3	SD (log detect) = 0	Max (detect) = 200 J	Arithmetic SD = 67

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Nickel

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **381**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 6
N (detect) = 3	SD (log detect) = 0	Max (detect) = 10 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Thallium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Vanadium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 45 J	Arithmetic Mean = 67
N (detect) = 3	SD (log detect) = 0	Max (detect) = 91 J	Arithmetic SD = 23

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Vanadium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Zinc

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 530 J	Arithmetic Mean = 830
N (detect) = 3	SD (log detect) = 0	Max (detect) = 1,300 J	Arithmetic SD = 400

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Zinc

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Benzo[a]pyrene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.42 J	Arithmetic Mean = 0.42
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.42 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Benzo[a]pyrene

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.085 J	Arithmetic Mean = 0.085
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.085 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure
386

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.005 J	Arithmetic Mean = 0.005
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.005 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Aldrin

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **387**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Heptachlor

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **388**

Media:
Marsh Sediment (All Samples)

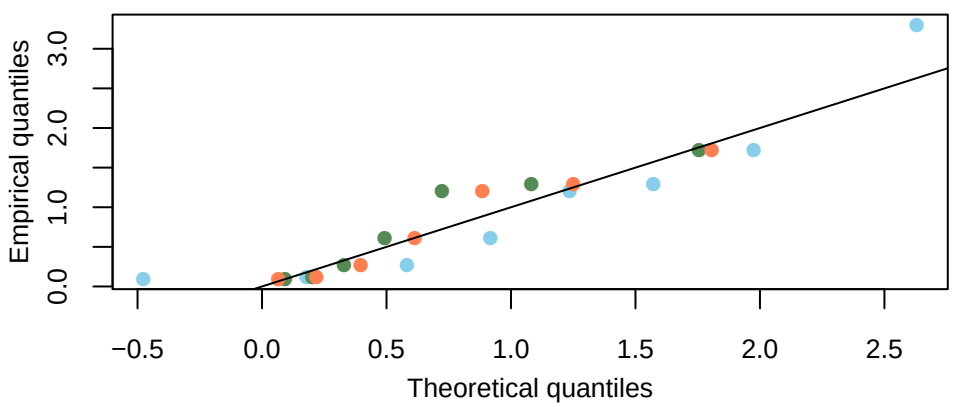
Exposure Unit:
Paterson Plank Marsh

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

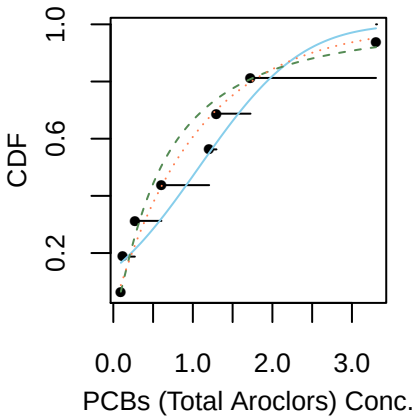
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

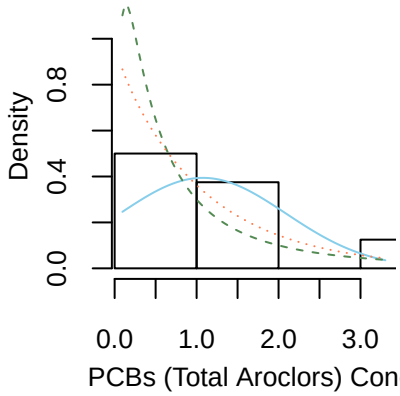


ECDF, Histogram & Q−Q (Detects Only)

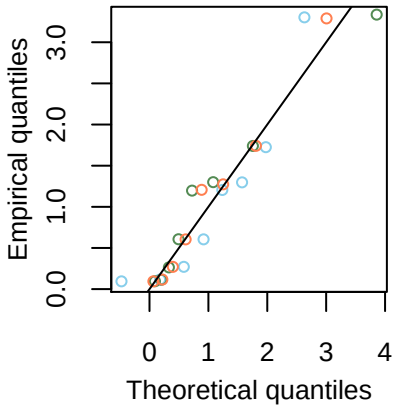
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 0.095 J	Arithmetic Mean = 1
N (detect) = 8	SD (log detect) = 1.3	Max (detect) = 3 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.14	0.61	–	–	–	–	26.9002	27.059
Lognormal	0.5	0.41	–	–	–	–	21.5785	21.7374
Gamma	–	–	0.1742	0.309	0.2573	0.762	21.187	21.3459

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **389**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Paterson Plank Marsh
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Paterson Plank Marsh−Trichloroethene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

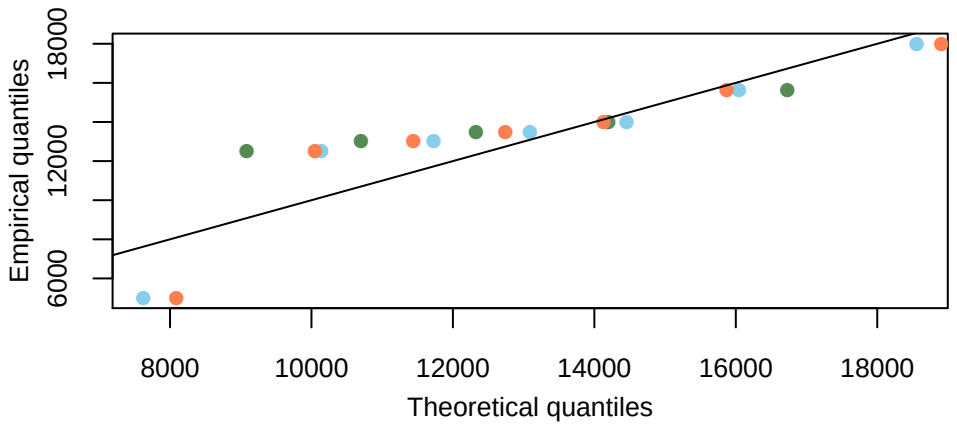
Figure **390**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Aluminum

Legend

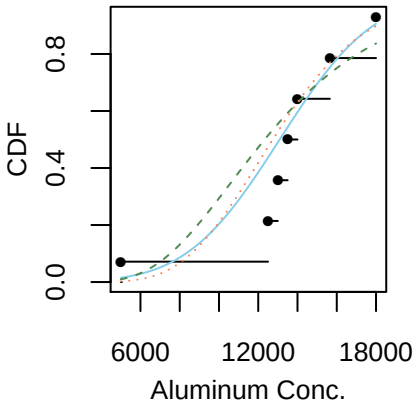
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

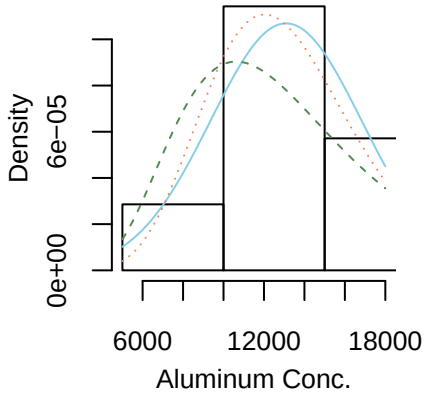


ECDF, Histogram & Q−Q (Detects Only)

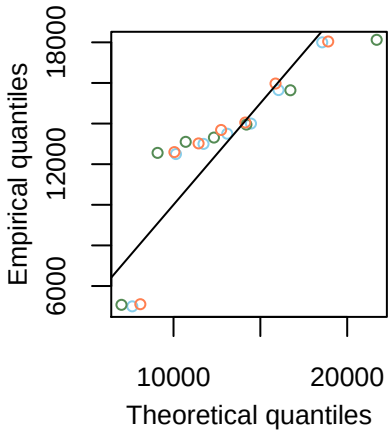
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 5,000 J	Arithmetic Mean = 13,000
N (detect) = 7	SD (log detect) = 0.42	Max (detect) = 18,000 J	Arithmetic SD = 4,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.18	0.059	–	–	–	–	139.009	138.9
Lognormal	0.0094	0.0043	–	–	–	–	142.406	142.298
Gamma	–	–	NA	NA	NA	NA	141.645	141.537

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Aluminum

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **391**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 33%	Min (detect) = 5 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 17 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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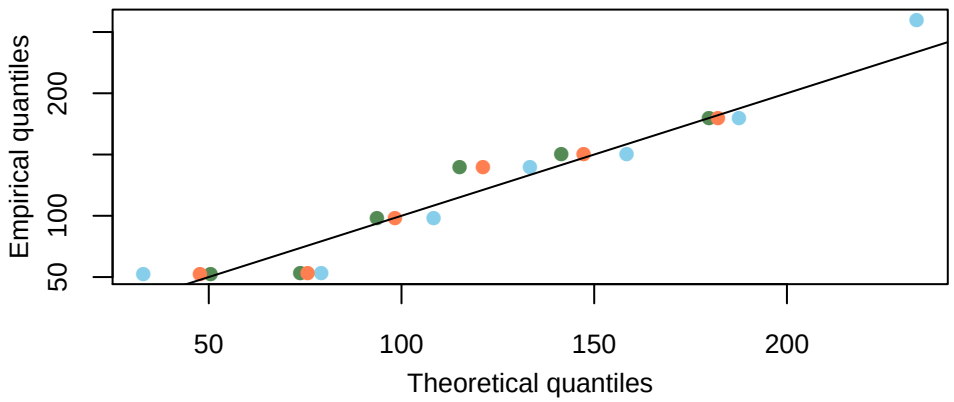
Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Antimony

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Arsenic

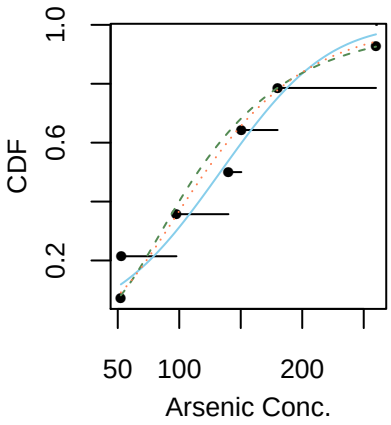
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

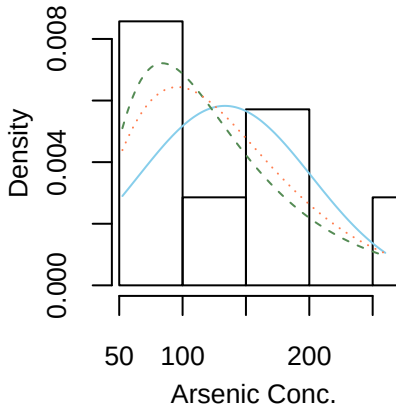


ECDF, Histogram & Q−Q (Detects Only)

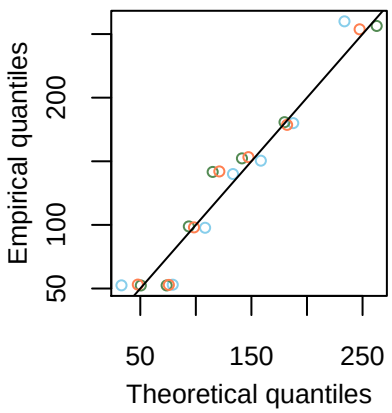
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 52 J	Arithmetic Mean = 130
N (detect) = 7	SD (log detect) = 0.61	Max (detect) = 260 J	Arithmetic SD = 74

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.6	0.92	–	–	–	–	83.0343	82.9261
Lognormal	0.47	0.56	–	–	–	–	82.2673	82.1591
Gamma	–	–	NA	NA	NA	NA	82.0851	81.977

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Arsenic

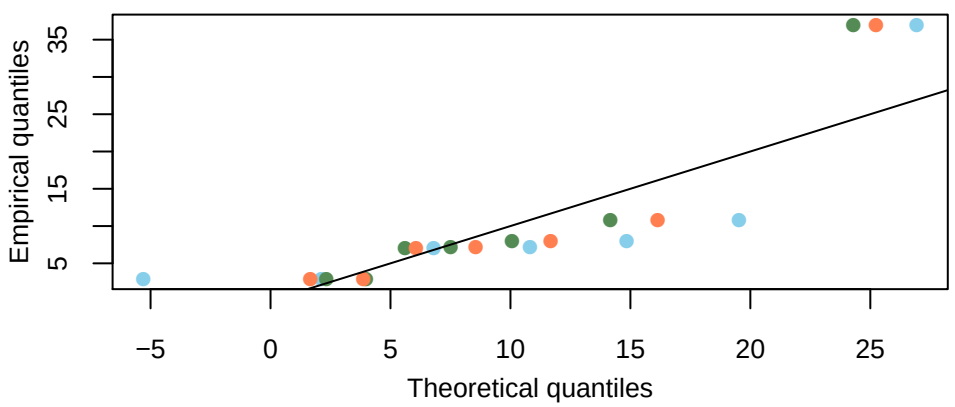
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **393**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Cadmium

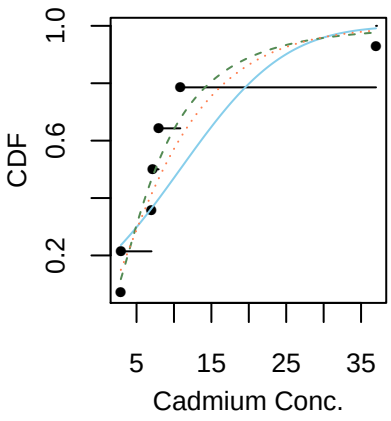
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

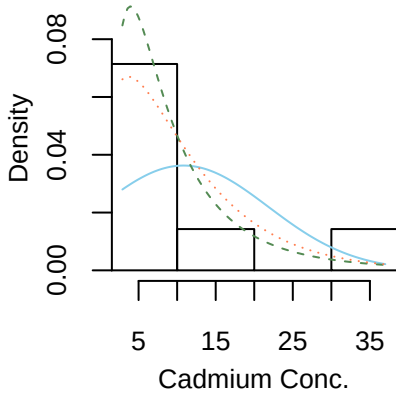


ECDF, Histogram & Q−Q (Detects Only)

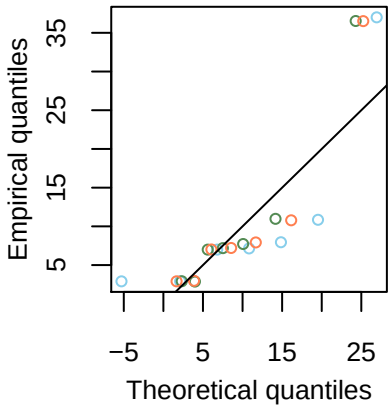
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 2 J	Arithmetic Mean = 11
N (detect) = 7	SD (log detect) = 0.87	Max (detect) = 37 J	Arithmetic SD = 12

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0016	0.0076	–	–	–	–	57.4349	57.3267
Lognormal	0.29	0.6	–	–	–	–	48.9884	48.8803
Gamma	–	–	NA	NA	NA	NA	50.6943	50.5861

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

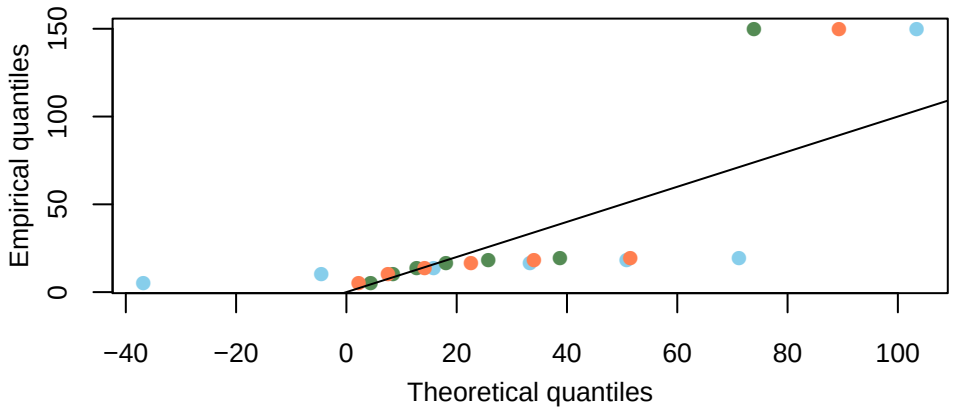
Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Cadmium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Cobalt

Legend

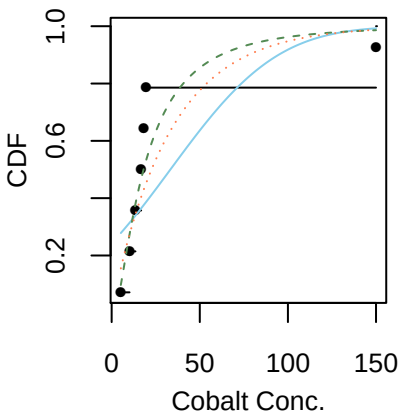
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

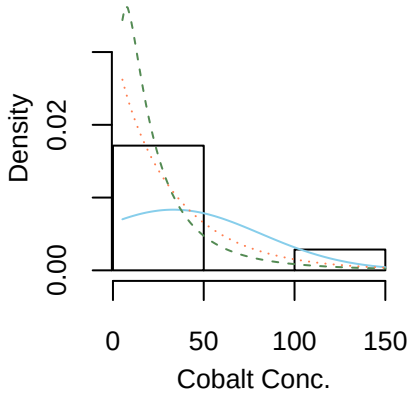


ECDF, Histogram & Q−Q (Detects Only)

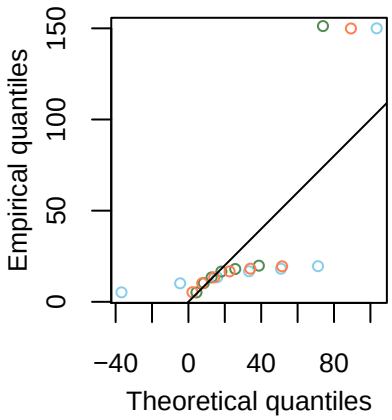
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 5 J	Arithmetic Mean = 33
N (detect) = 7	SD (log detect) = 1	Max (detect) = 150 J	Arithmetic SD = 52

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	7e−05	5.3e−05	–	–	–	–	78.0188	77.9106
Lognormal	0.11	0.022	–	–	–	–	63.8424	63.7342
Gamma	–	–	NA	NA	NA	NA	67.078	66.9699

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

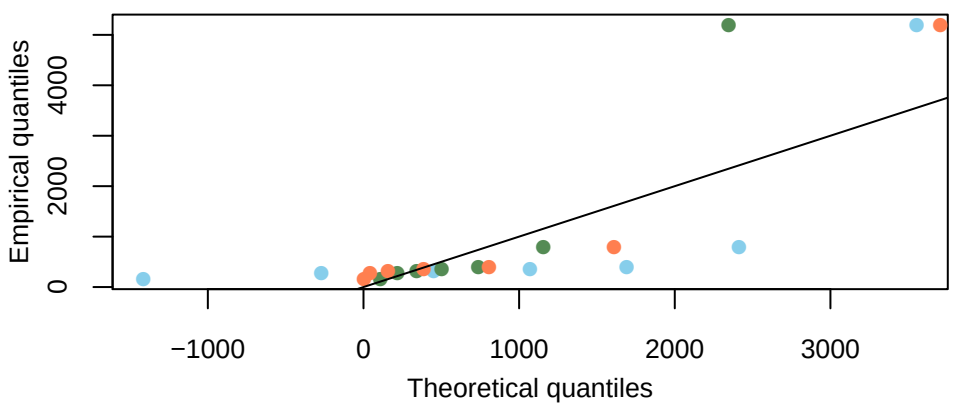
DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Cobalt

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Copper

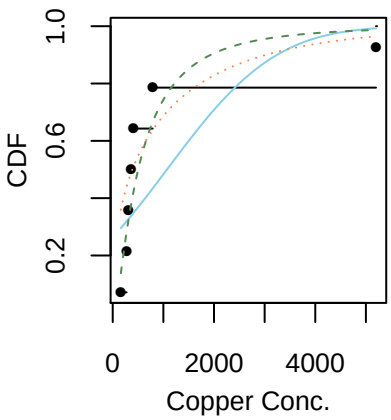
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

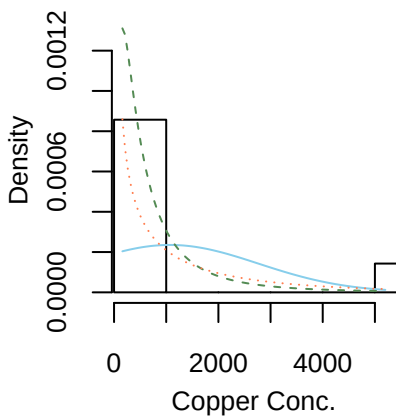


ECDF, Histogram & Q−Q (Detects Only)

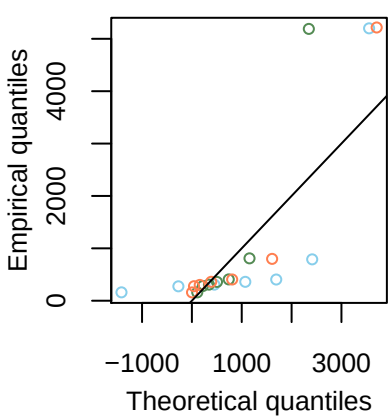
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 160 J	Arithmetic Mean = 1,100
N (detect) = 7	SD (log detect) = 1.1	Max (detect) = 5,200 J	Arithmetic SD = 1,800

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	6e−05	0.00051	–	–	–	–	127.965	127.857
Lognormal	0.073	0.077	–	–	–	–	111.646	111.538
Gamma	–	–	NA	NA	NA	NA	117.212	117.104

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

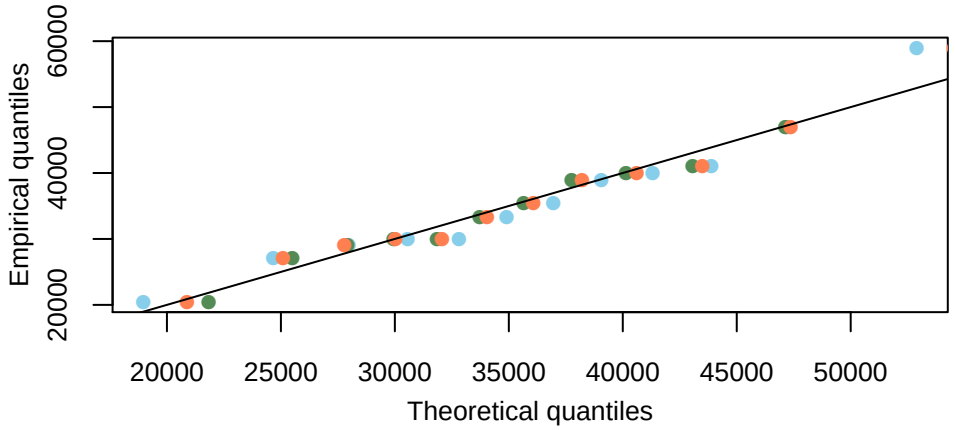
Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Copper

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Iron

Legend

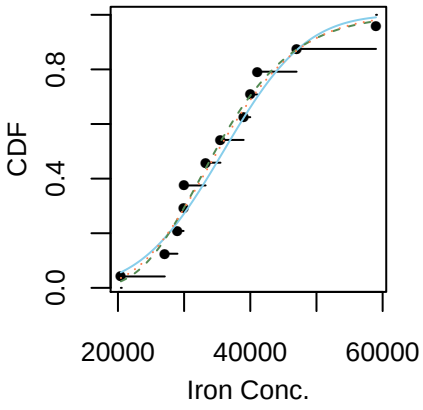
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

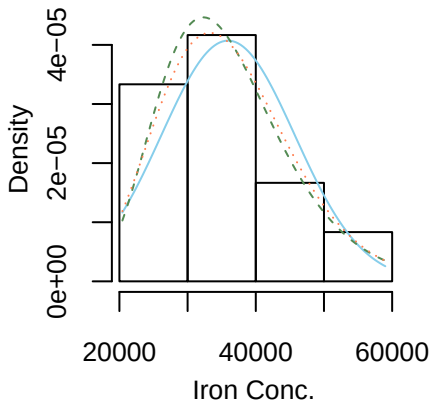


ECDF, Histogram & Q−Q (Detects Only)

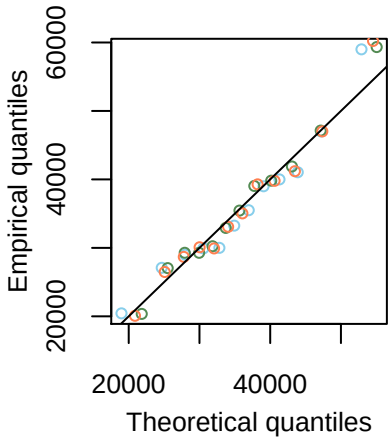
ECDF



Histogram



Q−Q



N = 12	FOD = 100%	Min (detect) = 20,000 J	Arithmetic Mean = 36,000
N (detect) = 12	SD (log detect) = 0.28	Max (detect) = 59,000 J	Arithmetic SD = 10,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.62	0.72	–	–	–	–	258.61	259.58
Lognormal	1	0.93	–	–	–	–	257.247	258.217
Gamma	–	–	0.1255	0.267	0.1947	0.725	257.452	258.421

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Iron

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **397**

Media:
Marsh Sediment (All Samples)

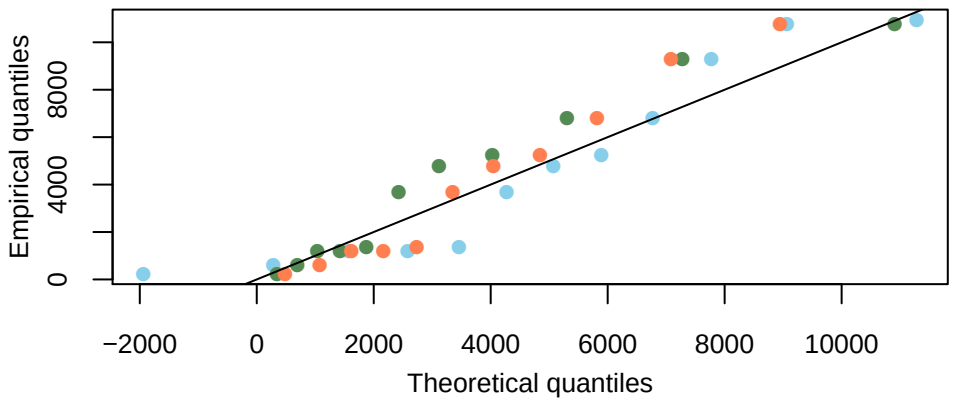
Exposure Unit:
UPIC Marsh

Chemical (mg/kg):
Manganese

Legend

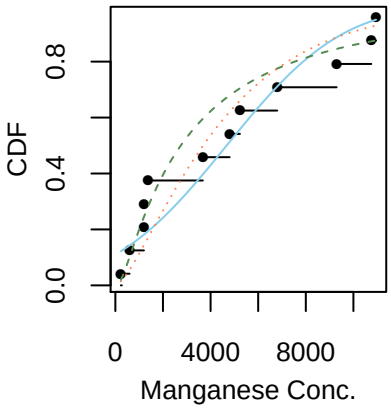
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

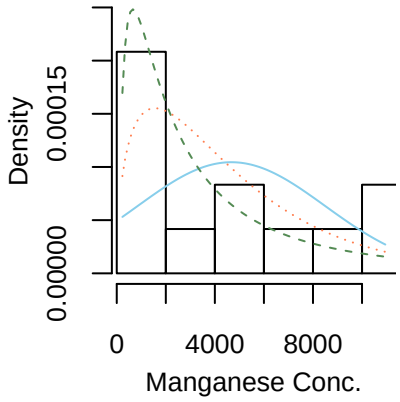


ECDF, Histogram & Q−Q (Detects Only)

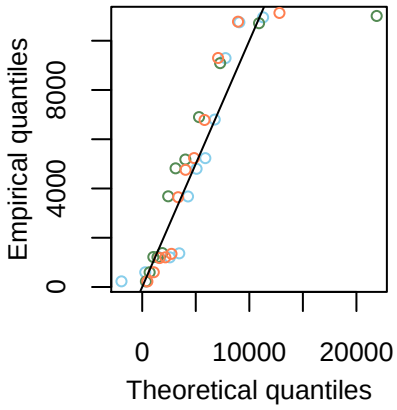
ECDF



Histogram



Q−Q



N = 12	FOD = 100%	Min (detect) = 230 J	Arithmetic Mean = 4,700
N (detect) = 12	SD (log detect) = 1.3	Max (detect) = 11,000 J	Arithmetic SD = 4,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.094	0.14	–	–	–	–	235.993	236.963
Lognormal	0.23	0.39	–	–	–	–	232.45	233.42
Gamma	–	–	0.2475	0.274	0.7647	0.748	231.675	232.645

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Manganese

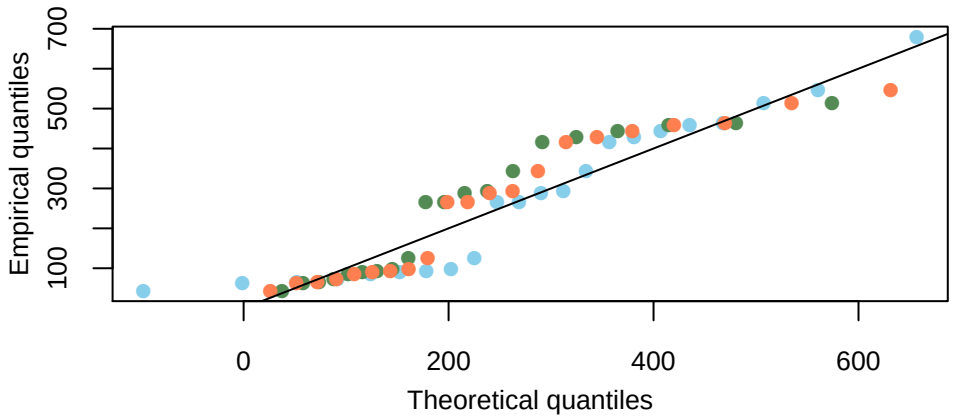
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **398**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Mercury

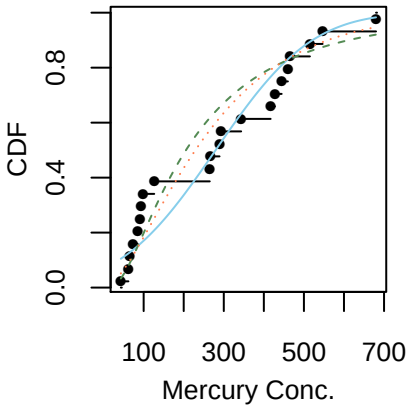
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

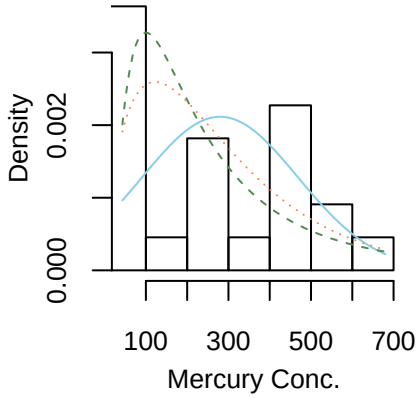


ECDF, Histogram & Q−Q (Detects Only)

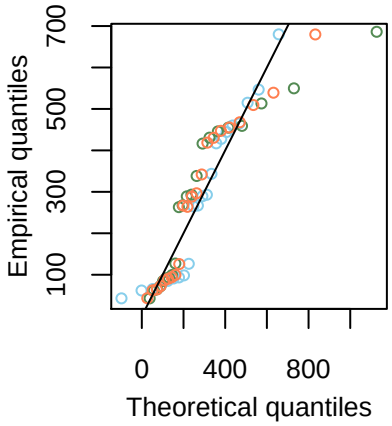
ECDF



Histogram



Q−Q



N = 22	FOD = 100%	Min (detect) = 43 J	Arithmetic Mean = 280
N (detect) = 22	SD (log detect) = 0.87	Max (detect) = 680 J	Arithmetic SD = 190

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.039	0.029	–	–	–	–	296.982	299.164
Lognormal	0.022	0.016	–	–	–	–	293.649	295.832
Gamma	–	–	0.1841	0.191	0.9382	0.771	292.211	294.393

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

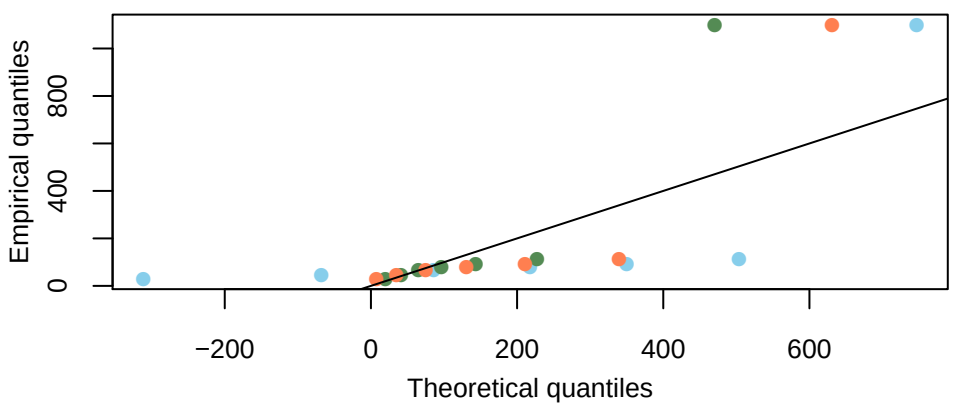
DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Mercury

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Nickel

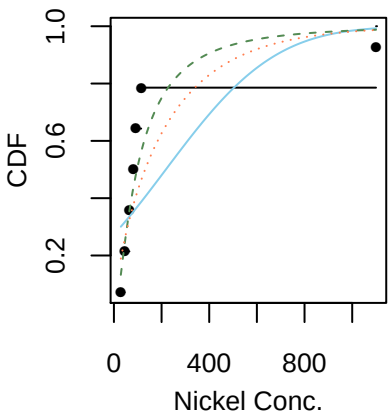
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

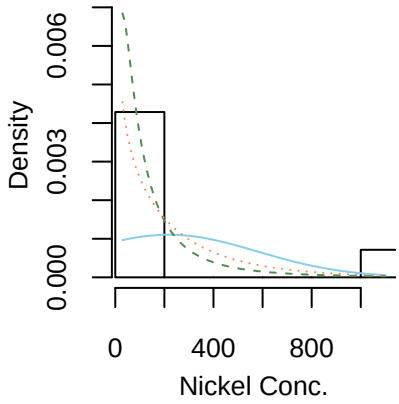


ECDF, Histogram & Q−Q (Detects Only)

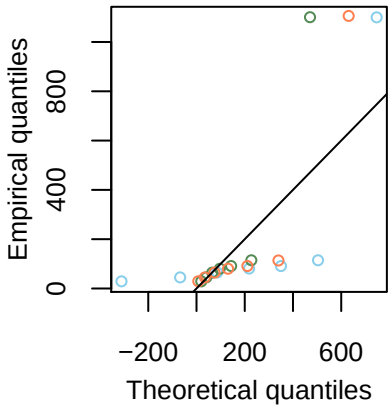
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 29 J	Arithmetic Mean = 220
N (detect) = 7	SD (log detect) = 1.2	Max (detect) = 1,100 J	Arithmetic SD = 390

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	3e−05	5.5e−05	–	–	–	–	106.312	106.204
Lognormal	0.072	0.057	–	–	–	–	88.9407	88.8325
Gamma	–	–	NA	NA	NA	NA	92.8977	92.7895

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Nickel

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **400**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 7	FOD = 43%	Min (detect) = 2 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 6 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Thallium

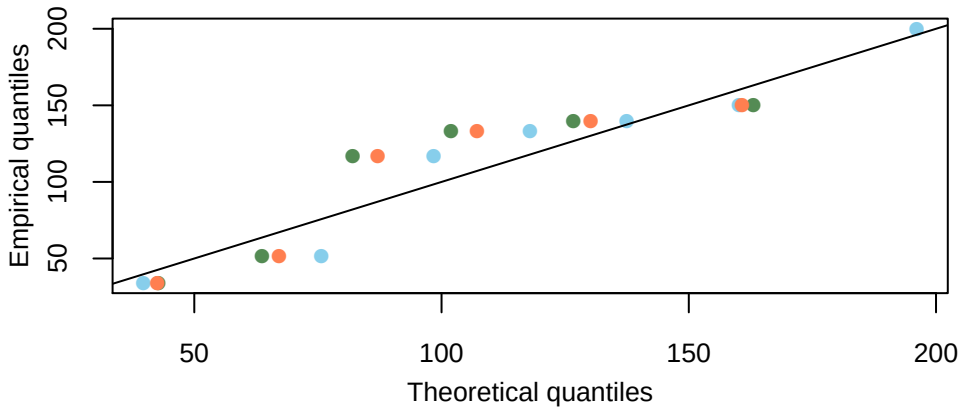
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **401**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Vanadium

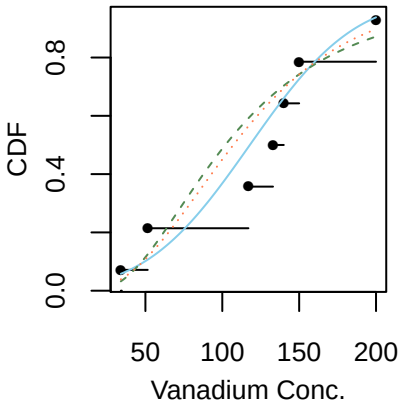
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

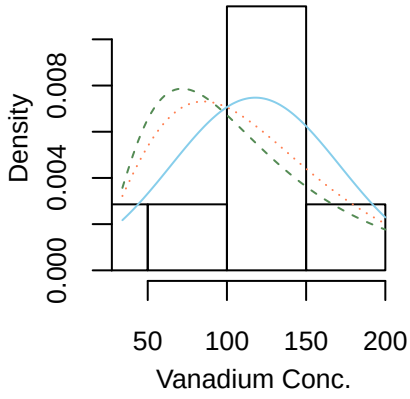


ECDF, Histogram & Q−Q (Detects Only)

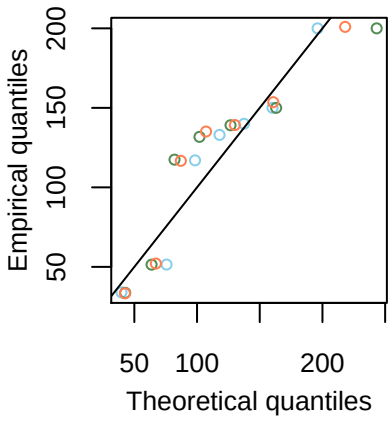
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 34 J	Arithmetic Mean = 120
N (detect) = 7	SD (log detect) = 0.64	Max (detect) = 200 J	Arithmetic SD = 58

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.59	0.48	–	–	–	–	79.5458	79.4376
Lognormal	0.14	0.058	–	–	–	–	81.303	81.1948
Gamma	–	–	NA	NA	NA	NA	80.3043	80.1961

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Vanadium

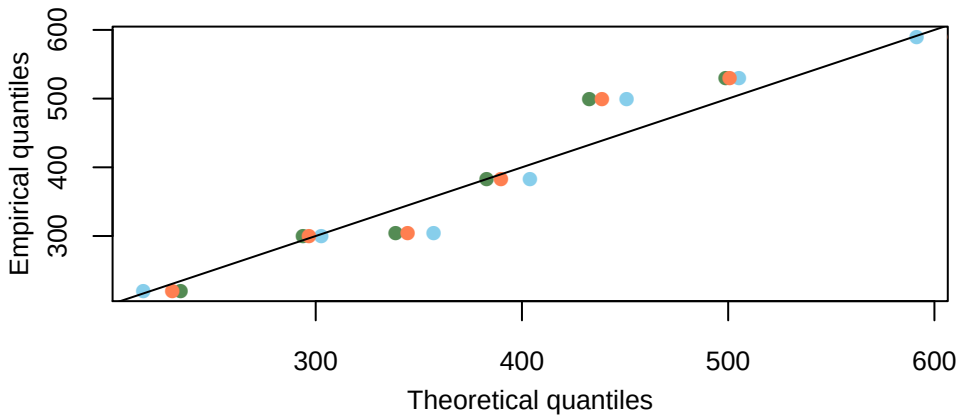
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **402**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Zinc

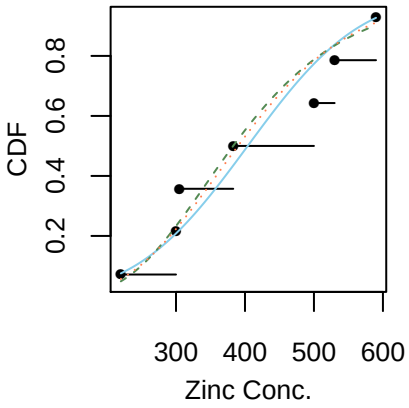
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

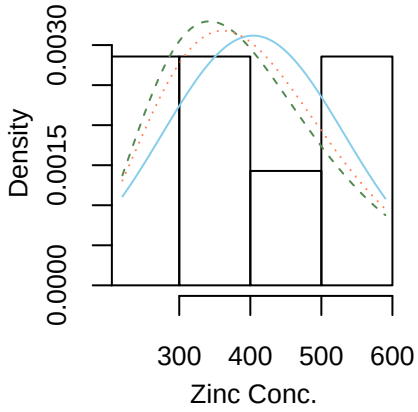


ECDF, Histogram & Q−Q (Detects Only)

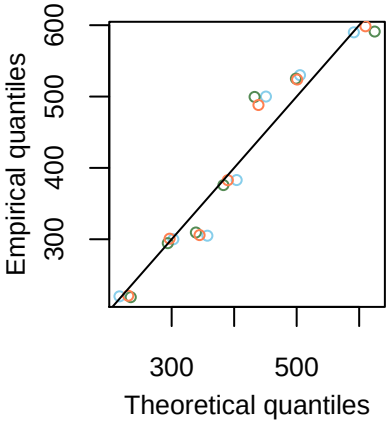
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 220 J	Arithmetic Mean = 400
N (detect) = 7	SD (log detect) = 0.36	Max (detect) = 590 J	Arithmetic SD = 140

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.62	0.61	–	–	–	–	91.7883	91.6801
Lognormal	0.63	0.55	–	–	–	–	91.7907	91.6825
Gamma	–	–	NA	NA	NA	NA	91.6498	91.5416

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Zinc

Media:
Marsh Sediment (All Samples)

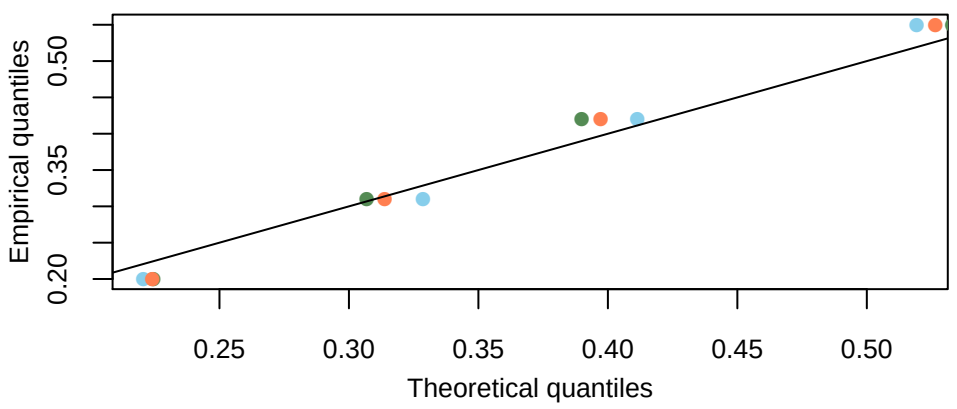
Exposure Unit:
UPIC Marsh

Chemical (mg/kg):
Benzo[a]pyrene

Legend

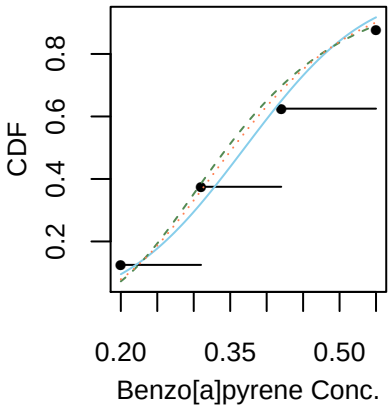
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

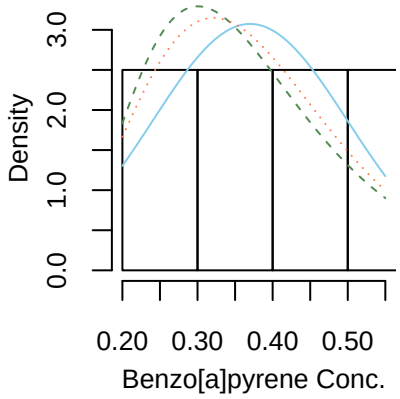


ECDF, Histogram & Q−Q (Detects Only)

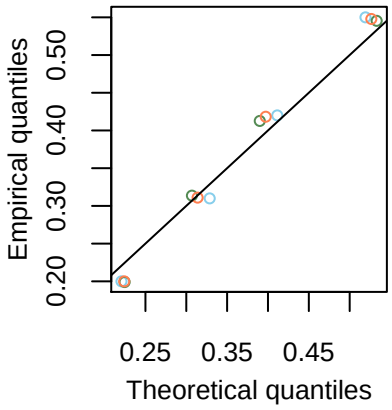
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 0.2 J	Arithmetic Mean = 0.37
N (detect) = 4	SD (log detect) = 0.43	Max (detect) = 0.55 J	Arithmetic SD = 0.15

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.98	N<5	–	–	–	–	−0.98211	−2.20952
Lognormal	0.93	N<5	–	–	–	–	−0.970115	−2.19753
Gamma	–	–	NA	NA	NA	NA	−1.0773	−2.30471

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Benzo[a]pyrene

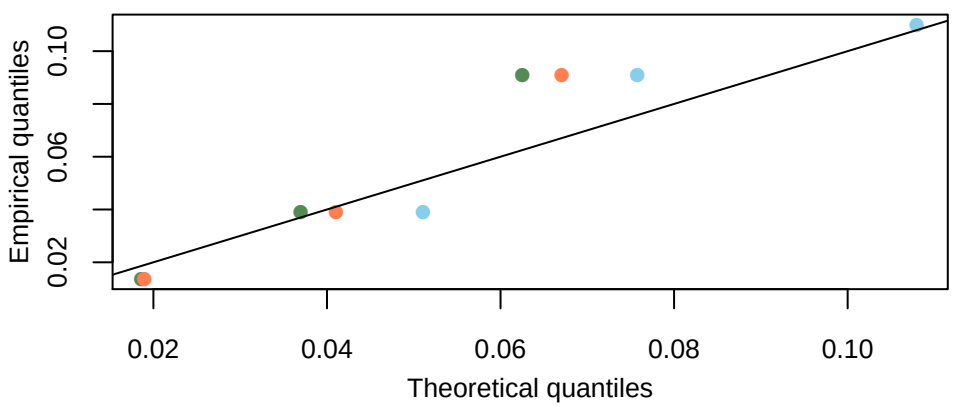
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **404**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Dibenz[a,h]anthracene

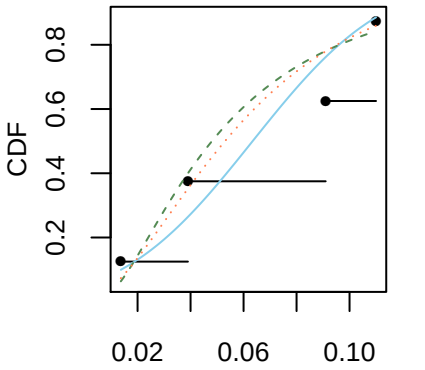
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

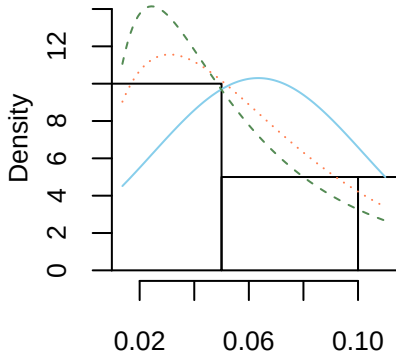


ECDF, Histogram & Q−Q (Detects Only)

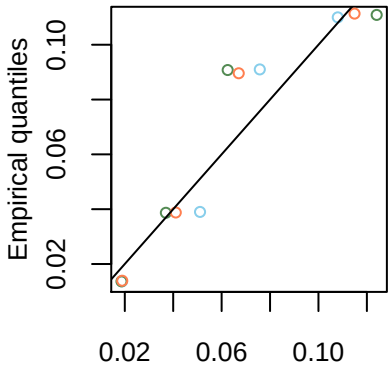
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 0.014 J	Arithmetic Mean = 0.063
N (detect) = 4	SD (log detect) = 0.95	Max (detect) = 0.11 J	Arithmetic SD = 0.045

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.62	N<5	–	–	–	–	−10.6568	−11.8842
Lognormal	0.49	N<5	–	–	–	–	−10.4773	−11.7047
Gamma	–	–	NA	NA	NA	NA	−10.9384	−12.1658

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **405**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 4	FOD = 50%	Min (detect) = 0.0065 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.045 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Aldrin

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 4	FOD = 50%	Min (detect) = 0.0085 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.021 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Heptachlor

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 67%	Min (detect) = 5e−04 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.0091 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

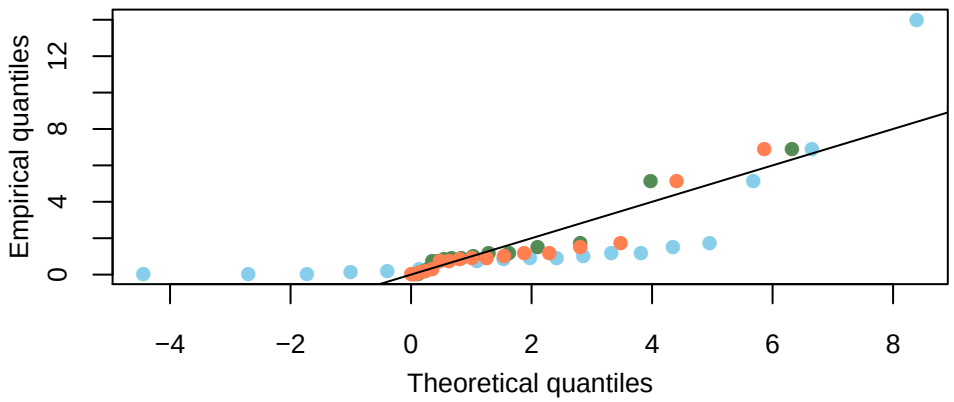
Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Heptachlor Epoxide

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

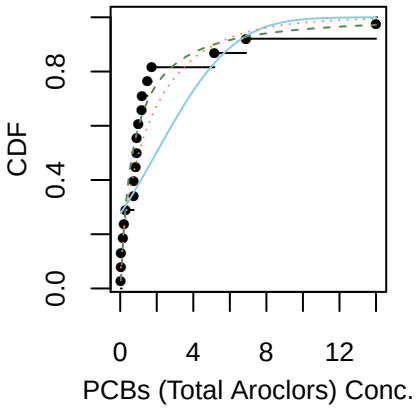
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

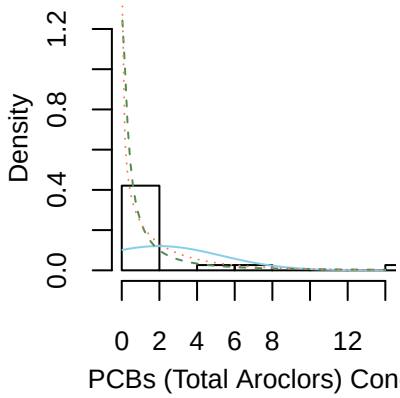


ECDF, Histogram & Q−Q (Detects Only)

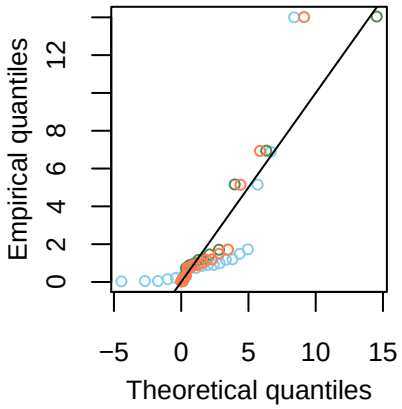
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 0.034 J	Arithmetic Mean = 2
N (detect) = 19	SD (log detect) = 1.6	Max (detect) = 14 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.5e−07	–	–	–	–	103.42	105.309
Lognormal	0.35	0.033	–	–	–	–	60.525	62.4139
Gamma	–	–	0.2072	0.21	0.7484	0.803	63.1698	65.0587

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **409**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
UPIC Marsh
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 4	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Upper Peach Island Creek Marsh−Trichloroethene

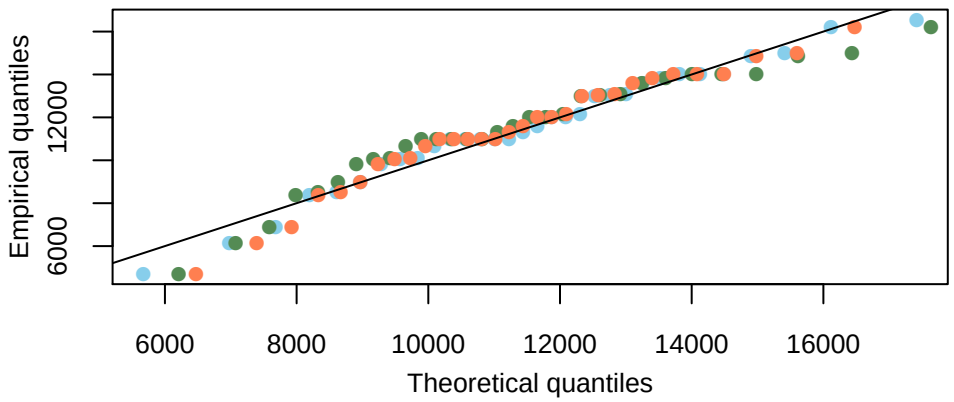
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **410**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Aluminum

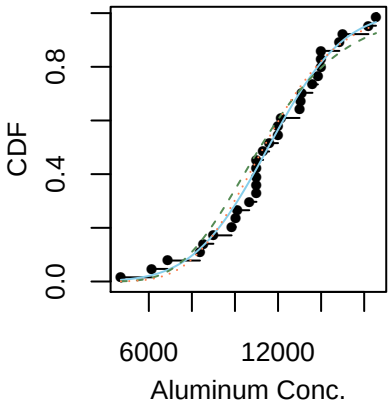
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

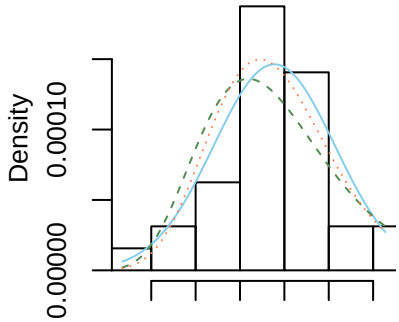


ECDF, Histogram & Q−Q (Detects Only)

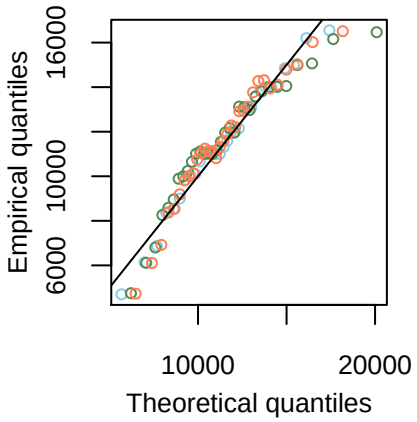
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 4,700	Arithmetic Mean = 12,000
N (detect) = 32	SD (log detect) = 0.28	Max (detect) = 17,000 J	Arithmetic SD = 2,800

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.63	0.43	–	–	–	–	601.1	604.031
Lognormal	0.0078	0.026	–	–	–	–	608.158	611.089
Gamma	–	–	0.1378	0.16	0.6256	0.745	605.517	608.448

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Aluminum

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

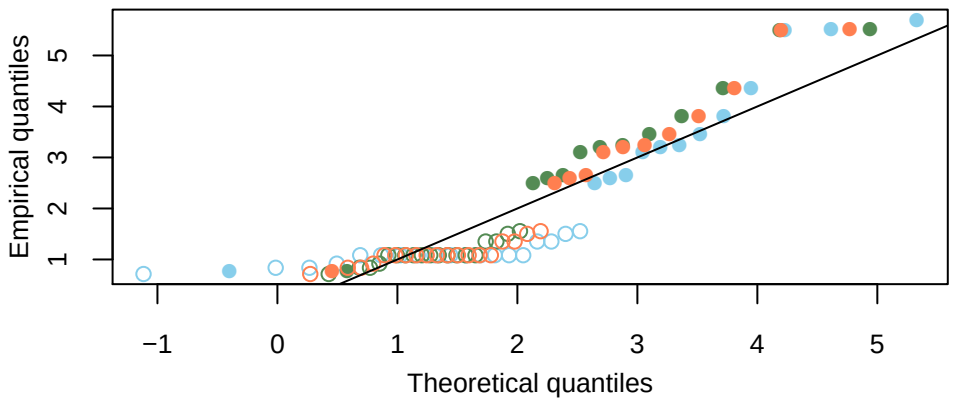
Figure **411**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Antimony

Legend

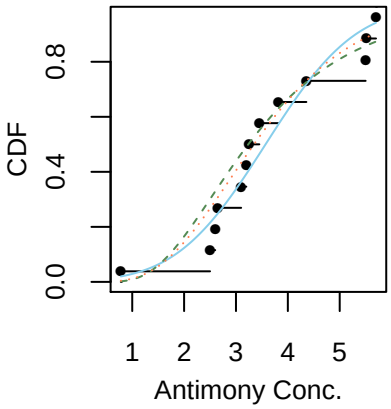
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

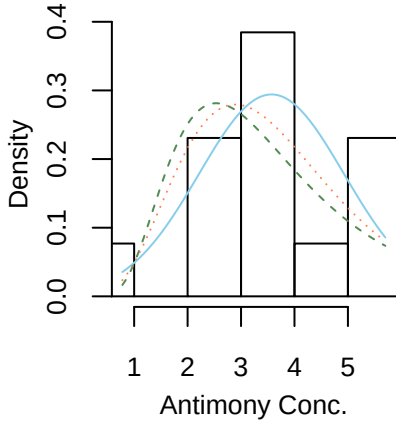


ECDF, Histogram & Q−Q (Detects Only)

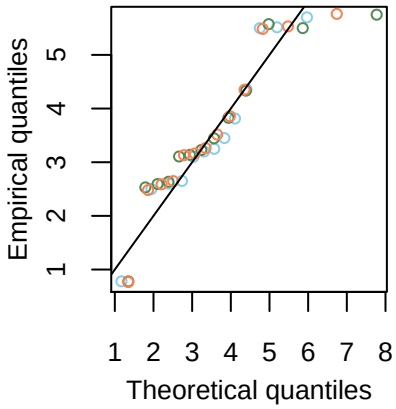
ECDF



Histogram



Q−Q



N = 32	FOD = 41%	Min (detect) = 0.78 J	Kaplan Meier Mean = 1
N (detect) = 13	SD (log detect) = 0.52	Max (detect) = 5 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	2e−05	3.6e−06	–	–	–	–	120.6	123.532
Lognormal	0.0012	1.5e−05	–	–	–	–	99.8229	102.754
Gamma	–	–	0.2609	0.162	2.119	0.758	104.298	107.23

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.36	0.59	–	–	–	–	48.8151	49.945
Lognormal	0.014	0.056	–	–	–	–	53.1584	54.2883
Gamma	–	–	0.1899	0.267	0.5211	0.729	50.6524	51.7823

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Antimony

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

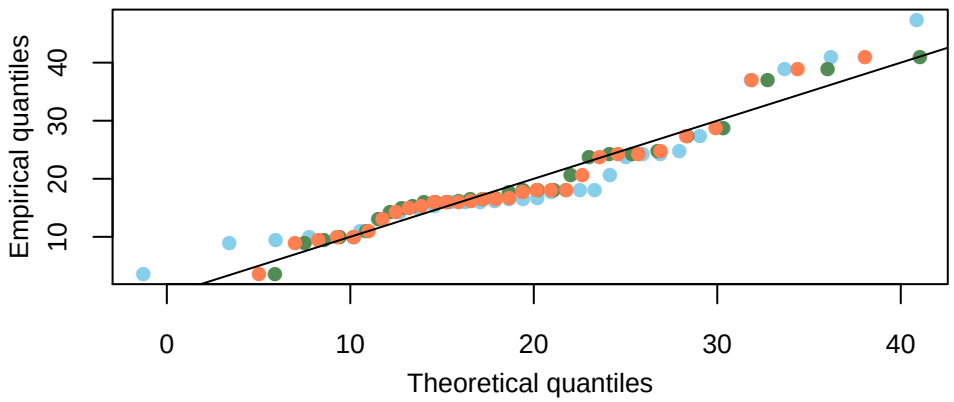
Figure **412**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Arsenic

Legend

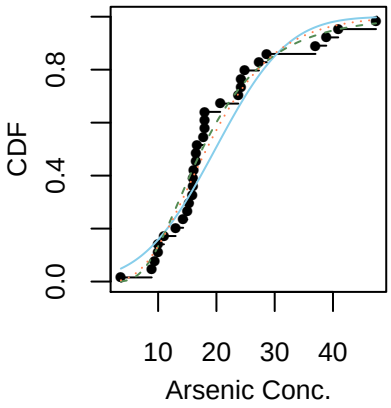
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

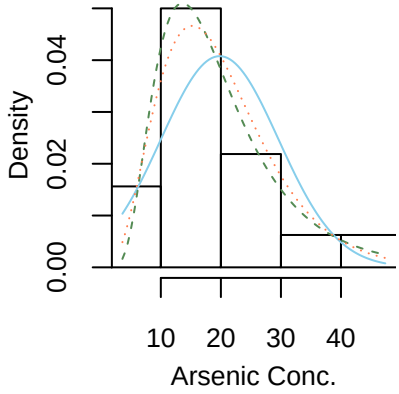


ECDF, Histogram & Q−Q (Detects Only)

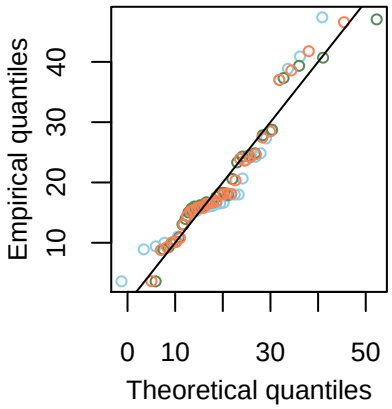
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 3	Arithmetic Mean = 20
N (detect) = 32	SD (log detect) = 0.51	Max (detect) = 47 J	Arithmetic SD = 9

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.004	0.00019	–	–	–	–	240.779	243.71
Lognormal	0.11	0.13	–	–	–	–	234.699	237.63
Gamma	–	–	0.1697	0.162	0.6288	0.758	233.766	236.697

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Arsenic

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

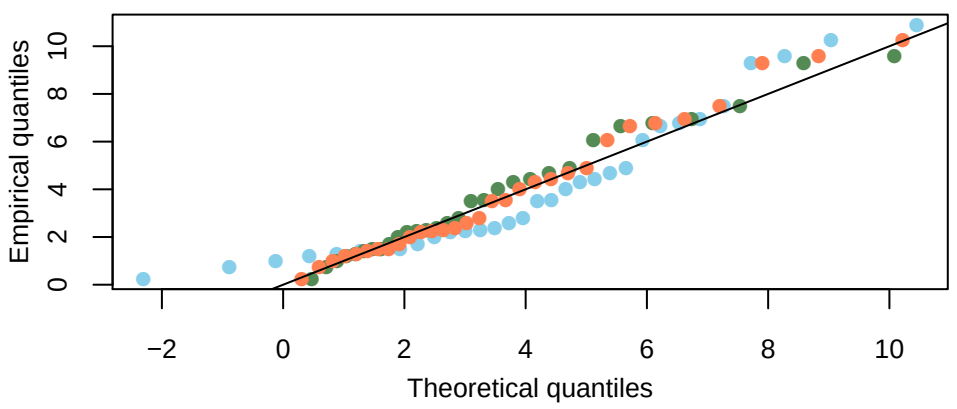
Figure **413**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Cadmium

Legend

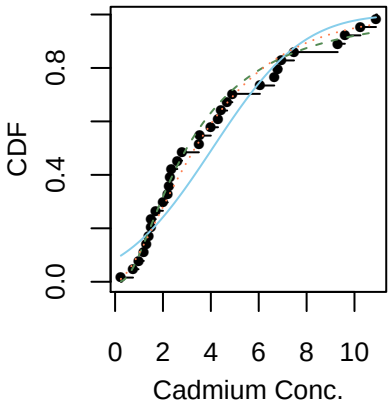
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

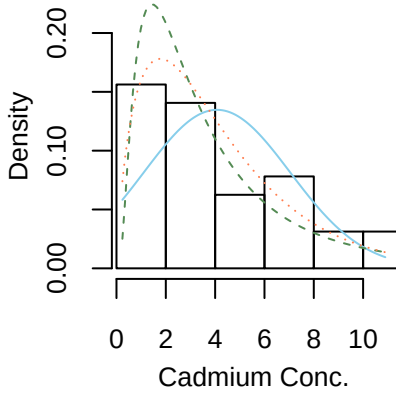


ECDF, Histogram & Q−Q (Detects Only)

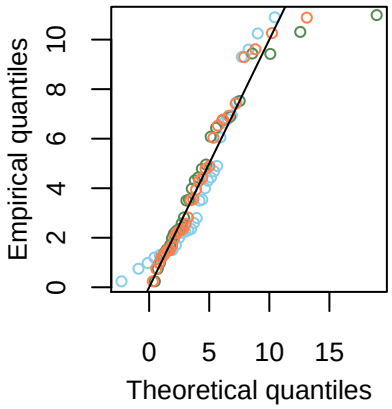
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 0.24 J	Arithmetic Mean = 4
N (detect) = 32	SD (log detect) = 0.87	Max (detect) = 11 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0051	0.028	–	–	–	–	164.287	167.218
Lognormal	0.23	0.94	–	–	–	–	155.077	158.009
Gamma	–	–	0.09546	0.165	0.2785	0.775	152.601	155.533

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Walden Swamp−Cadmium

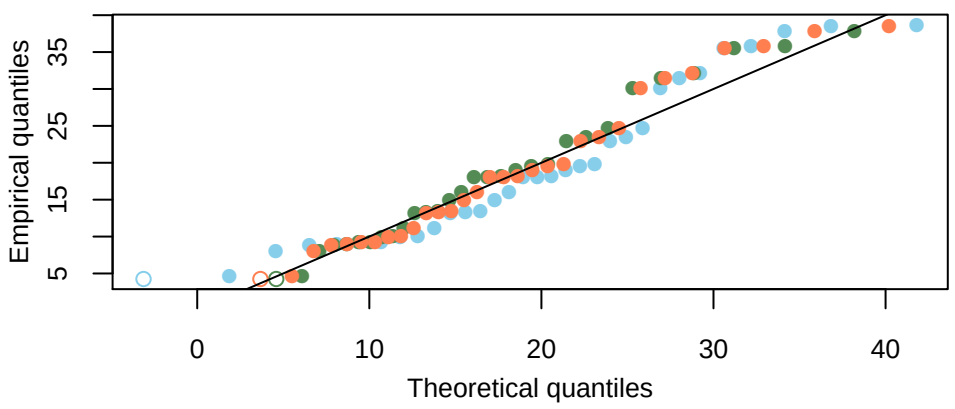
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **414**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Cobalt

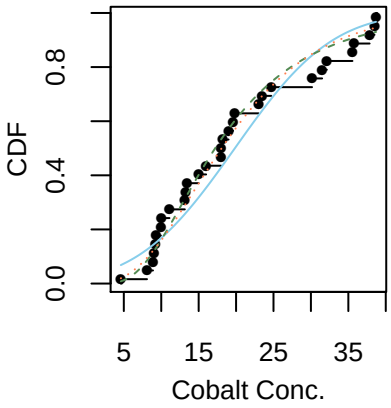
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

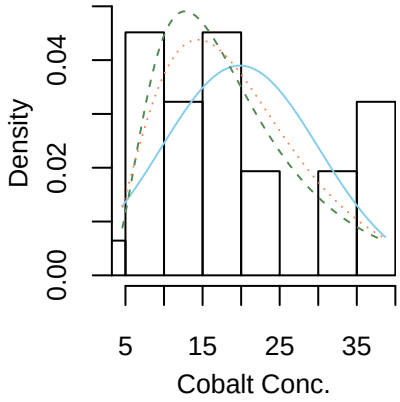


ECDF, Histogram & Q−Q (Detects Only)

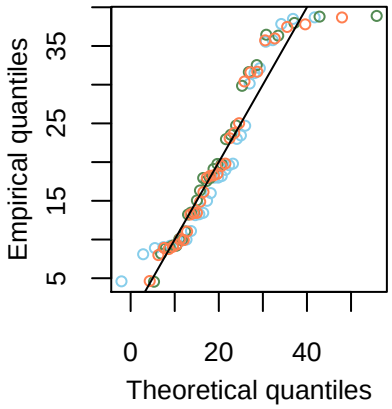
ECDF



Histogram



Q−Q



N = 32	FOD = 97%	Min (detect) = 4 J	Kaplan Meier Mean = 19
N (detect) = 31	SD (log detect) = 0.56	Max (detect) = 39 J	Kaplan Meier SD = 11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.016	0.12	–	–	–	–	244.884	247.815
Lognormal	0.16	0.7	–	–	–	–	240.674	243.606
Gamma	–	–	0.1016	0.162	0.4199	0.758	239.547	242.479

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.013	0.088	–	–	–	–	236.172	239.04
Lognormal	0.2	0.59	–	–	–	–	231.264	234.132
Gamma	–	–	0.1067	0.162	0.4999	0.758	230.861	233.729

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Cobalt

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **415**

Media:
Marsh Sediment (All Samples)

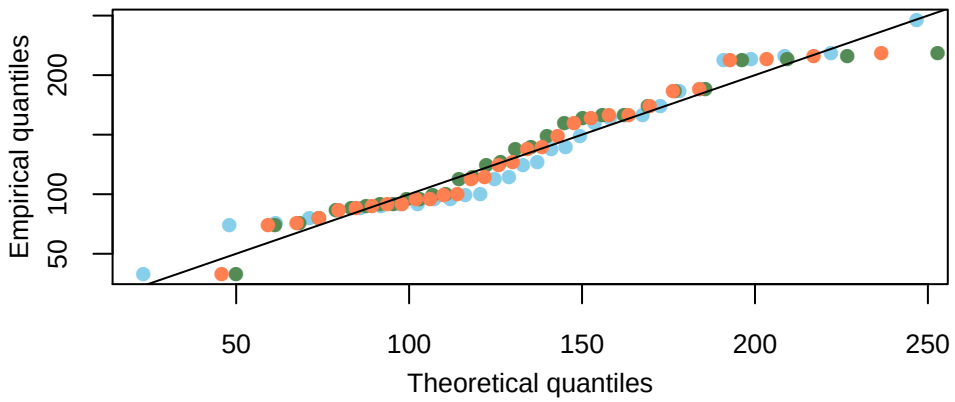
Exposure Unit:
Walden Swamp

Chemical (mg/kg):
Copper

Legend

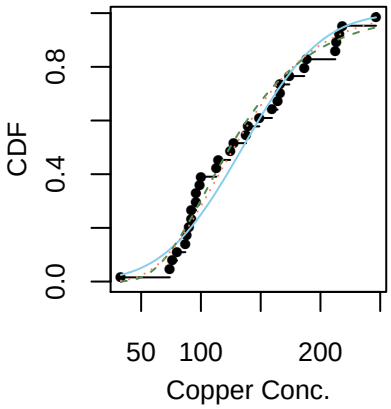
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

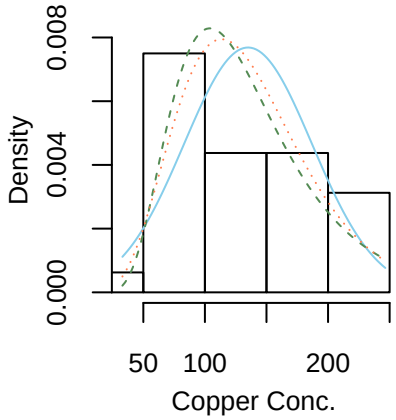


ECDF, Histogram & Q−Q (Detects Only)

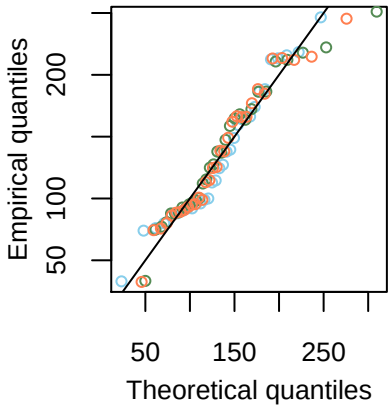
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 33	Arithmetic Mean = 140
N (detect) = 32	SD (log detect) = 0.43	Max (detect) = 250 J	Arithmetic SD = 53

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.17	0.055	–	–	–	–	347.577	350.508
Lognormal	0.064	0.57	–	–	–	–	348.482	351.413
Gamma	–	–	0.1251	0.16	0.4655	0.746	346.462	349.393

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Copper

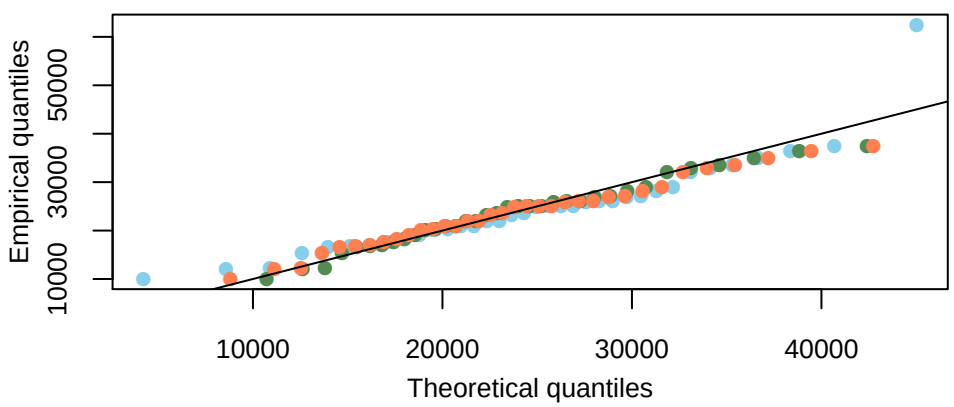
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **416**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Iron

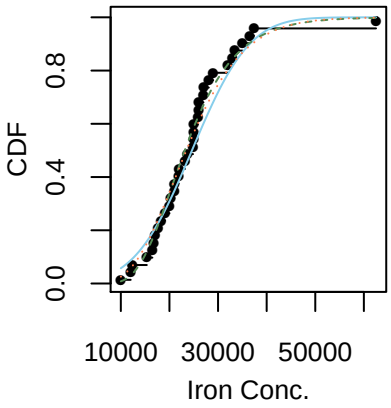
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

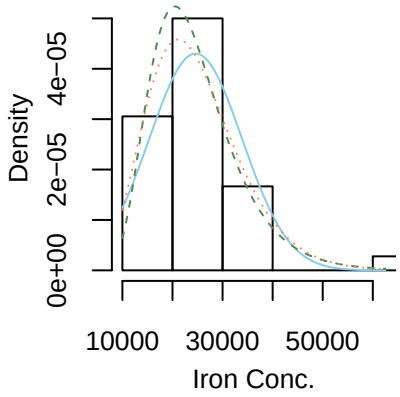


ECDF, Histogram & Q−Q (Detects Only)

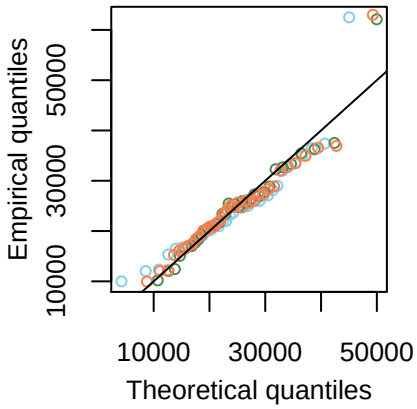
ECDF



Histogram



Q−Q



N = 36	FOD = 100%	Min (detect) = 10,000	Arithmetic Mean = 25,000
N (detect) = 36	SD (log detect) = 0.35	Max (detect) = 62,000 J	Arithmetic SD = 9,400

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00048	0.046	–	–	–	–	763.877	767.044
Lognormal	0.63	0.82	–	–	–	–	754.089	757.256
Gamma	–	–	0.1019	0.149	0.4635	0.75	755.777	758.944

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Iron

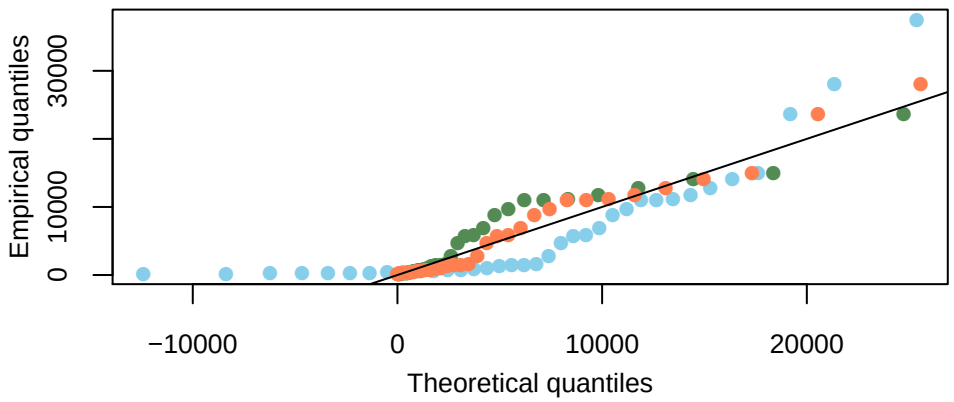
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **417**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Manganese

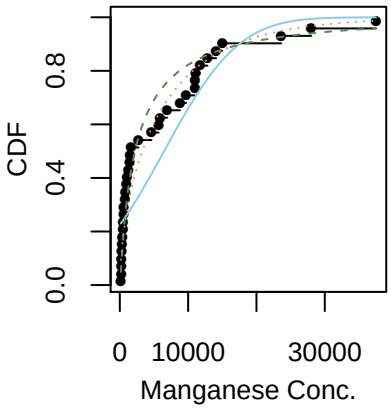
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

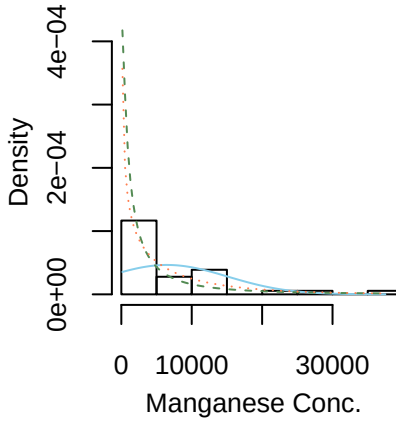


ECDF, Histogram & Q−Q (Detects Only)

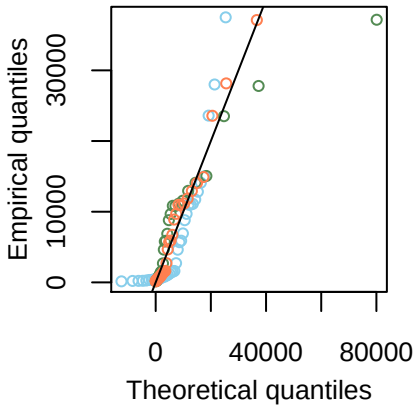
ECDF



Histogram



Q−Q



N = 36	FOD = 100%	Min (detect) = 150	Arithmetic Mean = 6,500
N (detect) = 36	SD (log detect) = 1.7	Max (detect) = 38,000 J	Arithmetic SD = 8,700

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.6e−05	–	–	–	–	758.324	761.491
Lognormal	0.029	0.11	–	–	–	–	695.977	699.144
Gamma	–	–	0.1769	0.157	1.064	0.812	698.932	702.099

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Manganese

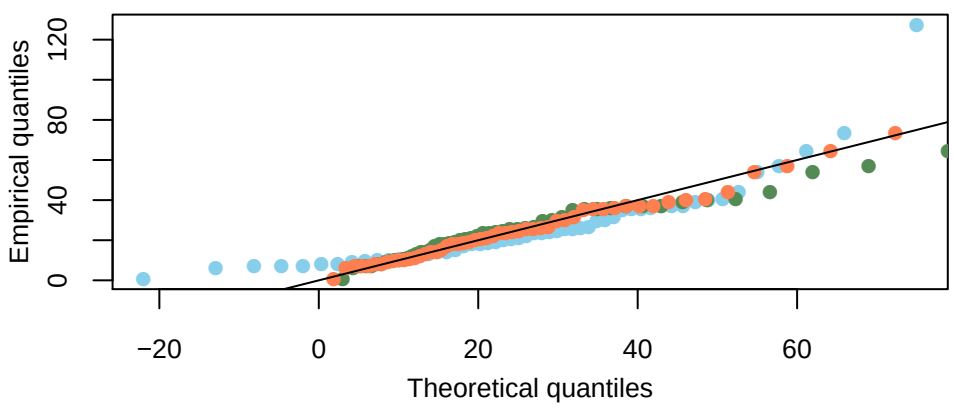
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **418**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Mercury

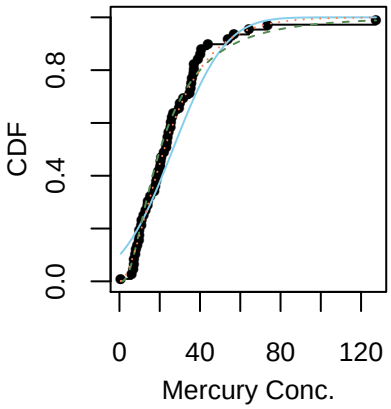
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

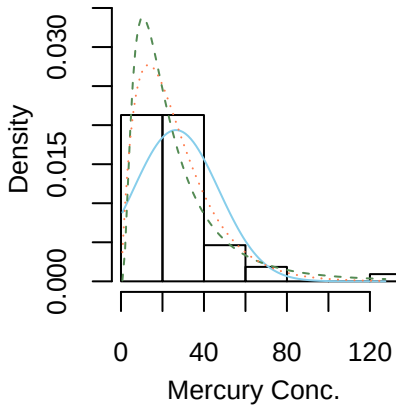


ECDF, Histogram & Q−Q (Detects Only)

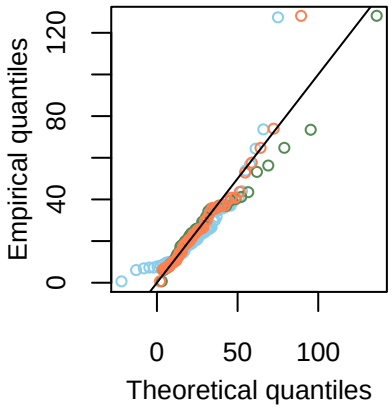
ECDF



Histogram



Q−Q



N = 54	FOD = 100%	Min (detect) = 0.68	Arithmetic Mean = 27
N (detect) = 54	SD (log detect) = 0.82	Max (detect) = 130 J	Arithmetic SD = 21

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.0066	–	–	–	–	483.953	487.931
Lognormal	0.0019	0.34	–	–	–	–	459.181	463.159
Gamma	–	–	0.07764	0.129	0.3651	0.78	453.619	457.596

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **419**

Media:
Marsh Sediment (All Samples)

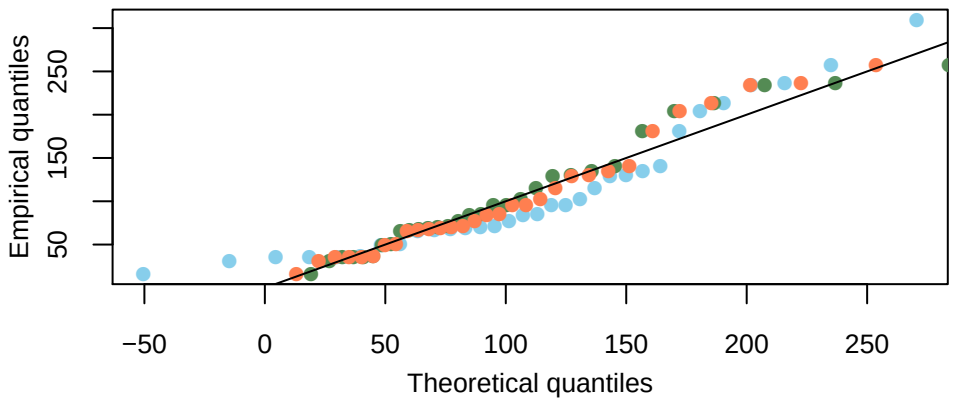
Exposure Unit:
Walden Swamp

Chemical (mg/kg):
Nickel

Legend

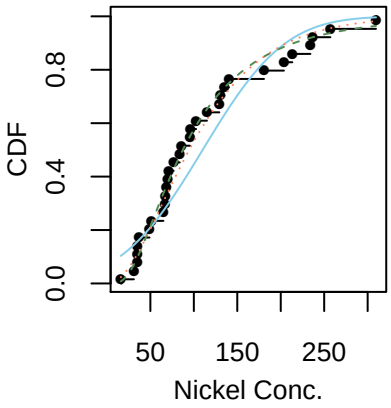
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

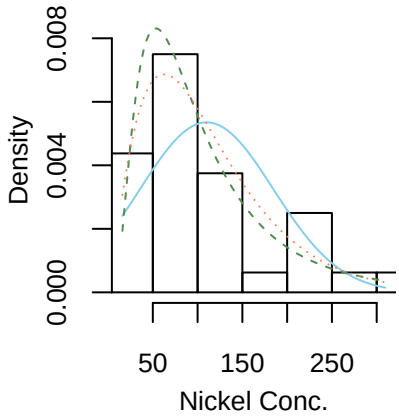


ECDF, Histogram & Q−Q (Detects Only)

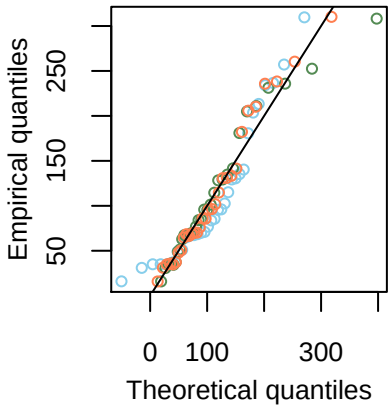
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 16	Arithmetic Mean = 110
N (detect) = 32	SD (log detect) = 0.71	Max (detect) = 310 J	Arithmetic SD = 76

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0029	0.023	–	–	–	–	370.716	373.648
Lognormal	0.68	0.74	–	–	–	–	358.376	361.308
Gamma	–	–	0.09031	0.162	0.3805	0.758	358.691	361.622

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Nickel

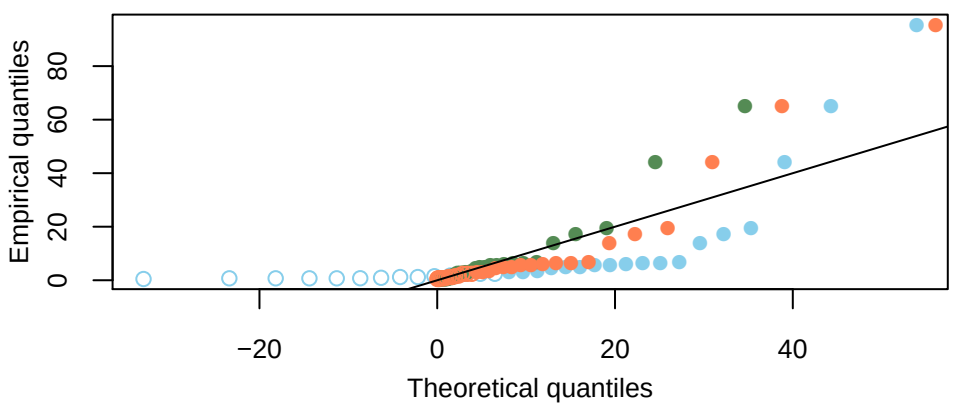
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **420**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Thallium

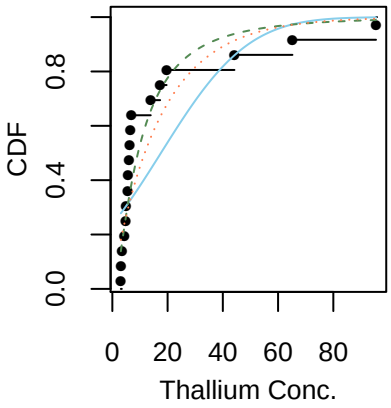
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

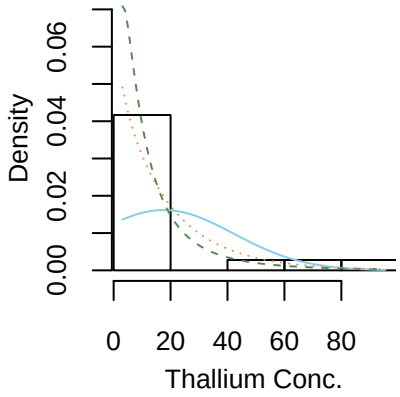


ECDF, Histogram & Q−Q (Detects Only)

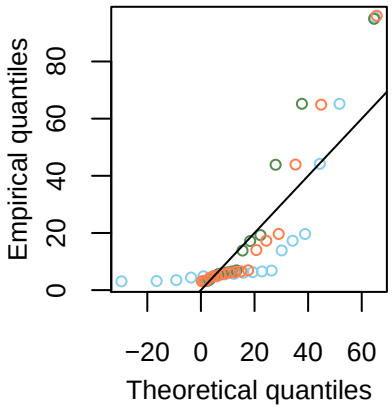
ECDF



Histogram



Q−Q



N = 32	FOD = 56%	Min (detect) = 3 J	Kaplan Meier Mean = 11
N (detect) = 18	SD (log detect) = 1	Max (detect) = 95 J	Kaplan Meier SD = 20

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.1e−13	–	–	–	–	287.163	290.094
Lognormal	0.092	0.13	–	–	–	–	196.889	199.82
Gamma	–	–	0.2557	0.169	2.033	0.809	211.039	213.971

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	1e−05	1.4e−05	–	–	–	–	170.479	172.26
Lognormal	0.0077	0.00059	–	–	–	–	135.743	137.524
Gamma	–	–	0.3245	0.215	1.793	0.8	143.118	144.899

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Thallium

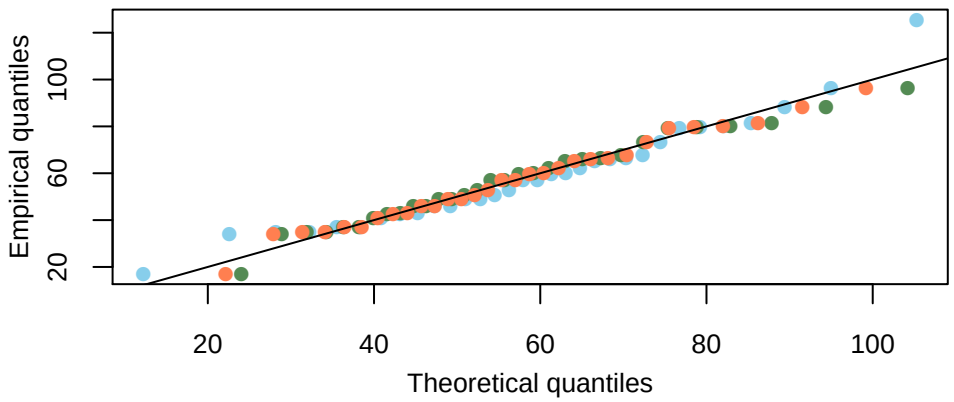
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **421**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Vanadium

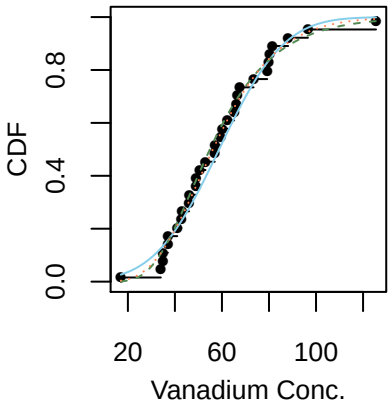
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

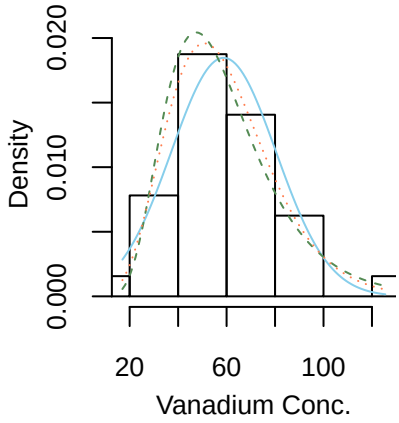


ECDF, Histogram & Q−Q (Detects Only)

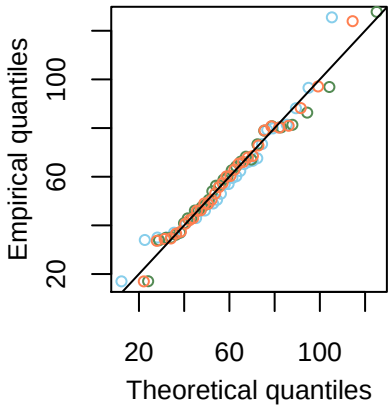
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 17	Arithmetic Mean = 59
N (detect) = 32	SD (log detect) = 0.39	Max (detect) = 130 J	Arithmetic SD = 22

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.19	0.6	–	–	–	–	291.463	294.395
Lognormal	0.44	0.89	–	–	–	–	289.663	292.595
Gamma	–	–	0.07674	0.16	0.1935	0.746	288.524	291.456

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Vanadium

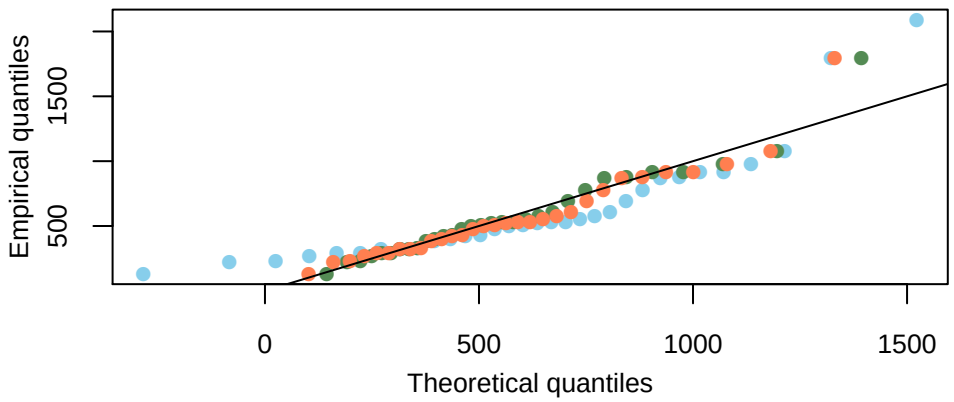
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **422**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Zinc

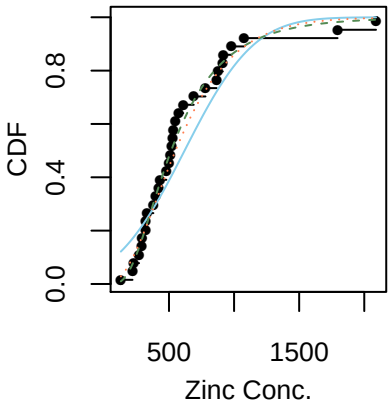
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

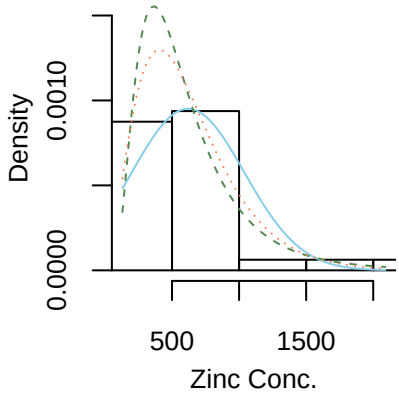


ECDF, Histogram & Q−Q (Detects Only)

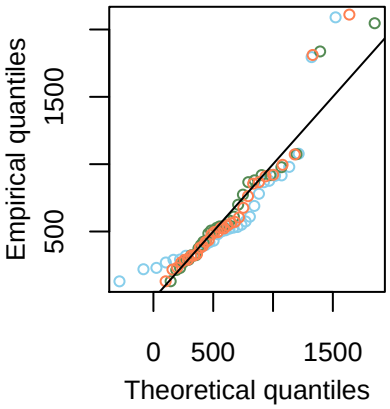
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 130	Arithmetic Mean = 620
N (detect) = 32	SD (log detect) = 0.6	Max (detect) = 2,100 J	Arithmetic SD = 430

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	4e−05	0.0026	–	–	–	–	481.293	484.225
Lognormal	0.9	0.8	–	–	–	–	461.101	464.033
Gamma	–	–	0.1273	0.162	0.5146	0.758	464.167	467.099

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Zinc

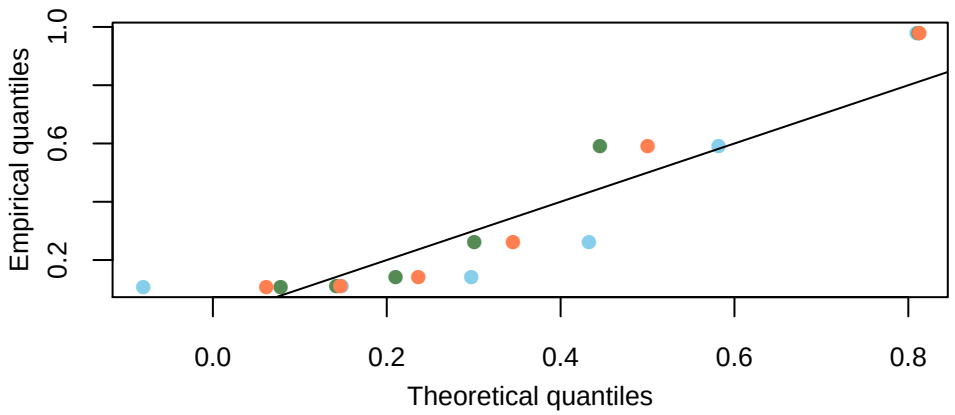
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **423**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Benzo[a]pyrene

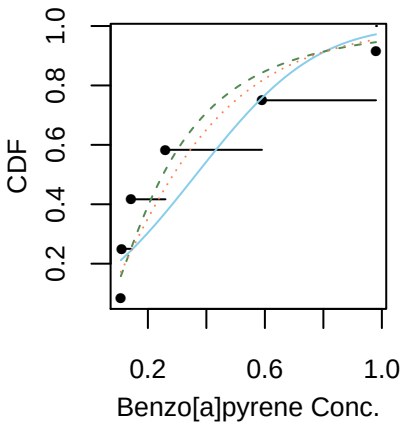
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

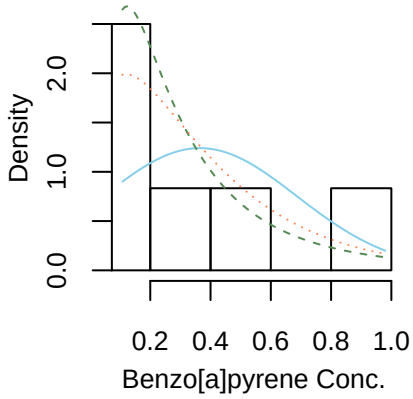


ECDF, Histogram & Q−Q (Detects Only)

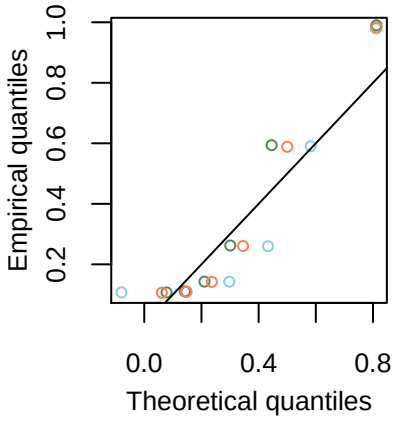
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 0.11 J	Arithmetic Mean = 0.37
N (detect) = 6	SD (log detect) = 0.93	Max (detect) = 0.98 J	Arithmetic SD = 0.35

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.063	0.14	–	–	–	–	7.41489	6.99841
Lognormal	0.26	0.41	–	–	–	–	2.47689	2.06041
Gamma	–	–	NA	NA	NA	NA	3.39157	2.97509

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Benzo[a]pyrene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

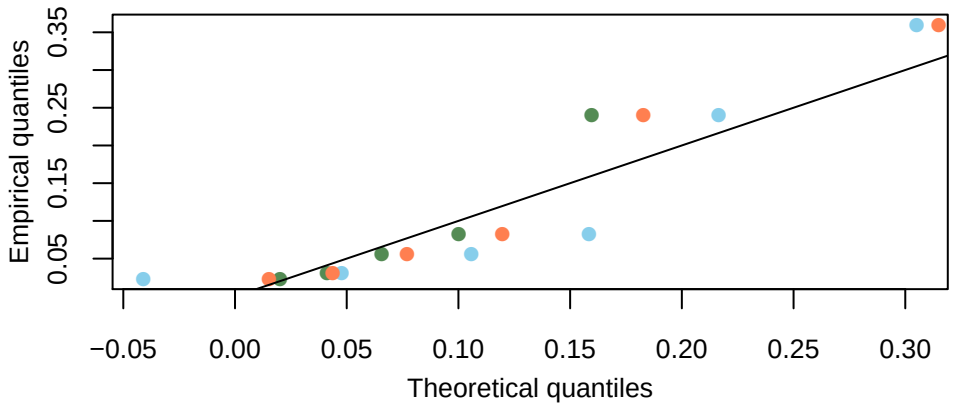
Figure **424**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

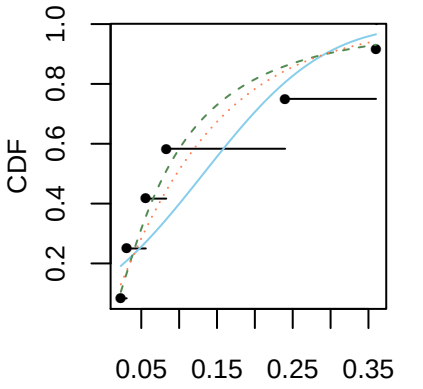
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

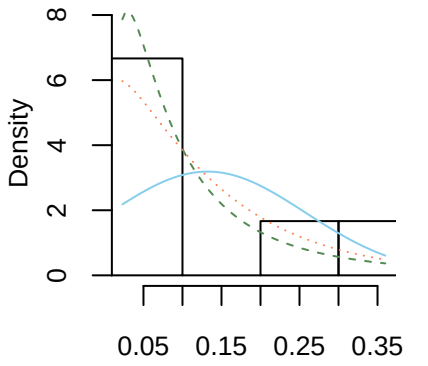


ECDF, Histogram & Q−Q (Detects Only)

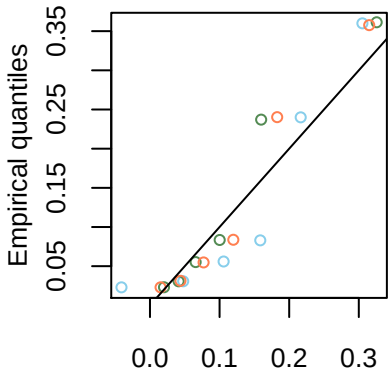
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 0.023 J	Arithmetic Mean = 0.13
N (detect) = 6	SD (log detect) = 1.1	Max (detect) = 0.36 J	Arithmetic SD = 0.14

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.091	0.081	–	–	–	–	−3.91249	−4.32898
Lognormal	0.61	0.84	–	–	–	–	−9.05683	−9.47331
Gamma	–	–	NA	NA	NA	NA	−8.36999	−8.78647

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **425**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 5	FOD = 60%	Min (detect) = 0.003 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.024 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Aldrin

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 33%	Min (detect) = 0.00092 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.0058 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Walden Swamp−Heptachlor

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **427**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 50%	Min (detect) = 0.0015 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.0092 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

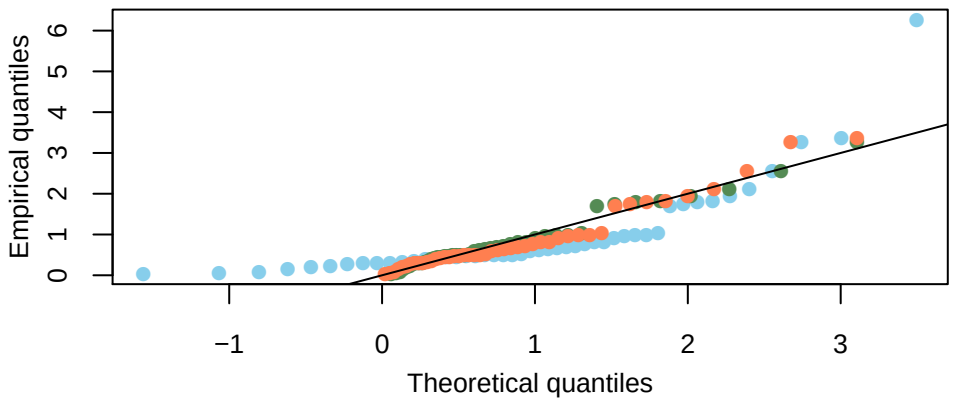
Distribution: Marsh Sediment (All Samples) in Walden Swamp−Heptachlor Epoxide

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

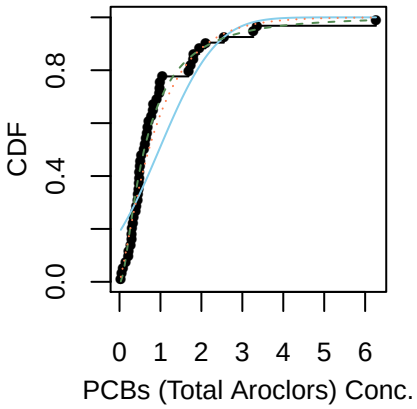
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

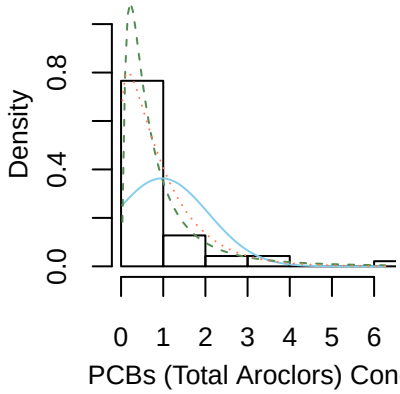


ECDF, Histogram & Q−Q (Detects Only)

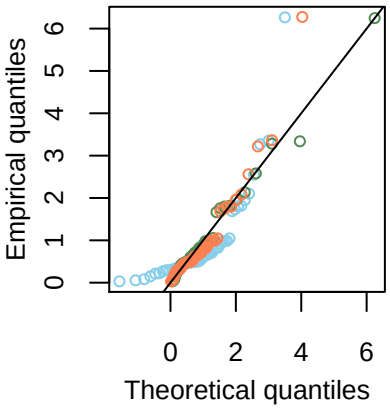
ECDF



Histogram



Q−Q



N = 47	FOD = 100%	Min (detect) = 0.032 J	Arithmetic Mean = 0.97
N (detect) = 47	SD (log detect) = 1	Max (detect) = 6 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.6e−08	–	–	–	–	146.193	149.894
Lognormal	0.23	0.39	–	–	–	–	91.2879	94.9882
Gamma	–	–	0.1367	0.136	0.9557	0.777	94.1403	97.8406

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Walden Swamp−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **429**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Walden Swamp
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Walden Swamp−Trichloroethene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

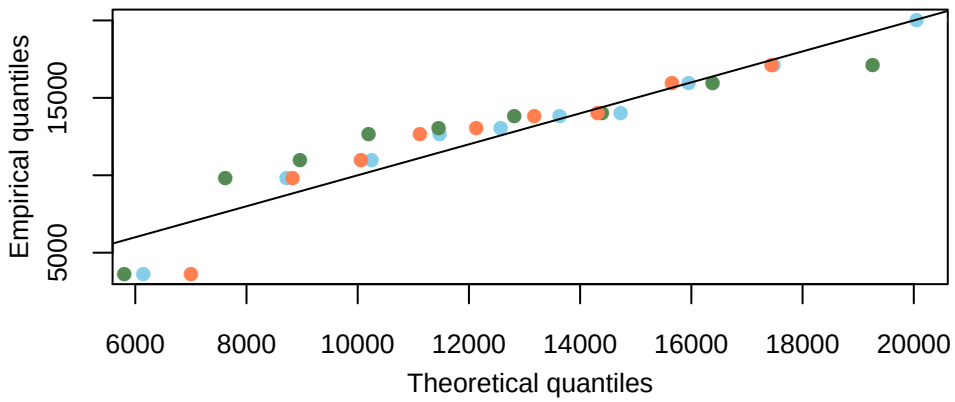
Figure **430**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Aluminum

Legend

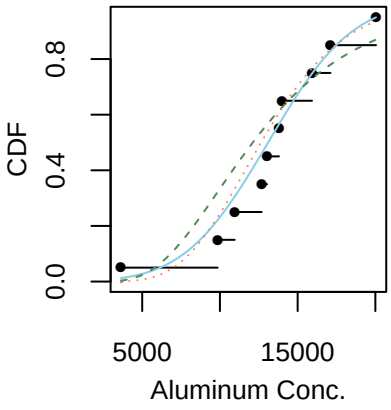
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

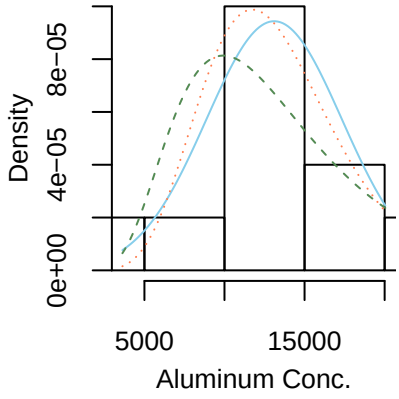


ECDF, Histogram & Q−Q (Detects Only)

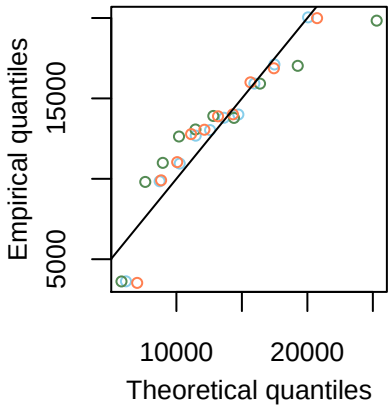
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 3,600 J	Arithmetic Mean = 13,000
N (detect) = 10	SD (log detect) = 0.47	Max (detect) = 20,000 J	Arithmetic SD = 4,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.73	0.64	–	–	–	–	199.366	199.971
Lognormal	0.011	0.11	–	–	–	–	204.339	204.944
Gamma	–	–	0.2034	0.267	0.6207	0.729	202.998	203.604

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Aluminum

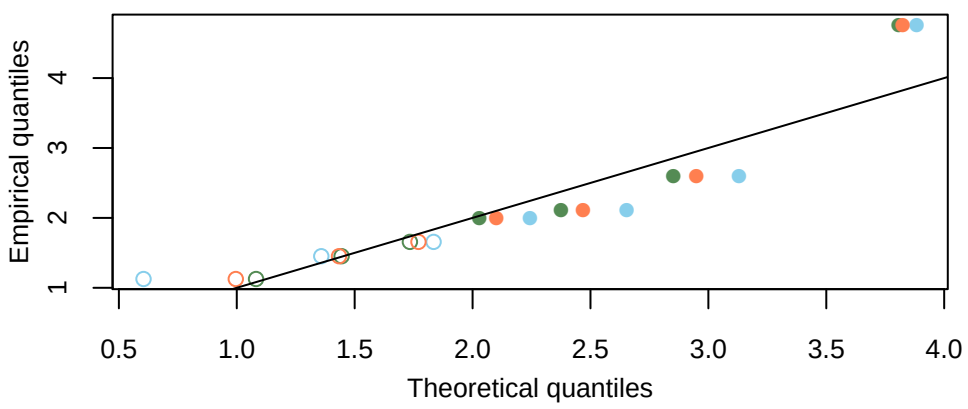
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **431**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Antimony

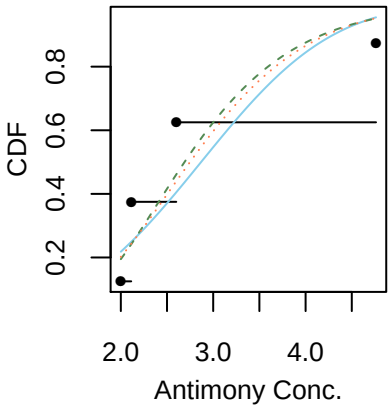
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

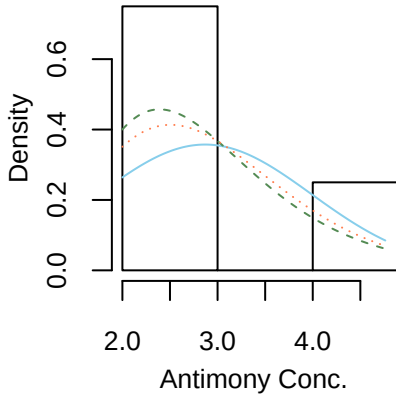


ECDF, Histogram & Q−Q (Detects Only)

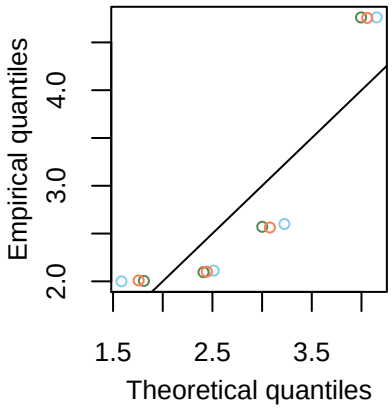
ECDF



Histogram



Q−Q



N = 10	FOD = 40%	Min (detect) = 2 J	Kaplan Meier Mean = 2
N (detect) = 4	SD (log detect) = 0.4	Max (detect) = 4	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.061	0.17	–	–	–	–	25.441	25.3328
Lognormal	0.76	0.71	–	–	–	–	21.9393	21.8311
Gamma	–	–	NA	NA	NA	NA	22.7849	22.6767

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.08	N<5	–	–	–	–	16.2322	15.0048
Lognormal	0.2	N<5	–	–	–	–	14.7324	13.5049
Gamma	–	–	NA	NA	NA	NA	15.1626	13.9352

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Antimony

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

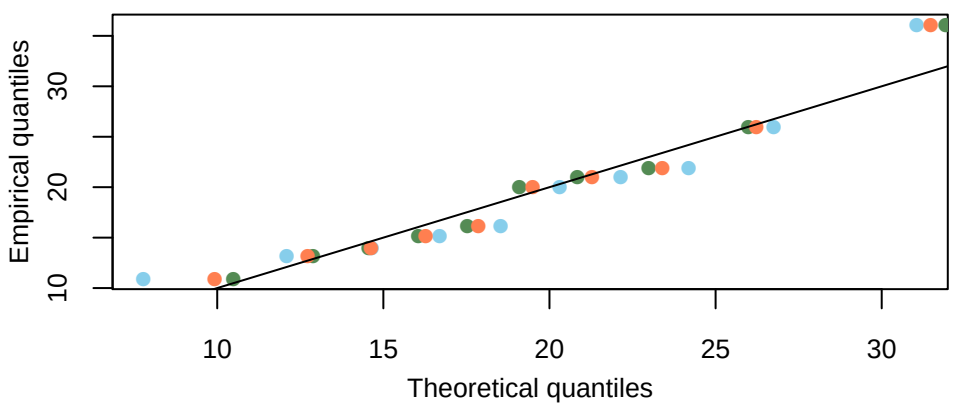
Figure **432**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Arsenic

Legend

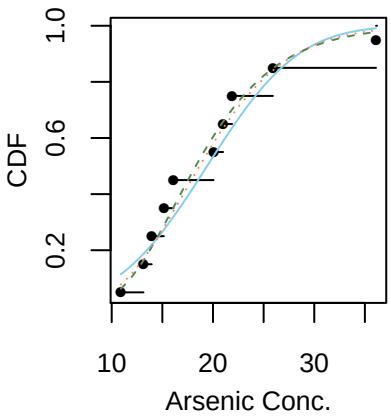
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

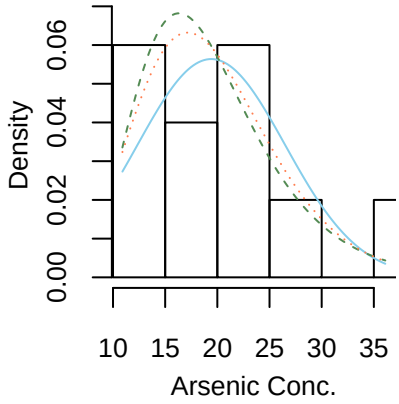


ECDF, Histogram & Q−Q (Detects Only)

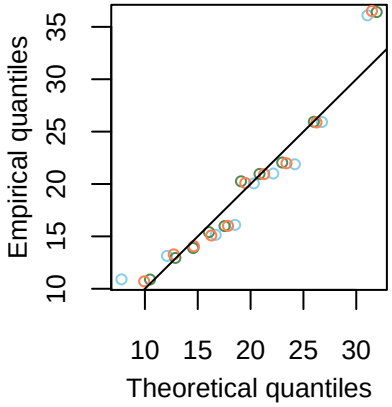
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 11 J	Arithmetic Mean = 19
N (detect) = 10	SD (log detect) = 0.36	Max (detect) = 36 J	Arithmetic SD = 7

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.23	0.55	–	–	–	–	71.512	72.1172
Lognormal	0.92	0.84	–	–	–	–	68.8503	69.4555
Gamma	–	–	0.1611	0.267	0.2489	0.729	69.4434	70.0486

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Arsenic

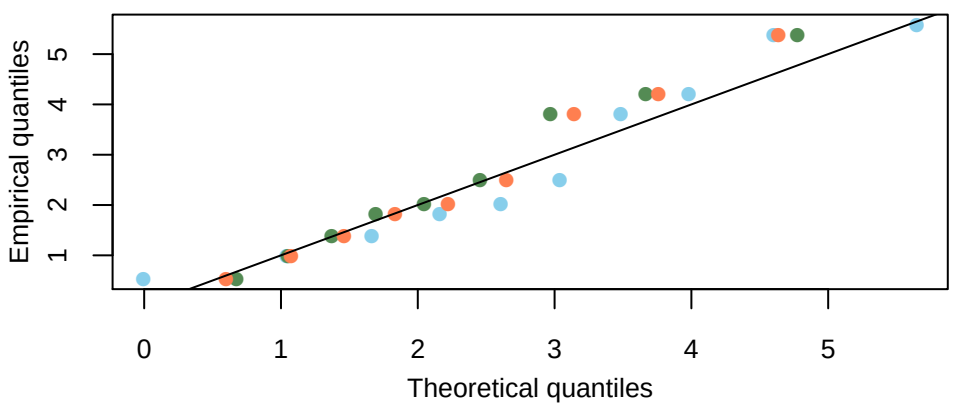
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **433**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Cadmium

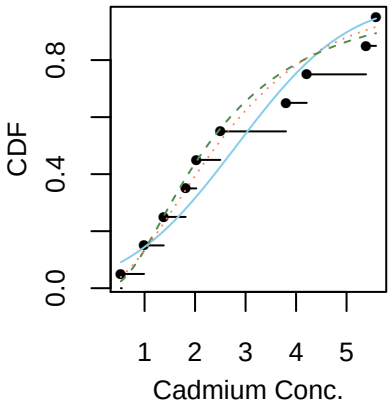
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

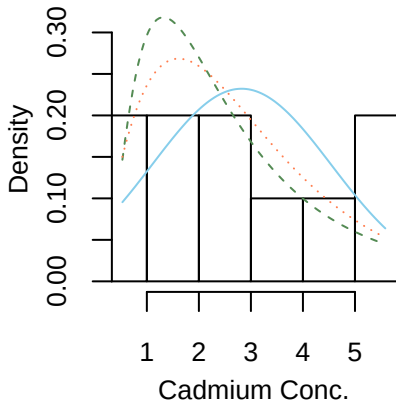


ECDF, Histogram & Q−Q (Detects Only)

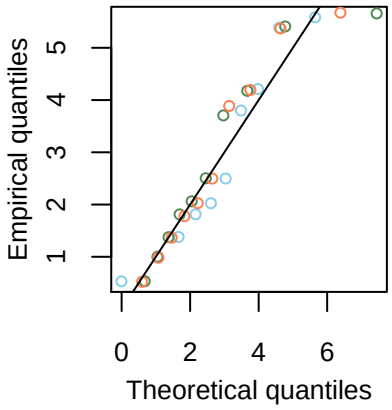
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 0.53 J	Arithmetic Mean = 2
N (detect) = 10	SD (log detect) = 0.77	Max (detect) = 5	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.37	0.56	–	–	–	–	43.2068	43.812
Lognormal	0.64	0.72	–	–	–	–	42.2216	42.8268
Gamma	–	–	0.1557	0.27	0.2235	0.736	41.5059	42.111

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Cadmium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **434**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Chromium (VI)

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 17	Arithmetic Mean = 17
N (detect) = 1	SD (log detect) = 0	Max (detect) = 17	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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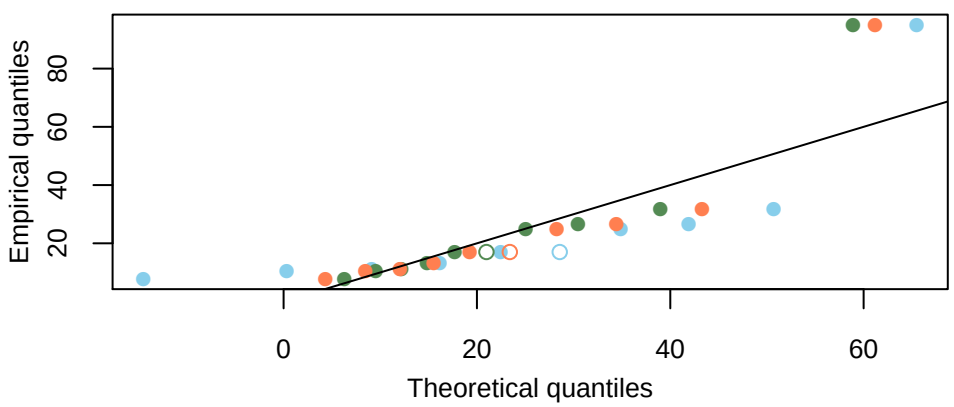
Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Chromium (VI)

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Cobalt

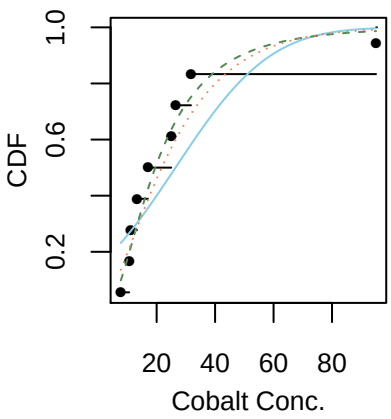
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

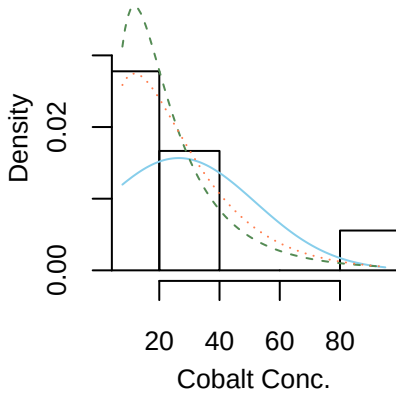


ECDF, Histogram & Q−Q (Detects Only)

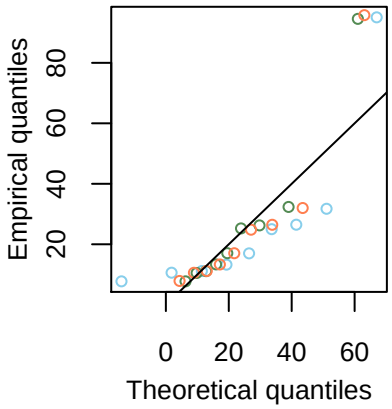
ECDF



Histogram



Q−Q



N = 10	FOD = 90%	Min (detect) = 7 J	Kaplan Meier Mean = 26
N (detect) = 9	SD (log detect) = 0.76	Max (detect) = 95 J	Kaplan Meier SD = 24

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00019	0.0094	–	–	–	–	96.2031	96.8083
Lognormal	0.36	0.58	–	–	–	–	83.821	84.4262
Gamma	–	–	0.2093	0.274	0.6545	0.748	86.6634	87.2686

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00059	0.012	–	–	–	–	87.8084	88.2028
Lognormal	0.43	0.81	–	–	–	–	77.0014	77.3959
Gamma	–	–	0.1975	0.287	0.5795	0.743	79.4004	79.7949

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Cobalt

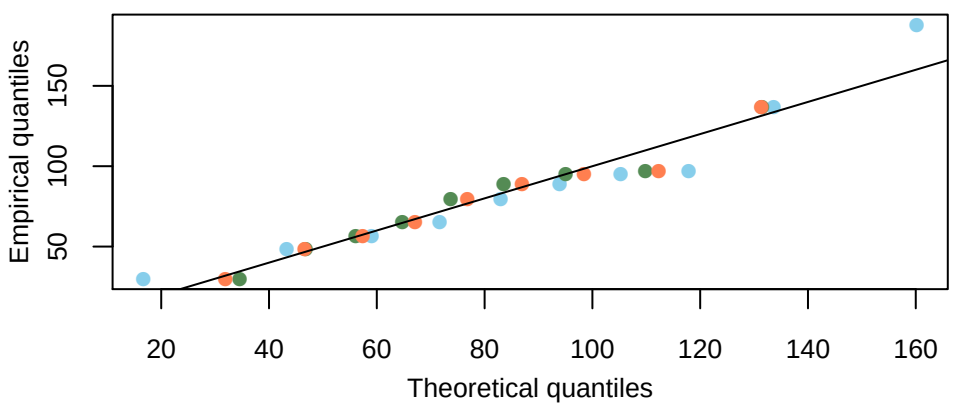
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **436**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Copper

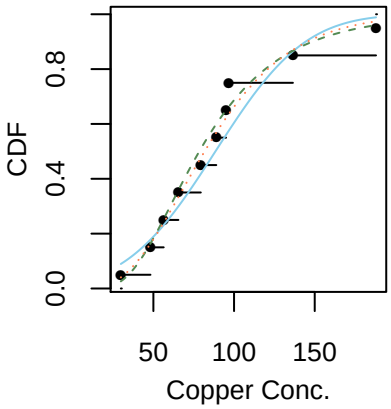
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

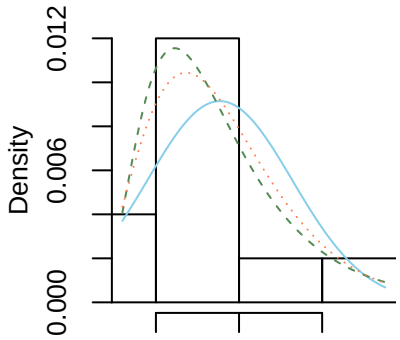


ECDF, Histogram & Q−Q (Detects Only)

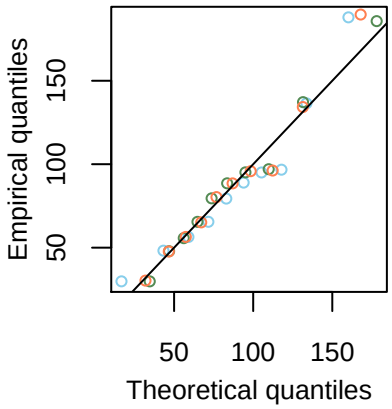
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 30	Arithmetic Mean = 88
N (detect) = 10	SD (log detect) = 0.53	Max (detect) = 190 J	Arithmetic SD = 46

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.38	0.15	–	–	–	–	107.888	108.493
Lognormal	0.99	0.8	–	–	–	–	105.696	106.301
Gamma	–	–	0.1639	0.27	0.1703	0.736	105.738	106.343

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Copper

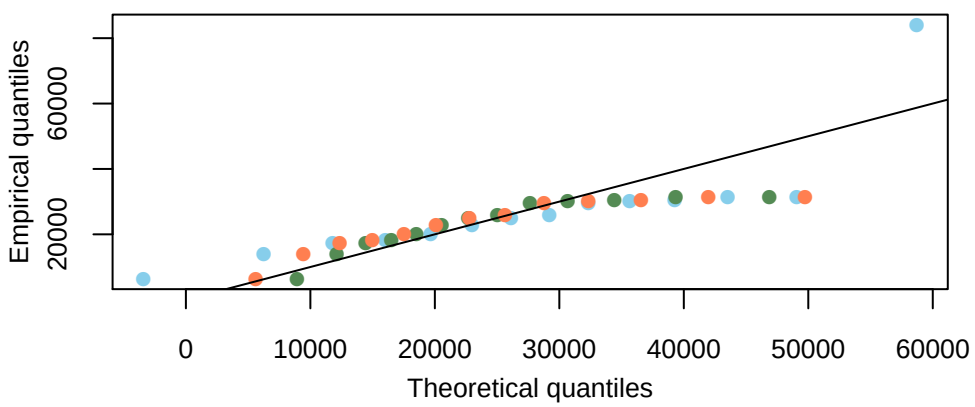
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **437**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Iron

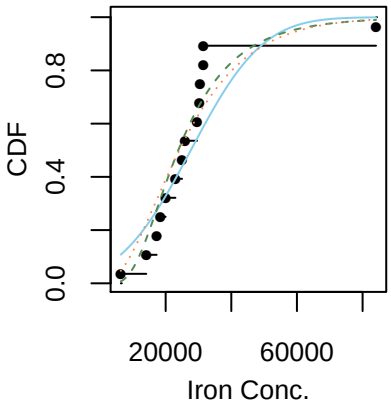
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

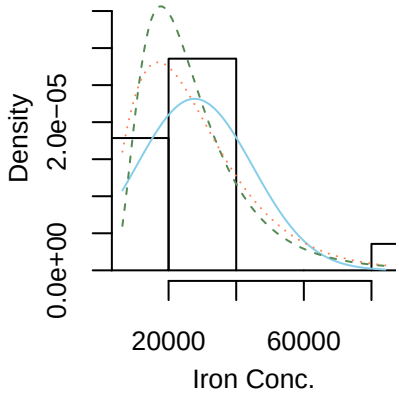


ECDF, Histogram & Q−Q (Detects Only)

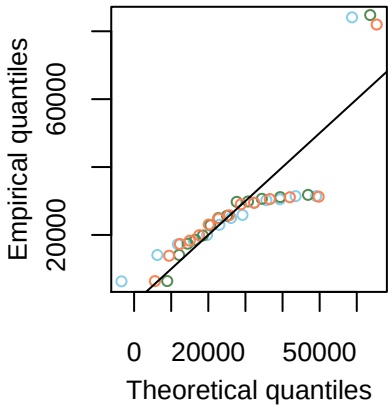
ECDF



Histogram



Q−Q



N = 14	FOD = 100%	Min (detect) = 6,300 J	Arithmetic Mean = 28,000
N (detect) = 14	SD (log detect) = 0.57	Max (detect) = 84,000 J	Arithmetic SD = 18,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00039	7.6e−05	–	–	–	–	316.854	318.133
Lognormal	0.11	0.027	–	–	–	–	308.921	310.2
Gamma	–	–	0.2666	0.27	0.8716	0.736	310.325	311.603

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Iron

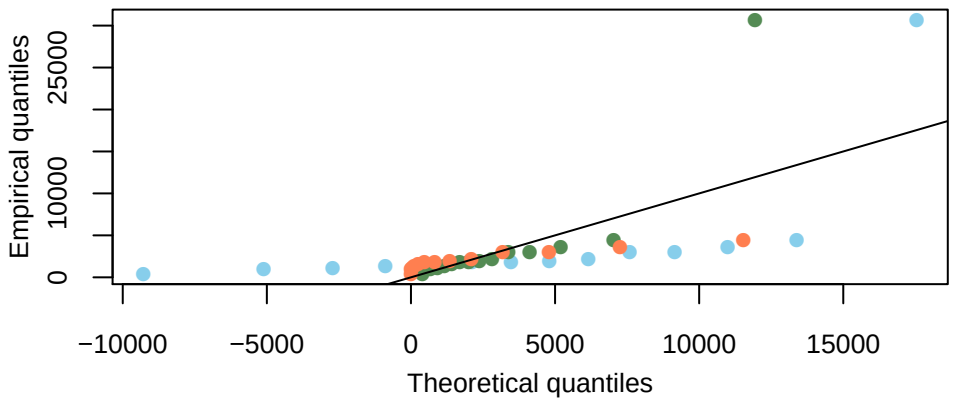
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **438**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Manganese

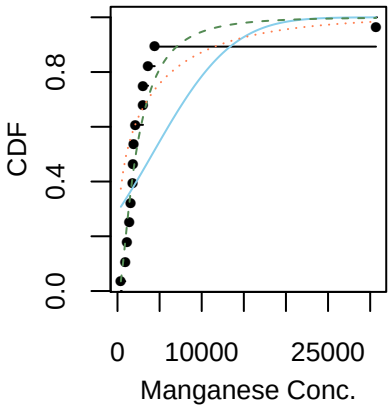
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

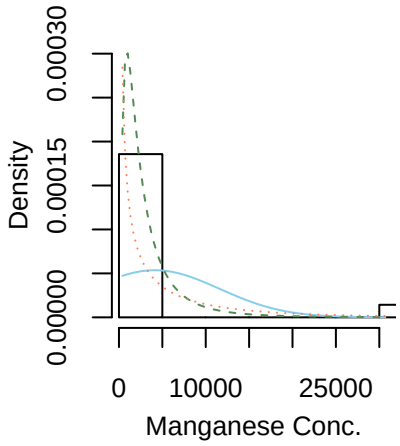


ECDF, Histogram & Q−Q (Detects Only)

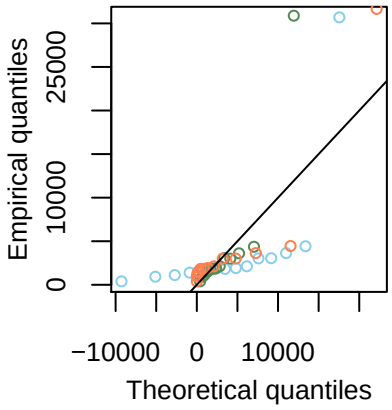
ECDF



Histogram



Q−Q



N = 14	FOD = 100%	Min (detect) = 400	Arithmetic Mean = 4,100
N (detect) = 14	SD (log detect) = 0.98	Max (detect) = 31,000 J	Arithmetic SD = 7,700

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	3.7e−07	–	–	–	–	293.347	294.625
Lognormal	0.079	0.39	–	–	–	–	257.341	258.619
Gamma	–	–	0.4101	0.2944	2.914	0.8551	273.419	274.698

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Manganese

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

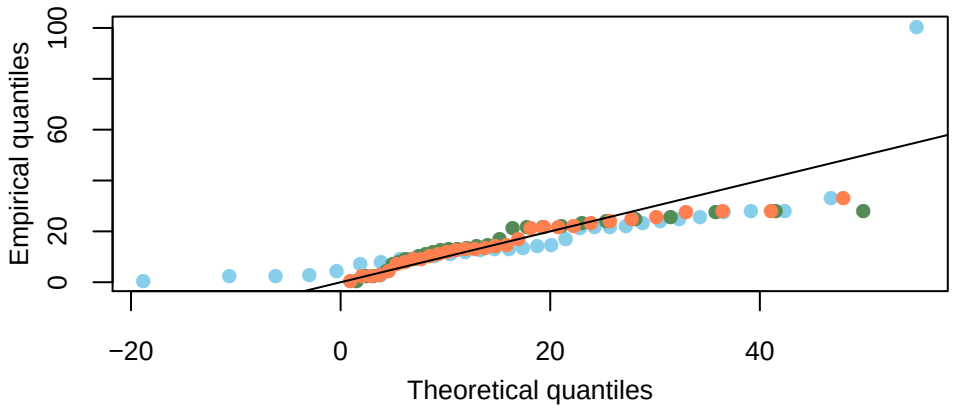
Figure **439**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Mercury

Legend

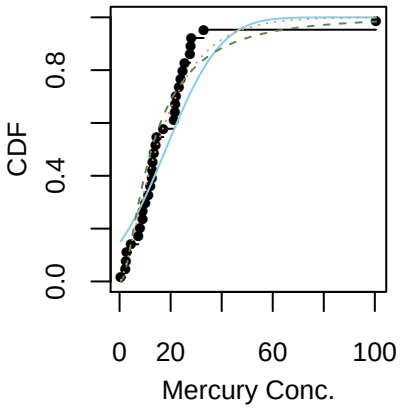
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

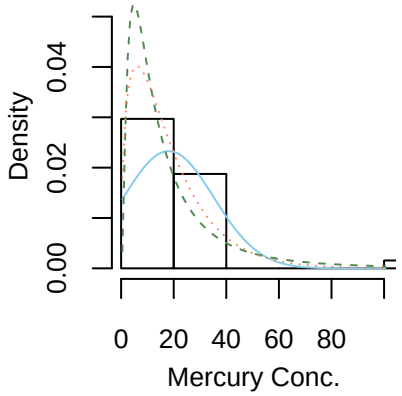


ECDF, Histogram & Q−Q (Detects Only)

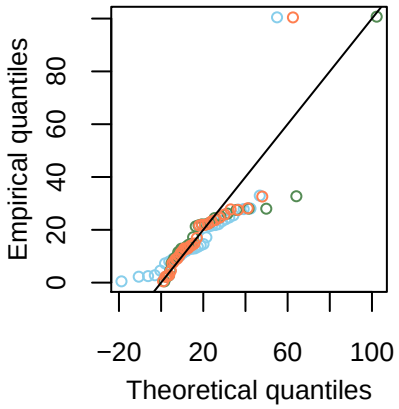
ECDF



Histogram



Q−Q



N = 32	FOD = 100%	Min (detect) = 0.49	Arithmetic Mean = 18
N (detect) = 32	SD (log detect) = 0.99	Max (detect) = 100 J	Arithmetic SD = 17

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	0.00038	–	–	–	–	276.617	279.549
Lognormal	0.0042	0.058	–	–	–	–	254.921	257.853
Gamma	–	–	0.1363	0.165	0.6994	0.775	250.425	253.356

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Mercury

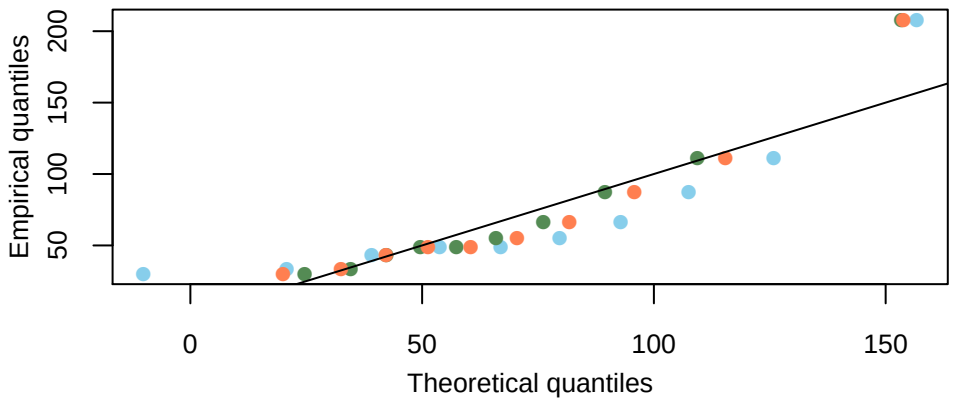
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **440**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Nickel

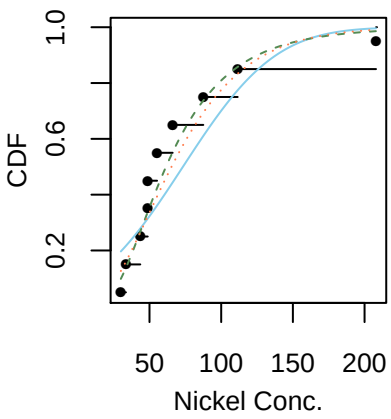
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

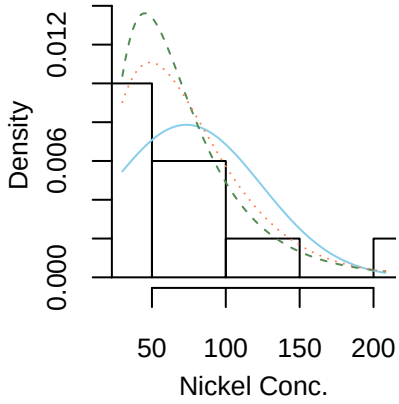


ECDF, Histogram & Q−Q (Detects Only)

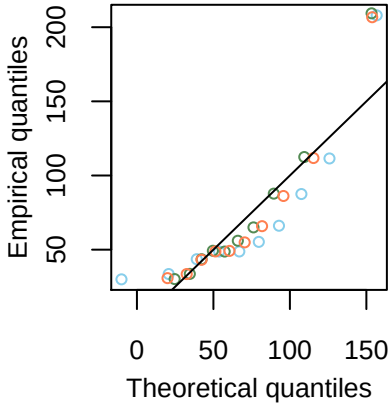
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 30 J	Arithmetic Mean = 73
N (detect) = 10	SD (log detect) = 0.59	Max (detect) = 210 J	Arithmetic SD = 53

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0044	0.068	–	–	–	–	110.904	111.509
Lognormal	0.48	0.54	–	–	–	–	103.011	103.616
Gamma	–	–	0.2064	0.27	0.508	0.736	104.865	105.471

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Nickel

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **441**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 10	FOD = 30%	Min (detect) = 0.57 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 100 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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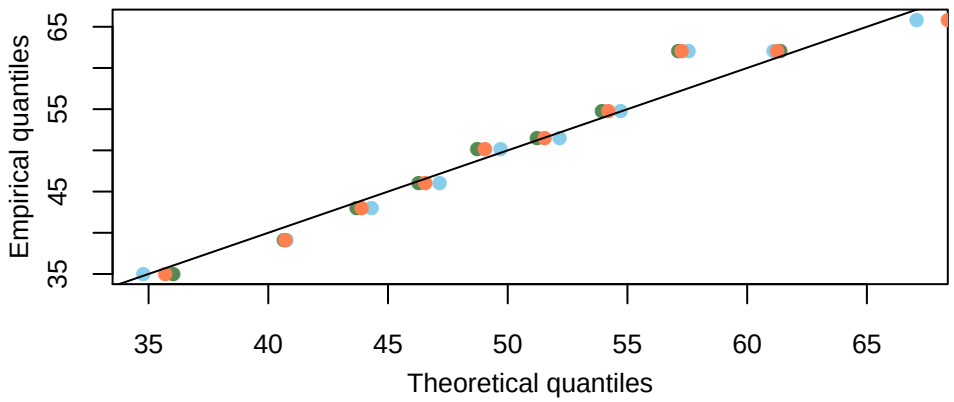
Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Thallium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Vanadium

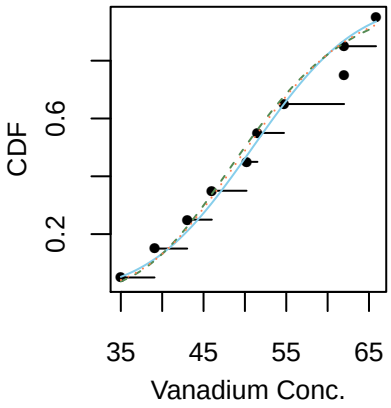
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

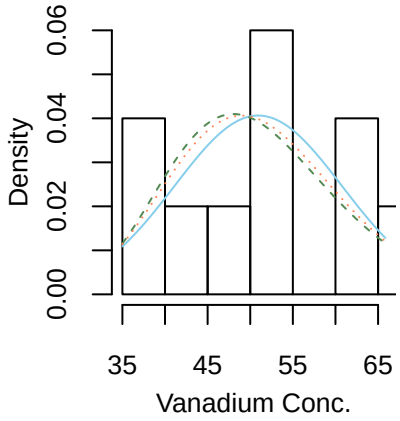


ECDF, Histogram & Q−Q (Detects Only)

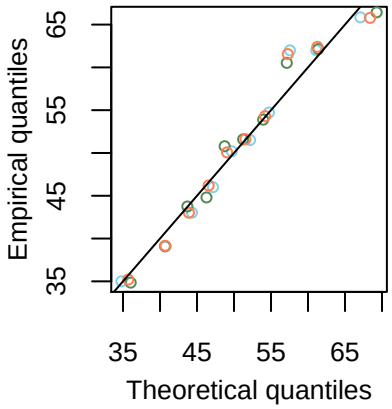
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 35 J	Arithmetic Mean = 51
N (detect) = 10	SD (log detect) = 0.21	Max (detect) = 66 J	Arithmetic SD = 10

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.79	0.69	–	–	–	–	78.0627	78.6679
Lognormal	0.76	0.77	–	–	–	–	78.2875	78.8927
Gamma	–	–	0.1644	0.266	0.2166	0.725	78.1317	78.7369

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Vanadium

Media:
Marsh Sediment (All Samples)

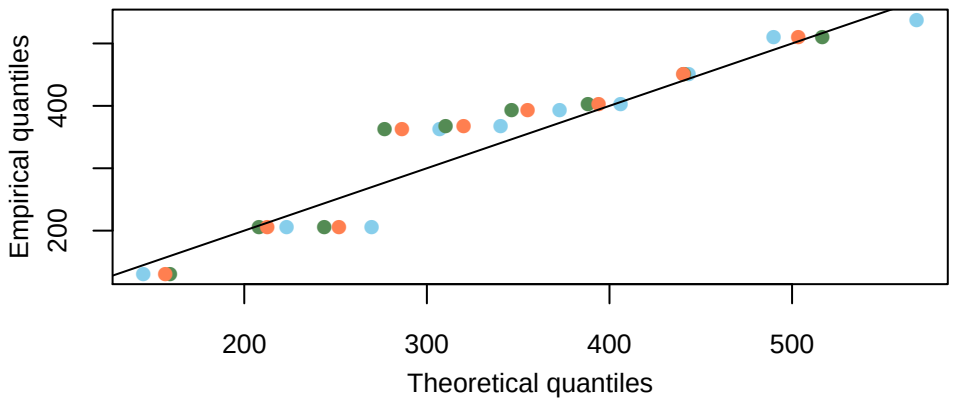
Exposure Unit:
Ackerman's East Marsh

Chemical (mg/kg):
Zinc

Legend

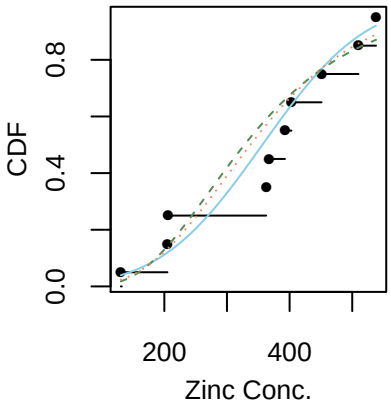
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

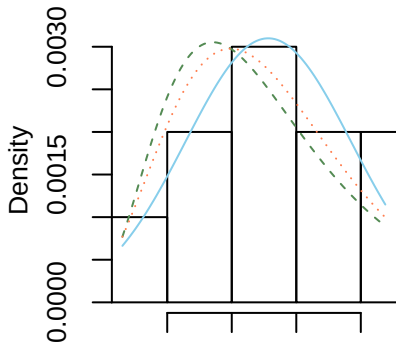


ECDF, Histogram & Q−Q (Detects Only)

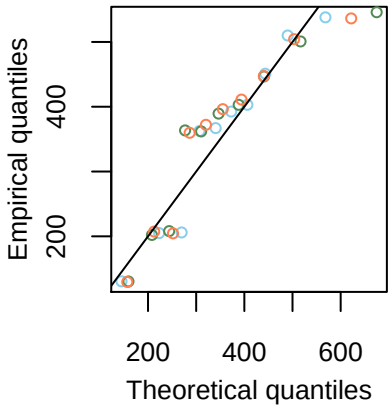
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 130	Arithmetic Mean = 360
N (detect) = 10	SD (log detect) = 0.46	Max (detect) = 540 J	Arithmetic SD = 140

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.45	0.2	–	–	–	–	129.534	130.139
Lognormal	0.11	0.02	–	–	–	–	131.756	132.361
Gamma	–	–	0.2702	0.267	0.5533	0.729	130.656	131.262

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Zinc

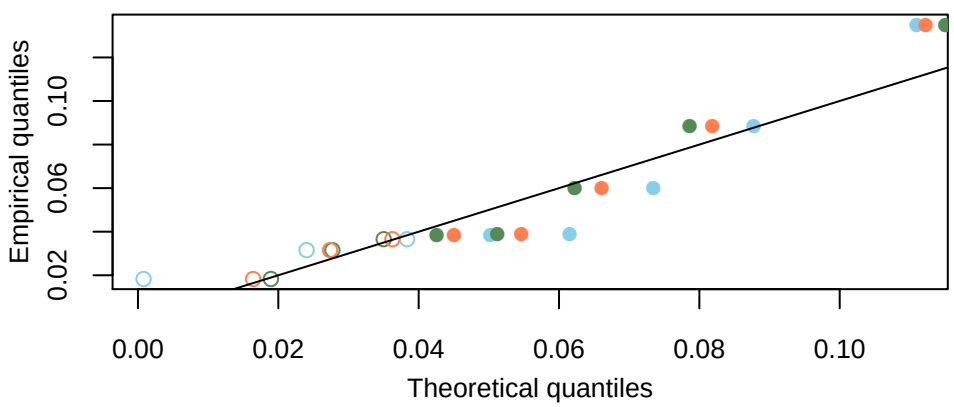
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **444**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Benzo[a]pyrene

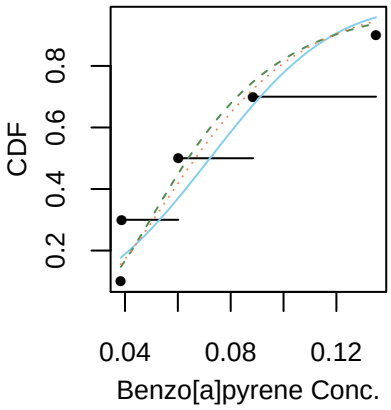
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

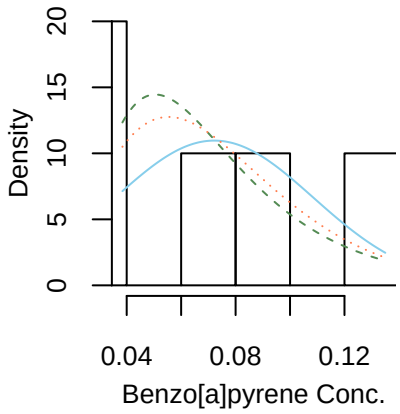


ECDF, Histogram & Q−Q (Detects Only)

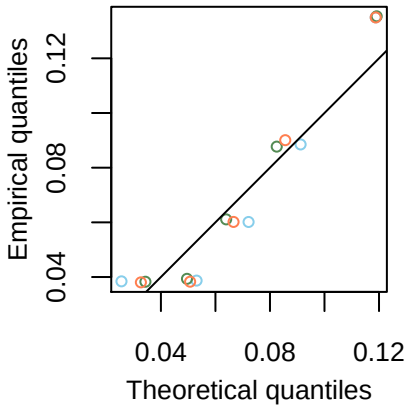
ECDF



Histogram



Q−Q



N = 8	FOD = 62%	Min (detect) = 0.038	Kaplan Meier Mean = 0.053
N (detect) = 5	SD (log detect) = 0.54	Max (detect) = 0.14 J	Kaplan Meier SD = 0.04

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.065	0.035	–	–	–	–	−26.5214	−26.3625
Lognormal	0.74	0.18	–	–	–	–	−30.8265	−30.6676
Gamma	–	–	0.2774	0.297	0.4103	0.724	−30.0274	−29.8686

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.3	N<5	–	–	–	–	−14.9477	−15.7288
Lognormal	0.46	N<5	–	–	–	–	−16.5315	−17.3126
Gamma	–	–	NA	NA	NA	NA	−16.2105	−16.9917

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Benzo[a]pyrene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **445**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 8	FOD = 38%	Min (detect) = 0.012	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.015 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Dibenz[a,h]anthracene

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 0.00074 J	Arithmetic Mean = 0.0026
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.0044 J	Arithmetic SD = 0.0026

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Aldrin

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Heptachlor

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **448**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Heptachlor Epoxide

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

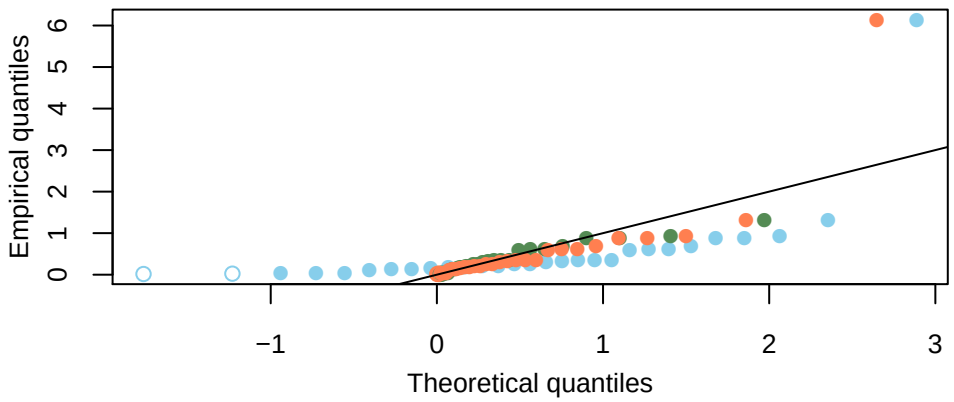
Figure **449**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

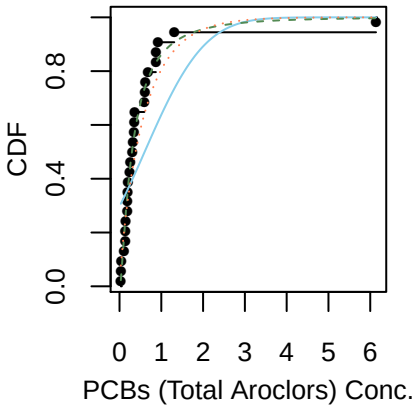
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

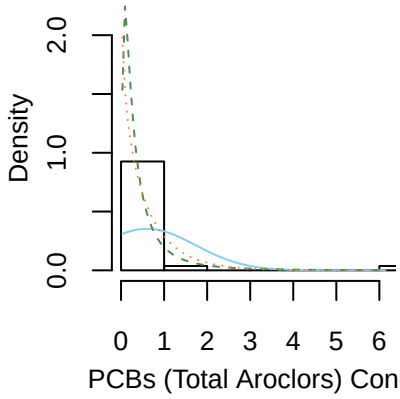


ECDF, Histogram & Q−Q (Detects Only)

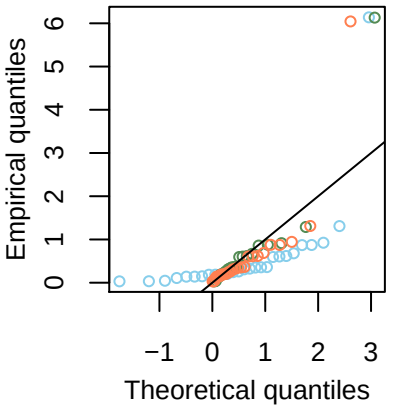
ECDF



Histogram



Q−Q



N = 29	FOD = 93%	Min (detect) = 0.032 J	Kaplan Meier Mean = 0.56
N (detect) = 27	SD (log detect) = 1.1	Max (detect) = 6 J	Kaplan Meier SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	7.1e−08	–	–	–	–	91.8584	94.593
Lognormal	0.44	0.3	–	–	–	–	19.2127	21.9473
Gamma	–	–	0.1682	0.184	0.9105	0.807	26.3665	29.1011

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0	1.9e−07	–	–	–	–	87.2416	89.8333
Lognormal	0.44	0.59	–	–	–	–	21.0741	23.6658
Gamma	–	–	0.186	0.184	1.102	0.807	29.9245	32.5162

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **450**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Ackerman's East Marsh
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 8	FOD = 12%	Min (detect) = 0.033 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.033 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

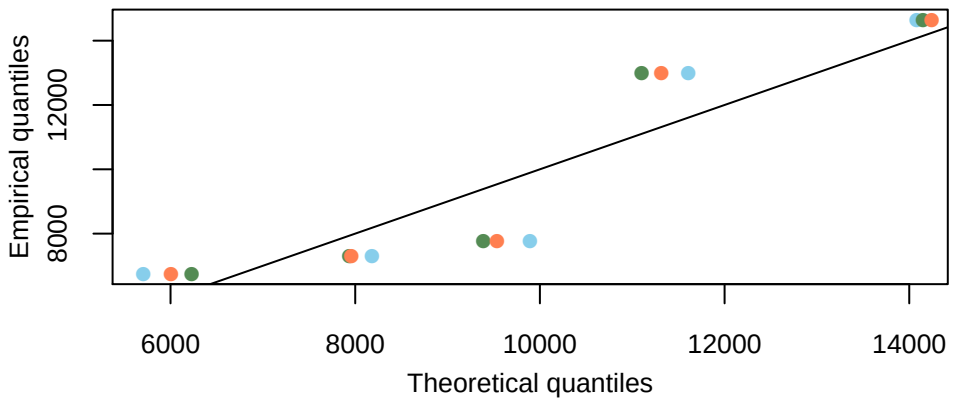
Distribution: Marsh Sediment (All Samples) in Ackerman's East Marsh−Trichloroethene

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Aluminum

Legend

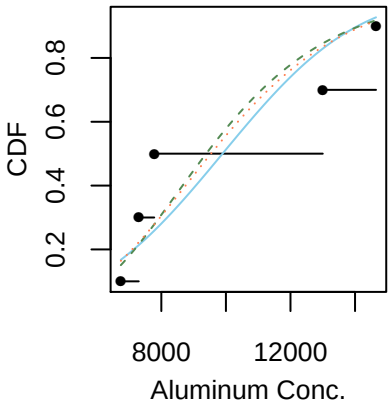
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

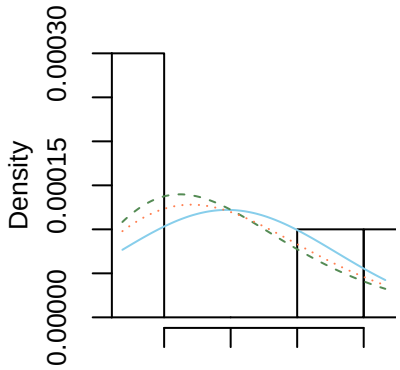


ECDF, Histogram & Q−Q (Detects Only)

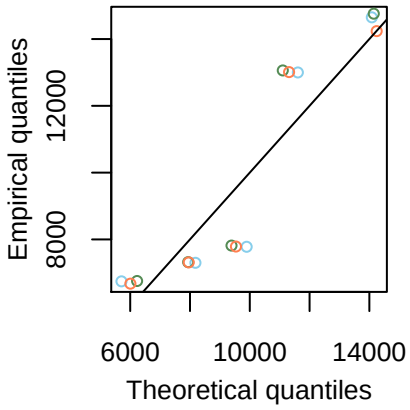
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 6,700 J	Arithmetic Mean = 9,900
N (detect) = 5	SD (log detect) = 0.36	Max (detect) = 15,000 J	Arithmetic SD = 3,700

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.12	N<5	–	–	–	–	99.107	98.3259
Lognormal	0.16	N<5	–	–	–	–	98.2668	97.4856
Gamma	–	–	NA	NA	NA	NA	98.488	97.7069

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Aluminum

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 5	FOD = 20%	Min (detect) = 1 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 1 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

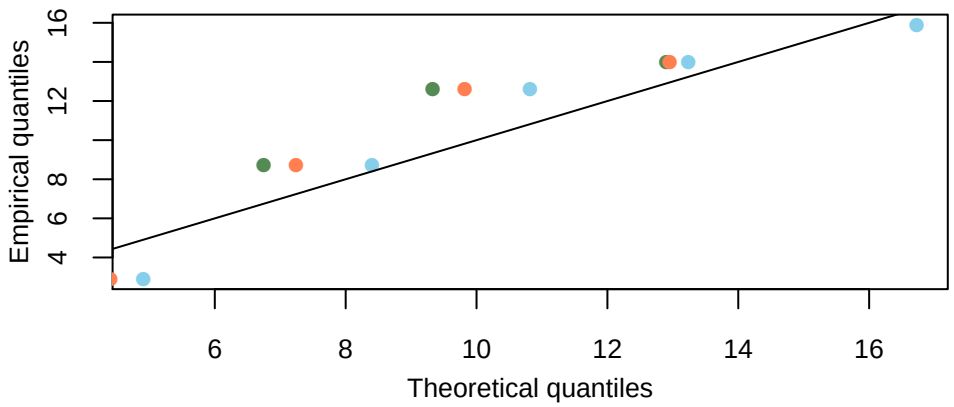
DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Antimony

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Arsenic

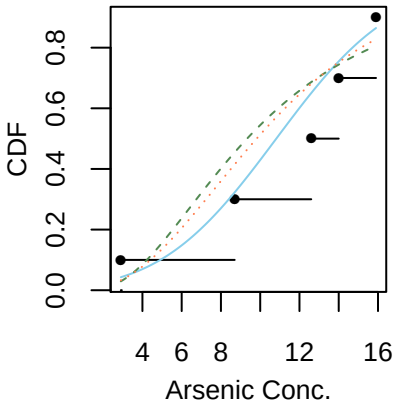
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

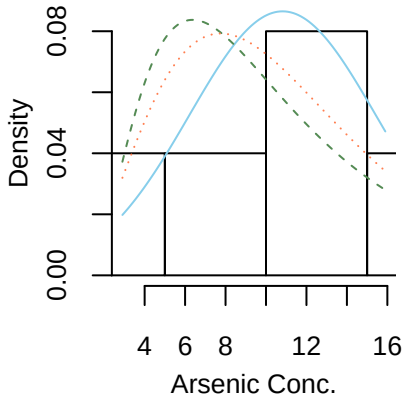


ECDF, Histogram & Q−Q (Detects Only)

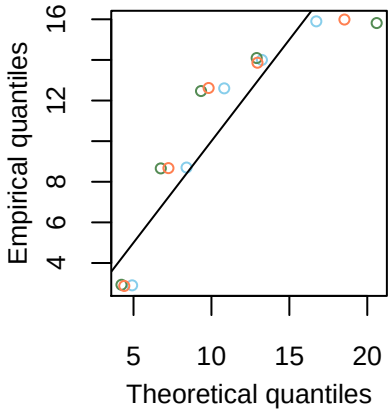
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 2	Arithmetic Mean = 11
N (detect) = 5	SD (log detect) = 0.69	Max (detect) = 16 J	Arithmetic SD = 5

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.57	N<5	–	–	–	–	33.4739	32.6928
Lognormal	0.1	N<5	–	–	–	–	35.7106	34.9295
Gamma	–	–	NA	NA	NA	NA	34.6761	33.8949

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Arsenic

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **454**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Cadmium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 5	FOD = 60%	Min (detect) = 0.21 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 1 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

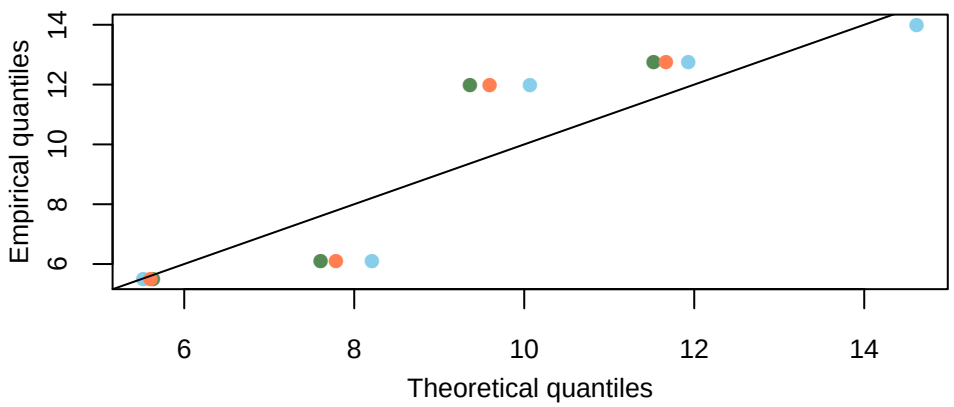
Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Cadmium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Cobalt

Legend

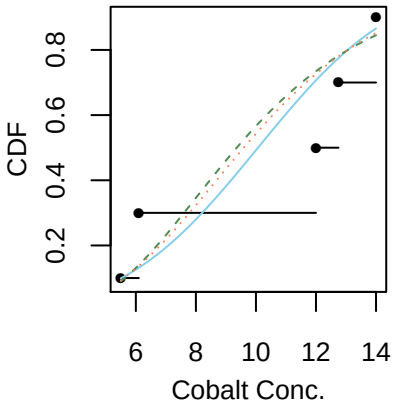
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

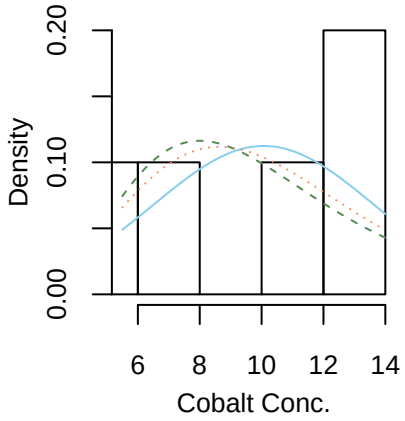


ECDF, Histogram & Q−Q (Detects Only)

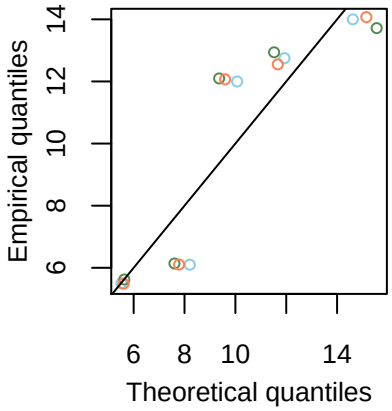
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 5 J	Arithmetic Mean = 10
N (detect) = 5	SD (log detect) = 0.44	Max (detect) = 14 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.15	N<5	–	–	–	–	30.8577	30.0766
Lognormal	0.1	N<5	–	–	–	–	31.2993	30.5182
Gamma	–	–	NA	NA	NA	NA	31.0577	30.2765

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

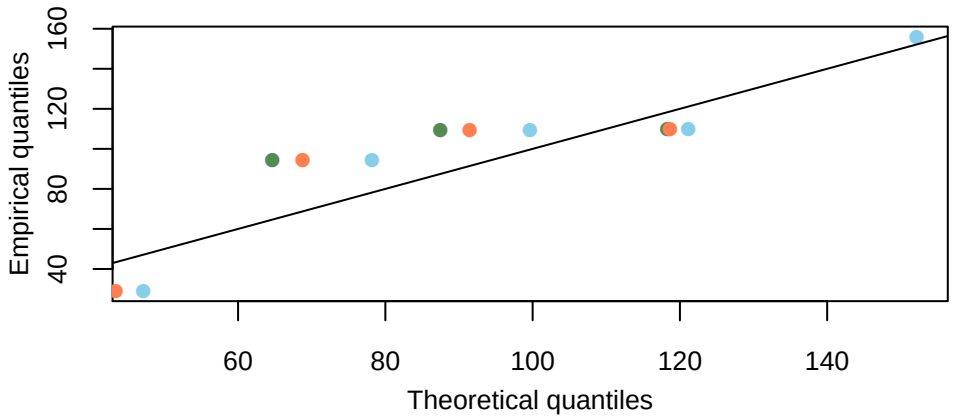
DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Cobalt

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Copper

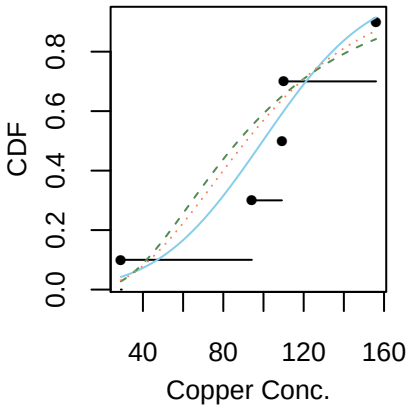
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

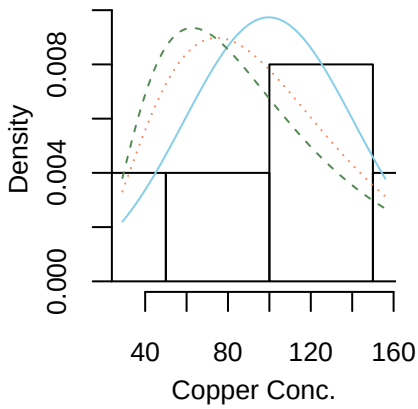


ECDF, Histogram & Q−Q (Detects Only)

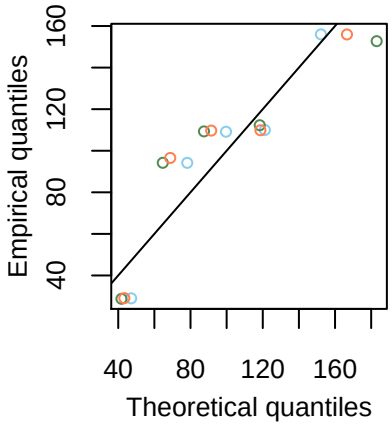
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 29	Arithmetic Mean = 100
N (detect) = 5	SD (log detect) = 0.64	Max (detect) = 160 J	Arithmetic SD = 46

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.58	N<5	–	–	–	–	55.3184	54.5373
Lognormal	0.088	N<5	–	–	–	–	57.3896	56.6085
Gamma	–	–	NA	NA	NA	NA	56.4057	55.6246

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

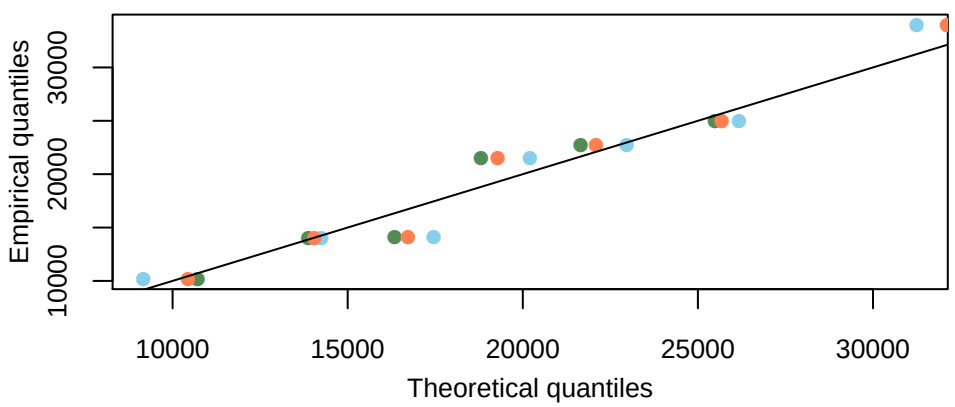
Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Copper

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Iron

Legend

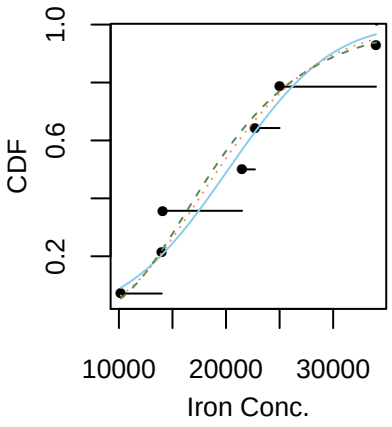
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

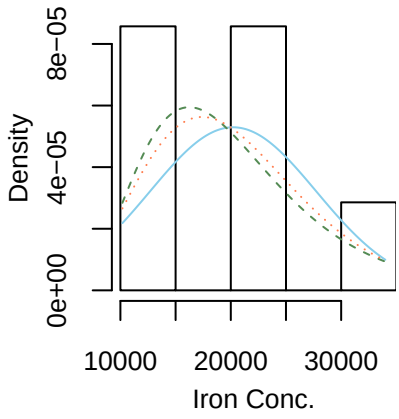


ECDF, Histogram & Q−Q (Detects Only)

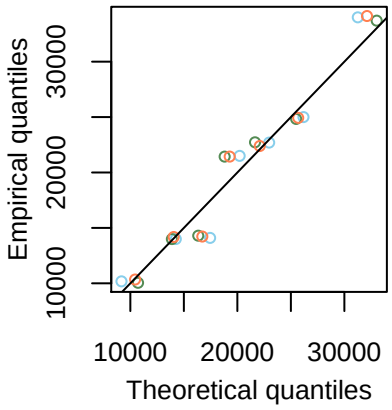
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 10,000 J	Arithmetic Mean = 20,000
N (detect) = 7	SD (log detect) = 0.41	Max (detect) = 34,000 J	Arithmetic SD = 8,100

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.69	0.52	–	–	–	–	148.848	148.74
Lognormal	0.8	0.56	–	–	–	–	148.254	148.146
Gamma	–	–	NA	NA	NA	NA	148.235	148.126

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Iron

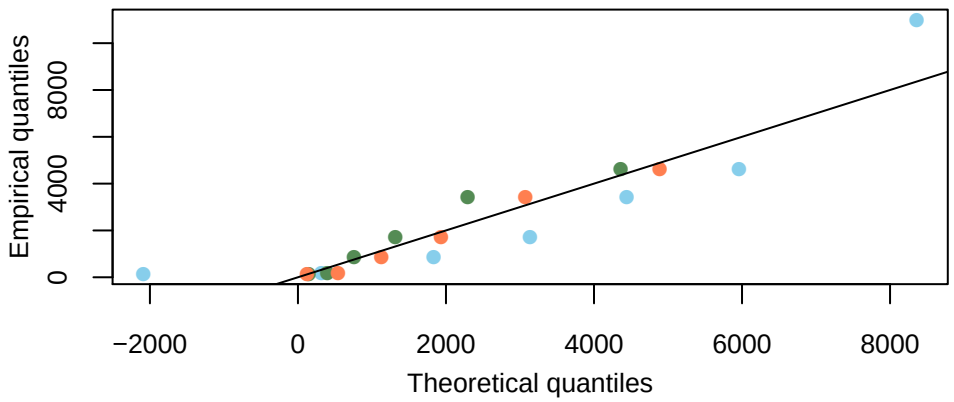
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **458**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Manganese

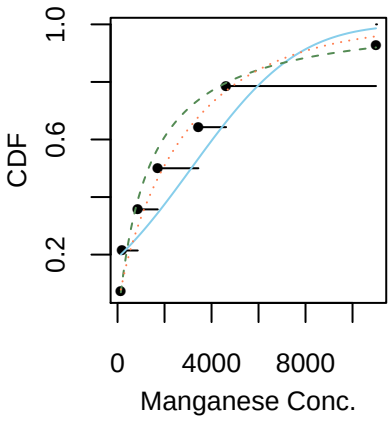
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

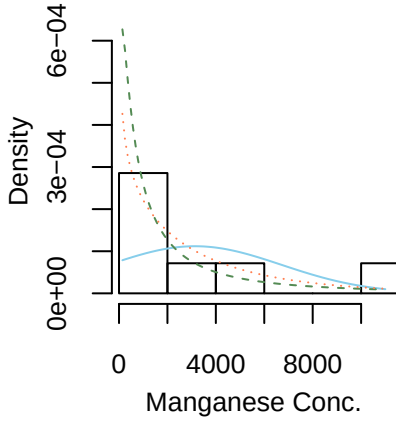


ECDF, Histogram & Q−Q (Detects Only)

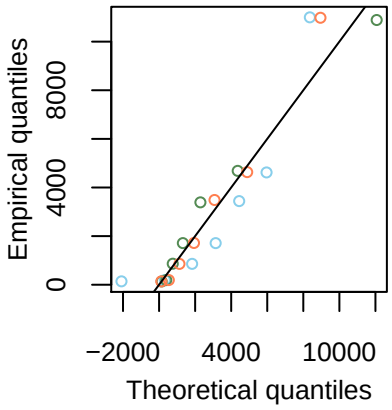
ECDF



Histogram



Q−Q



N = 7	FOD = 100%	Min (detect) = 140	Arithmetic Mean = 3,100
N (detect) = 7	SD (log detect) = 1.6	Max (detect) = 11,000 J	Arithmetic SD = 3,900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.048	0.4	–	–	–	–	138.372	138.264
Lognormal	0.65	0.8	–	–	–	–	130.223	130.115
Gamma	–	–	NA	NA	NA	NA	130.079	129.97

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Manganese

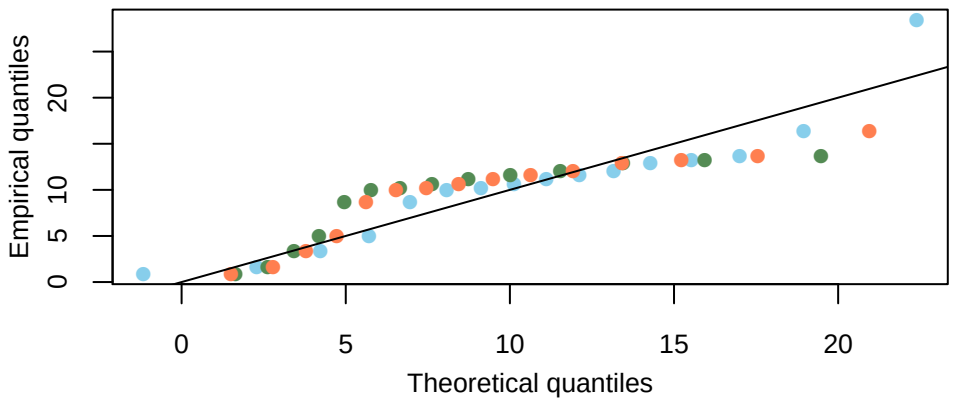
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **459**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Mercury

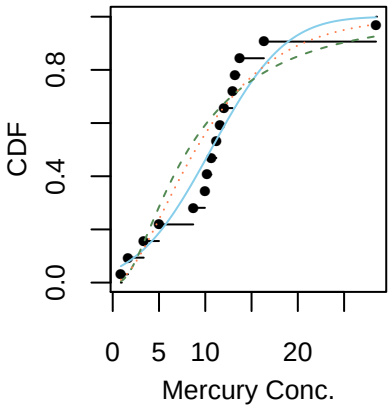
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

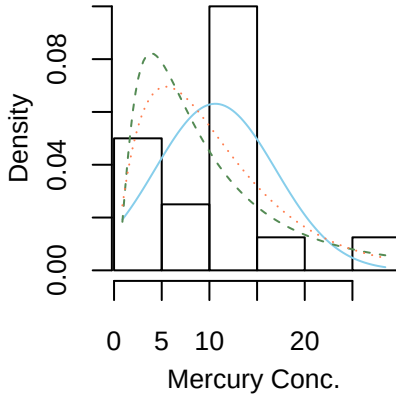


ECDF, Histogram & Q−Q (Detects Only)

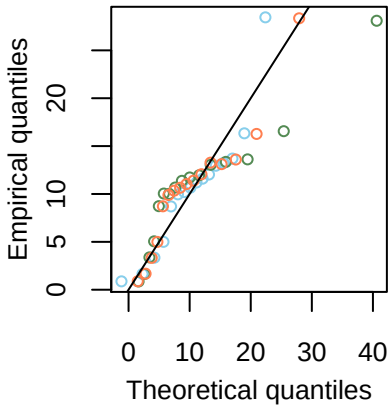
ECDF



Histogram



Q−Q



N = 16	FOD = 100%	Min (detect) = 0.88	Arithmetic Mean = 11
N (detect) = 16	SD (log detect) = 0.89	Max (detect) = 28 J	Arithmetic SD = 6

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.061	0.11	–	–	–	–	108.423	109.968
Lognormal	0.0076	0.0017	–	–	–	–	111.818	113.363
Gamma	–	–	0.2453	0.218	0.8942	0.75	107.653	109.198

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Mercury

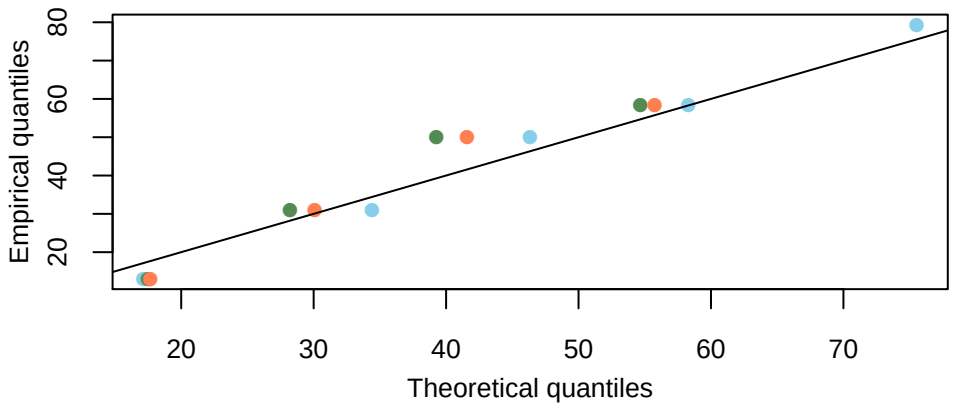
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **460**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Nickel

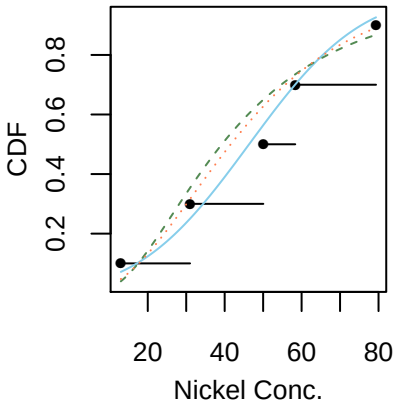
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

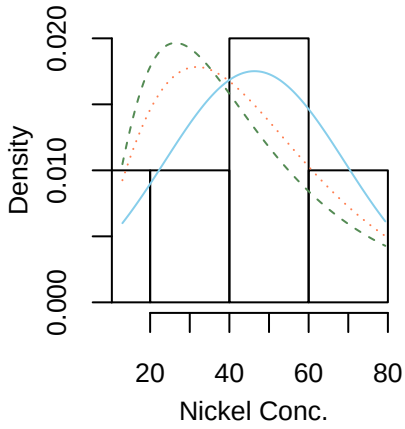


ECDF, Histogram & Q−Q (Detects Only)

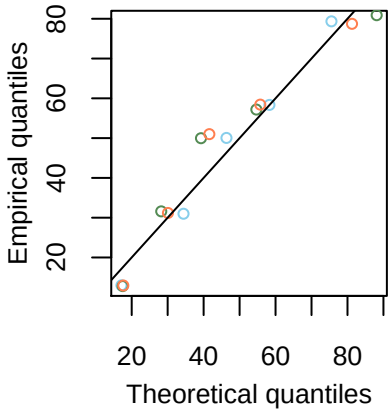
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 13	Arithmetic Mean = 46
N (detect) = 5	SD (log detect) = 0.71	Max (detect) = 79 J	Arithmetic SD = 25

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.98	N<5	–	–	–	–	49.448	48.6669
Lognormal	0.55	N<5	–	–	–	–	50.2837	49.5026
Gamma	–	–	NA	NA	NA	NA	49.642	48.8609

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

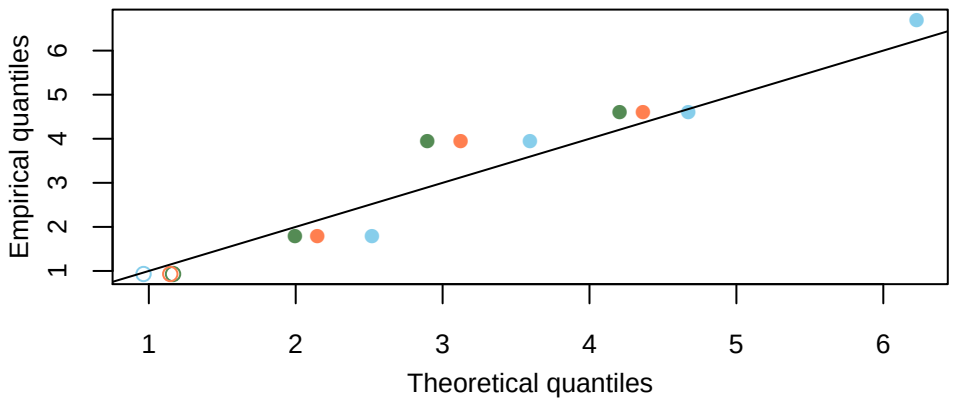
DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Nickel

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Thallium

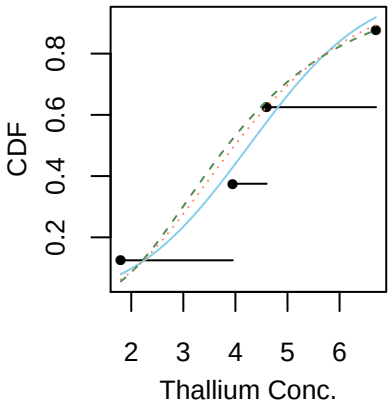
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

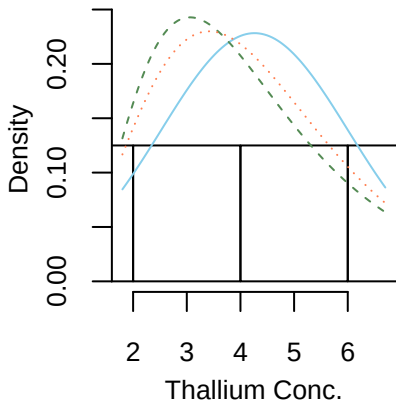


ECDF, Histogram & Q−Q (Detects Only)

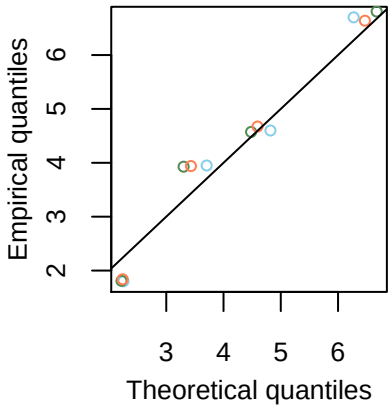
ECDF



Histogram



Q−Q



N = 5	FOD = 80%	Min (detect) = 1 J	Kaplan Meier Mean = 3
N (detect) = 4	SD (log detect) = 0.55	Max (detect) = 6 J	Kaplan Meier SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.84	N<5	–	–	–	–	25.3871	24.606
Lognormal	0.64	N<5	–	–	–	–	25.4146	24.6335
Gamma	–	–	NA	NA	NA	NA	24.9808	24.1997

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.95	N<5	–	–	–	–	19.8176	18.5902
Lognormal	0.65	N<5	–	–	–	–	20.2405	19.0131
Gamma	–	–	NA	NA	NA	NA	19.9237	18.6963

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Thallium

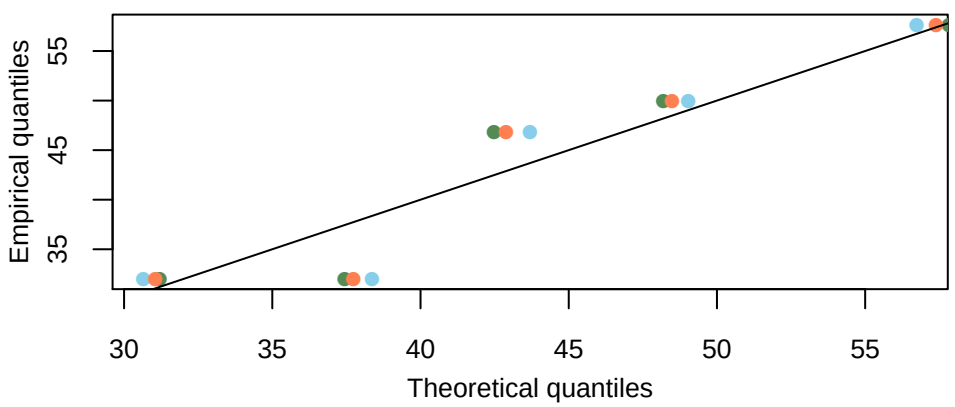
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **462**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Vanadium

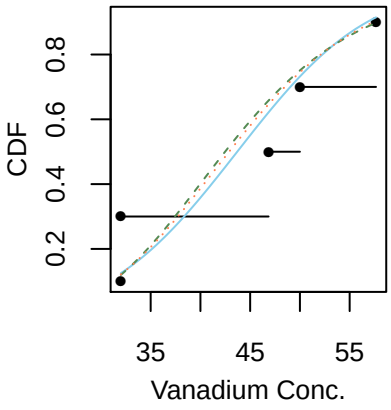
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

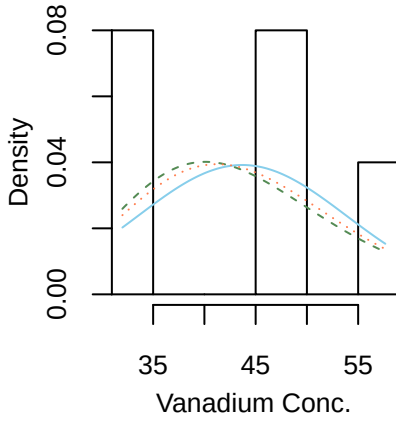


ECDF, Histogram & Q−Q (Detects Only)

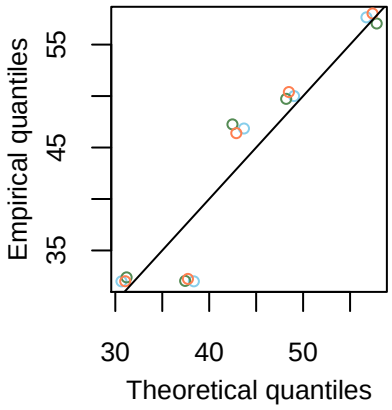
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 32	Arithmetic Mean = 44
N (detect) = 5	SD (log detect) = 0.27	Max (detect) = 58 J	Arithmetic SD = 11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.33	N<5	–	–	–	–	41.392	40.6109
Lognormal	0.22	N<5	–	–	–	–	41.441	40.6598
Gamma	–	–	NA	NA	NA	NA	41.3817	40.6005

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Vanadium

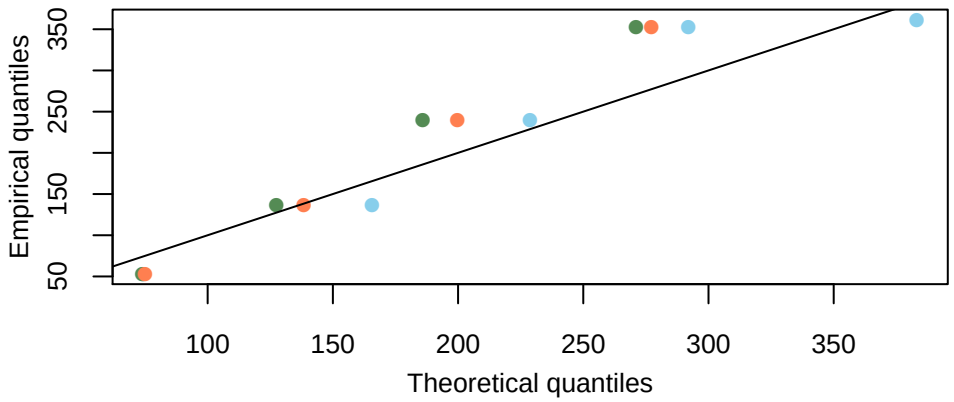
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **463**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Zinc

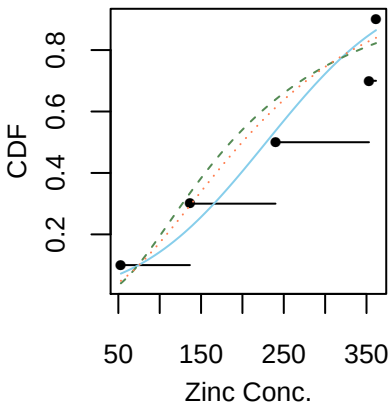
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

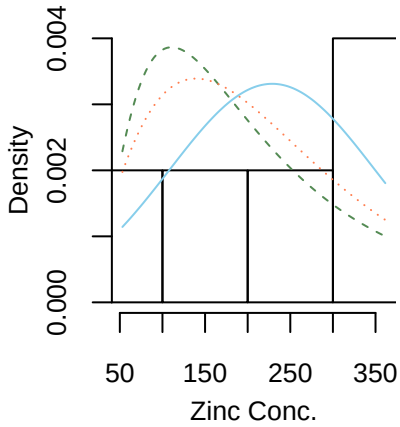


ECDF, Histogram & Q−Q (Detects Only)

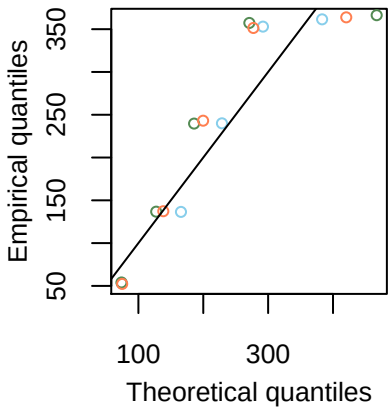
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 53	Arithmetic Mean = 230
N (detect) = 5	SD (log detect) = 0.8	Max (detect) = 360 J	Arithmetic SD = 130

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.48	N<5	–	–	–	–	66.1048	65.3237
Lognormal	0.29	N<5	–	–	–	–	67.1465	66.3654
Gamma	–	–	NA	NA	NA	NA	66.3874	65.6062

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

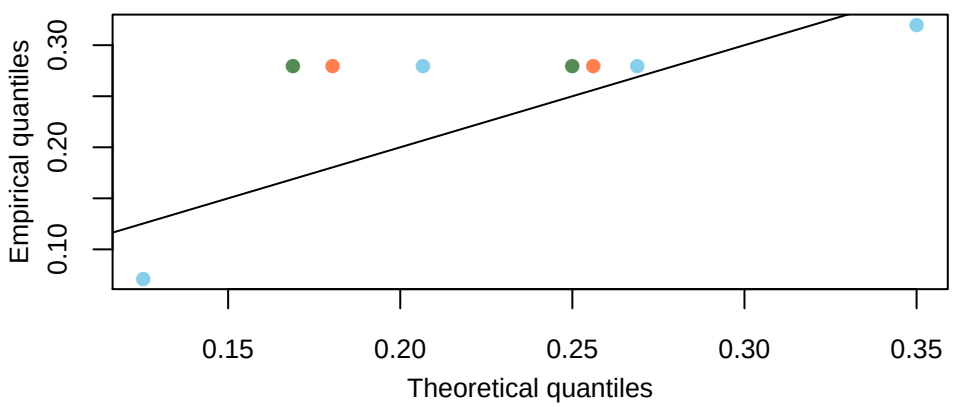
DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Zinc

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Benzo[a]pyrene

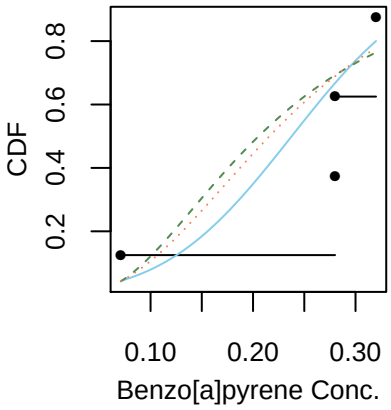
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

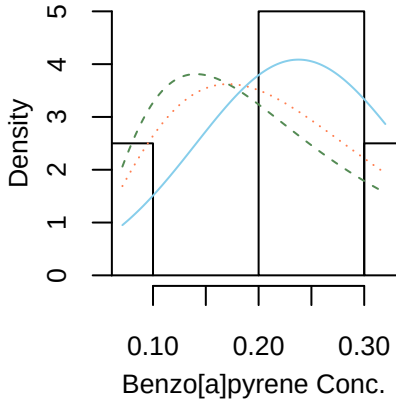


ECDF, Histogram & Q−Q (Detects Only)

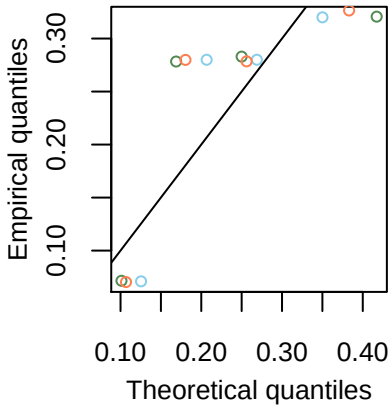
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 0.071	Arithmetic Mean = 0.24
N (detect) = 4	SD (log detect) = 0.71	Max (detect) = 0.32 J	Arithmetic SD = 0.11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.056	N<5	–	–	–	–	−3.25956	−4.48697
Lognormal	0.014	N<5	–	–	–	–	−1.18762	−2.41503
Gamma	–	–	NA	NA	NA	NA	−2.0415	−3.26891

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Benzo[a]pyrene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **465**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 4	FOD = 50%	Min (detect) = 0.016 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.059	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Dibenz[a,h]anthracene

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 4	FOD = 50%	Min (detect) = 0.005 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.0056 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Aldrin

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Heptachlor

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 67%	Min (detect) = 0.0024 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.0027 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

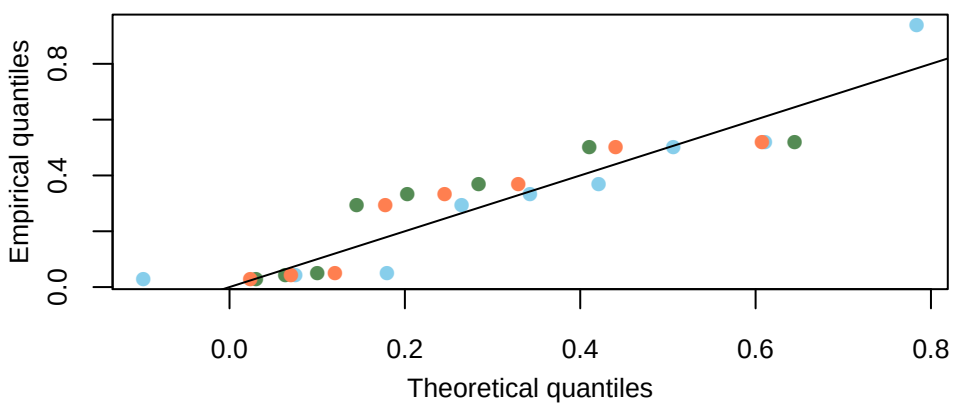
Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Heptachlor Epoxide

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

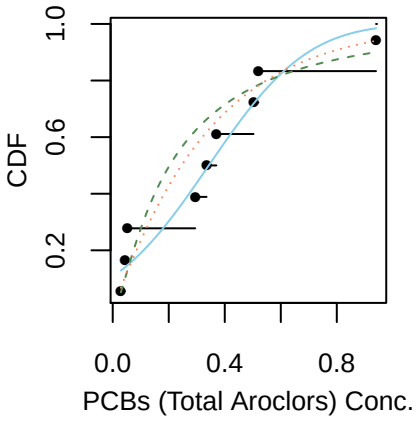
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

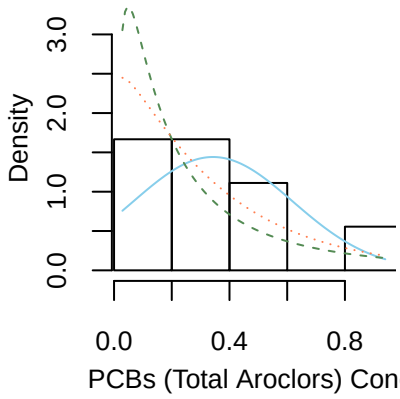


ECDF, Histogram & Q−Q (Detects Only)

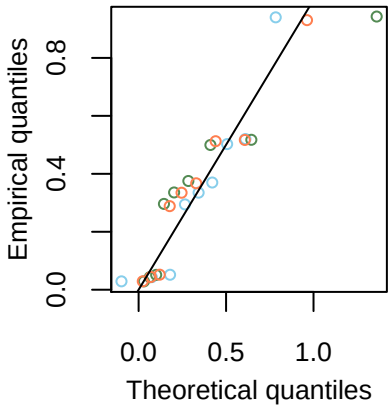
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 0.029 J	Arithmetic Mean = 0.34
N (detect) = 9	SD (log detect) = 1.3	Max (detect) = 0.94 J	Arithmetic SD = 0.29

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.25	0.61	–	–	–	–	6.4202	6.81465
Lognormal	0.099	0.037	–	–	–	–	4.03405	4.4285
Gamma	–	–	0.2348	0.287	0.5182	0.743	2.69462	3.08907

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−PCBs (Total Aroclors)

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Rutherford Marsh
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 4	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Rutherford Marsh−Trichloroethene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

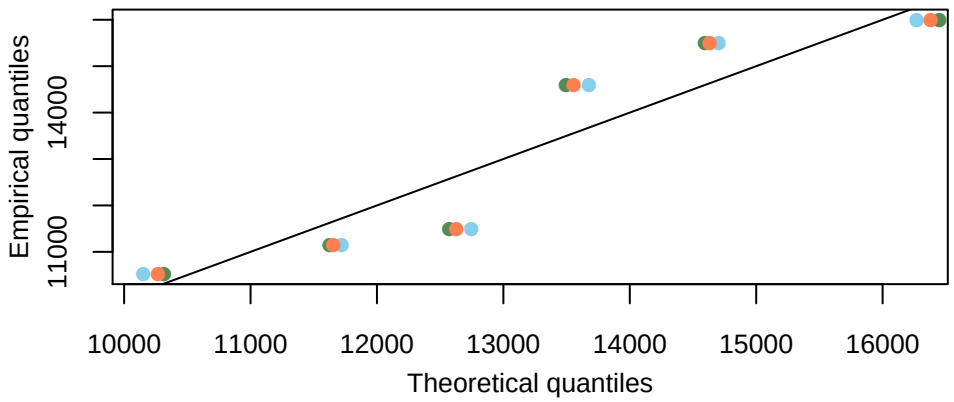
Figure **471**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Aluminum

Legend

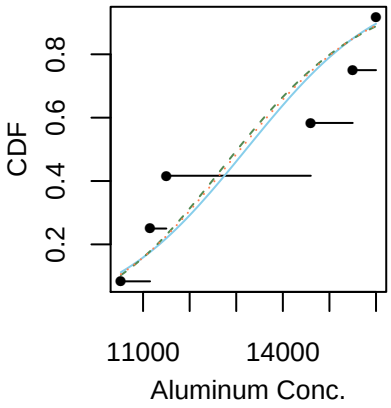
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

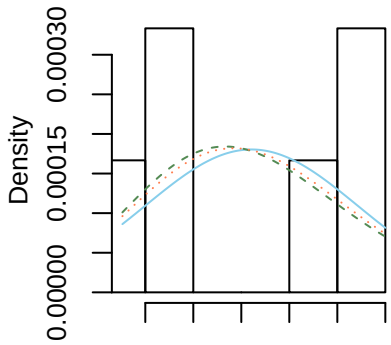


ECDF, Histogram & Q−Q (Detects Only)

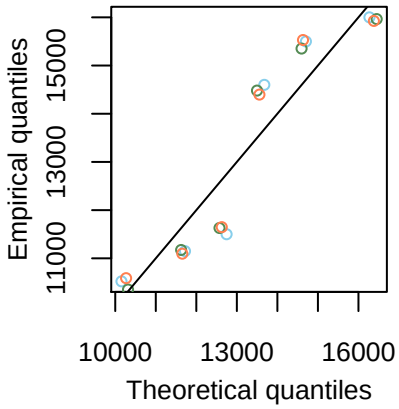
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 11,000 J	Arithmetic Mean = 13,000
N (detect) = 6	SD (log detect) = 0.18	Max (detect) = 16,000 J	Arithmetic SD = 2,400

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.18	0.23	–	–	–	–	113.445	113.029
Lognormal	0.18	0.28	–	–	–	–	113.369	112.953
Gamma	–	–	NA	NA	NA	NA	113.372	112.956

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Aluminum

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **472**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 6	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

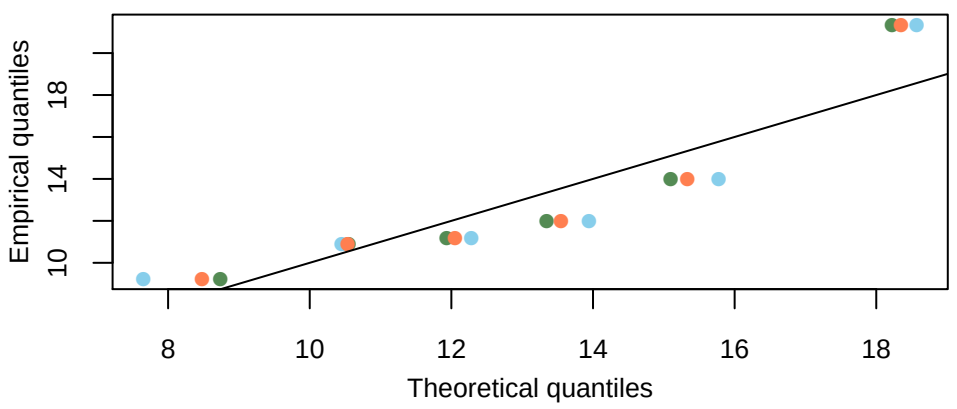
DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Antimony

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Arsenic

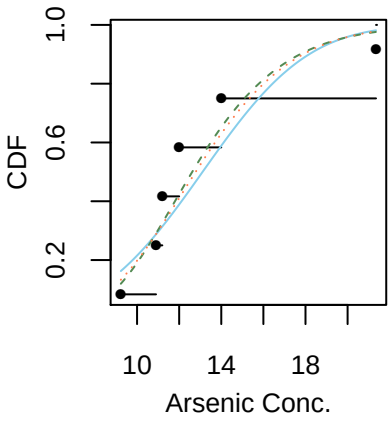
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

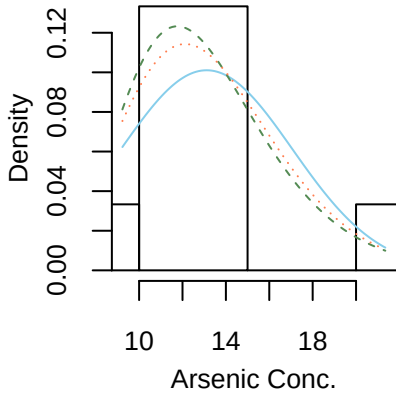


ECDF, Histogram & Q−Q (Detects Only)

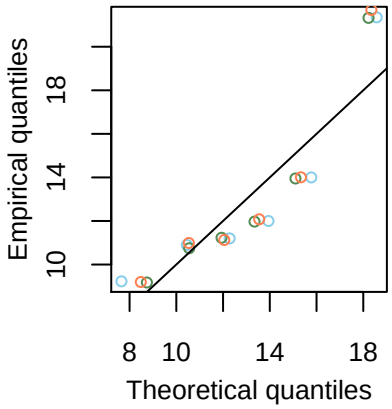
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 9 J	Arithmetic Mean = 13
N (detect) = 6	SD (log detect) = 0.29	Max (detect) = 21 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.081	0.19	–	–	–	–	37.5057	37.0892
Lognormal	0.35	0.37	–	–	–	–	35.5442	35.1278
Gamma	–	–	NA	NA	NA	NA	36.109	35.6925

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

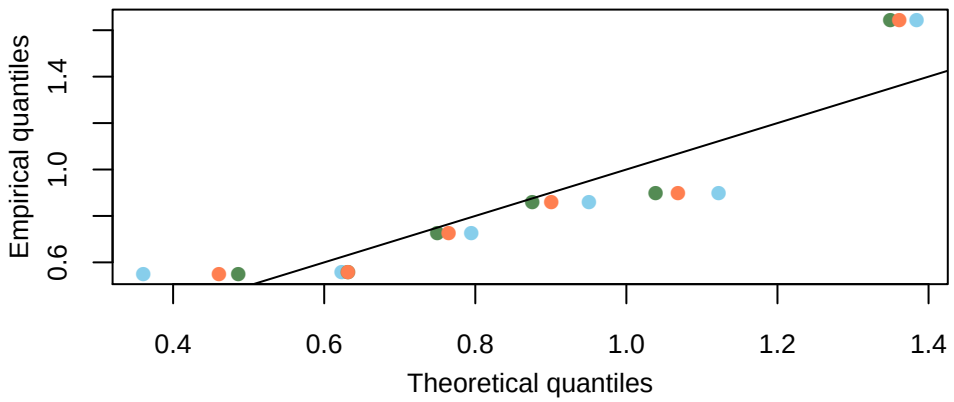
Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Arsenic

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Cadmium

Legend

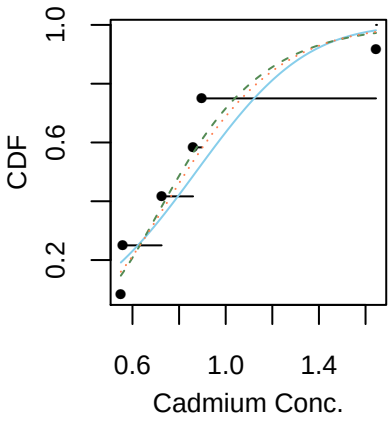
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

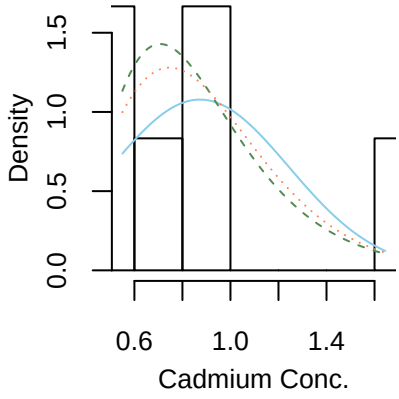


ECDF, Histogram & Q−Q (Detects Only)

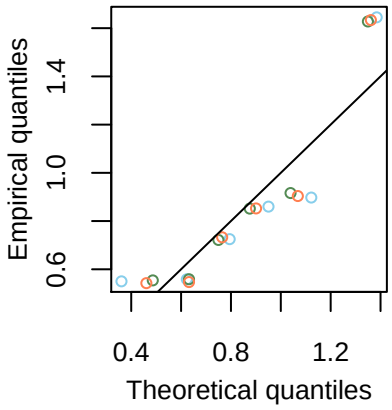
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 0.55 J	Arithmetic Mean = 0.87
N (detect) = 6	SD (log detect) = 0.4	Max (detect) = 1 J	Arithmetic SD = 0.41

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.059	0.076	–	–	–	–	9.09953	8.68305
Lognormal	0.32	0.39	–	–	–	–	6.53284	6.11636
Gamma	–	–	NA	NA	NA	NA	7.2102	6.79372

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

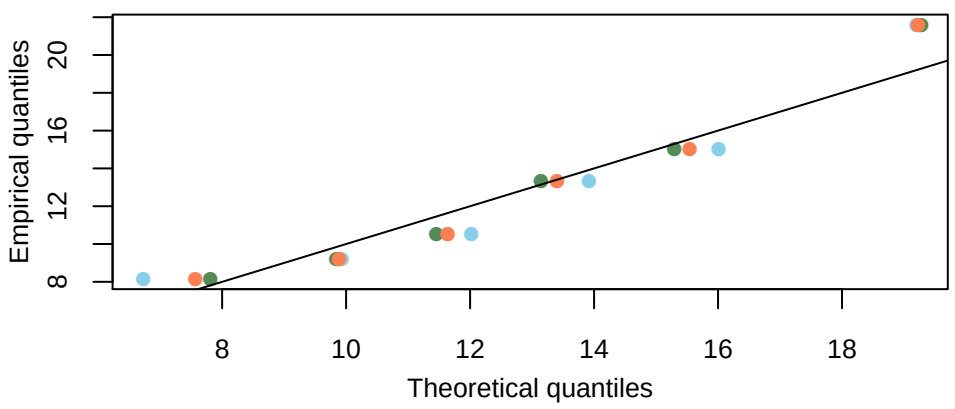
Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Cadmium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Cobalt

Legend

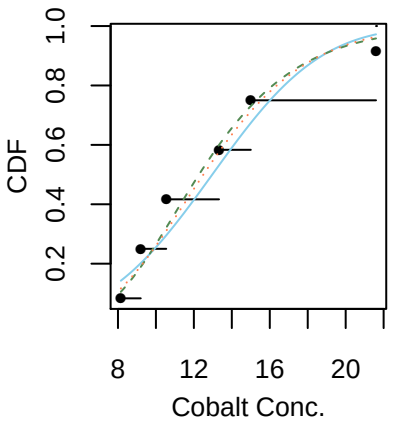
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

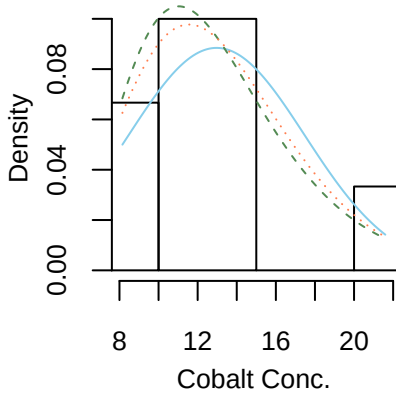


ECDF, Histogram & Q−Q (Detects Only)

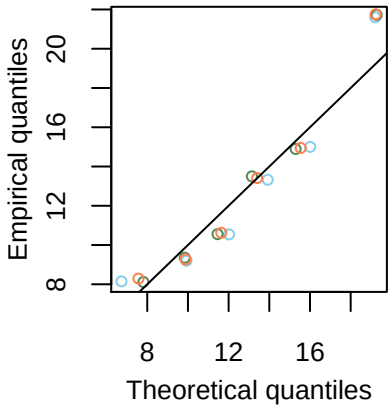
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 8 J	Arithmetic Mean = 13
N (detect) = 6	SD (log detect) = 0.36	Max (detect) = 22 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.42	0.72	–	–	–	–	39.1038	38.6873
Lognormal	0.83	0.88	–	–	–	–	37.6881	37.2716
Gamma	–	–	NA	NA	NA	NA	38.0269	37.6104

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Cobalt

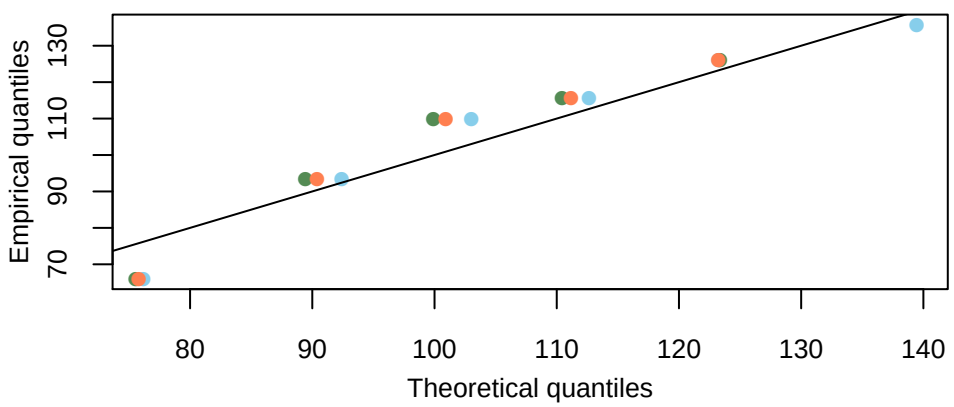
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **476**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Copper

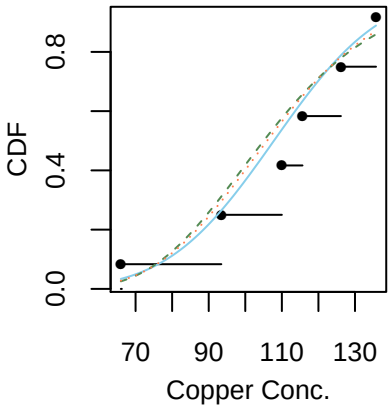
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

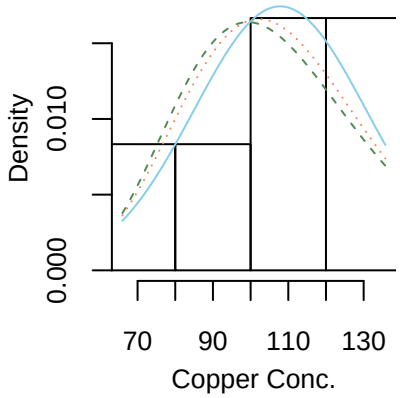


ECDF, Histogram & Q−Q (Detects Only)

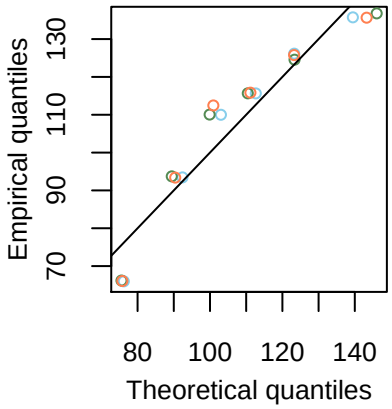
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 66 J	Arithmetic Mean = 110
N (detect) = 6	SD (log detect) = 0.26	Max (detect) = 140 J	Arithmetic SD = 25

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.72	0.63	–	–	–	–	58.5884	58.172
Lognormal	0.35	0.36	–	–	–	–	59.6683	59.2518
Gamma	–	–	NA	NA	NA	NA	59.2411	58.8246

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Copper

Media:
Marsh Sediment (All Samples)

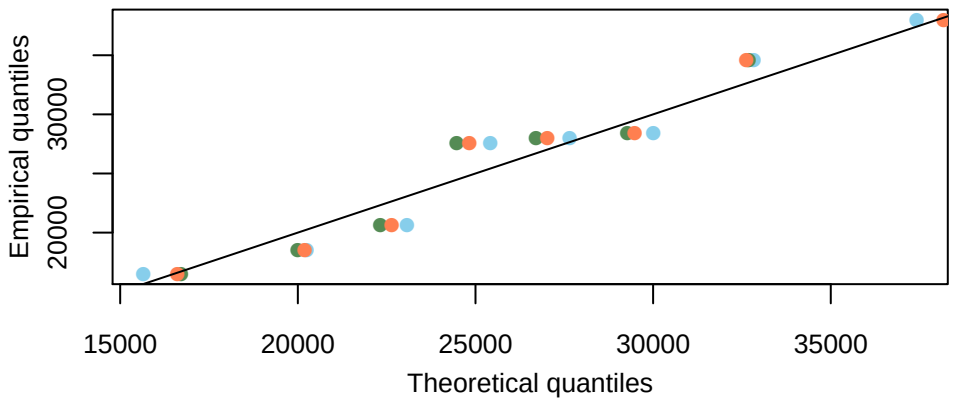
Exposure Unit:
Tollgate Marsh

Chemical (mg/kg):
Iron

Legend

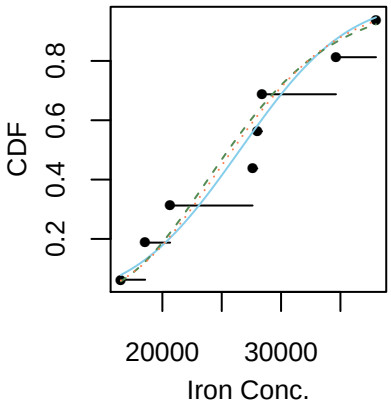
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

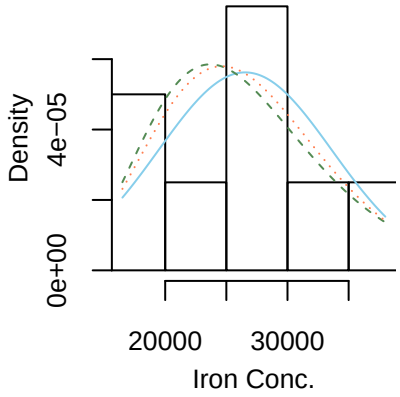


ECDF, Histogram & Q−Q (Detects Only)

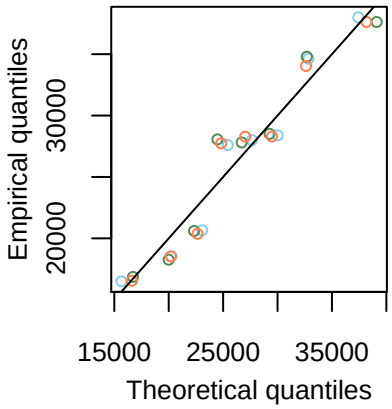
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 16,000 J	Arithmetic Mean = 27,000
N (detect) = 8	SD (log detect) = 0.3	Max (detect) = 38,000 J	Arithmetic SD = 7,600

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.63	0.62	–	–	–	–	168.576	168.734
Lognormal	0.58	0.26	–	–	–	–	168.553	168.712
Gamma	–	–	0.2184	0.294	0.3354	0.715	168.447	168.606

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Iron

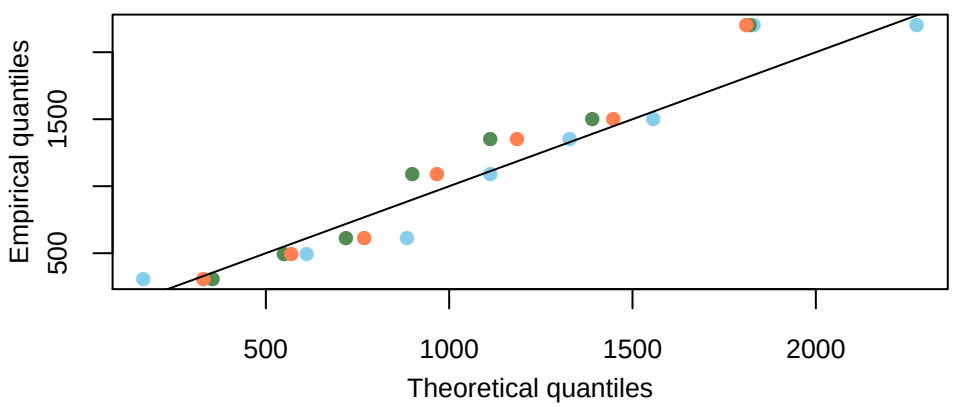
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **478**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Manganese

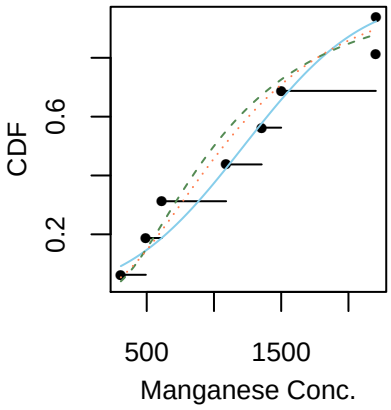
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

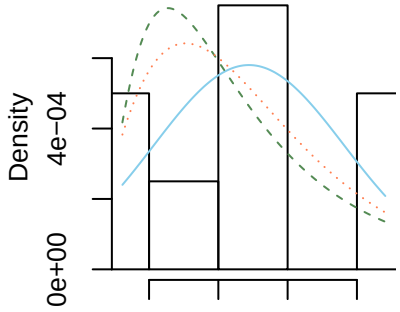


ECDF, Histogram & Q−Q (Detects Only)

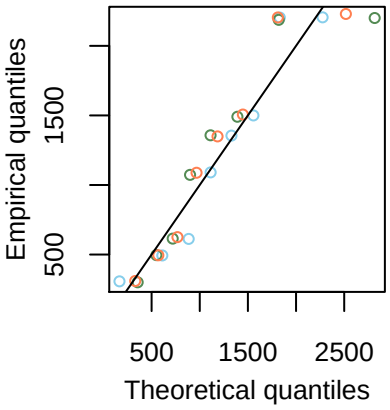
ECDF



Histogram



Q−Q



N = 8	FOD = 100%	Min (detect) = 310 J	Arithmetic Mean = 1,200
N (detect) = 8	SD (log detect) = 0.72	Max (detect) = 2,200 J	Arithmetic SD = 730

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.39	0.7	–	–	–	–	131.23	131.389
Lognormal	0.46	0.69	–	–	–	–	130.937	131.096
Gamma	–	–	0.1615	0.297	0.2983	0.724	130.392	130.551

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

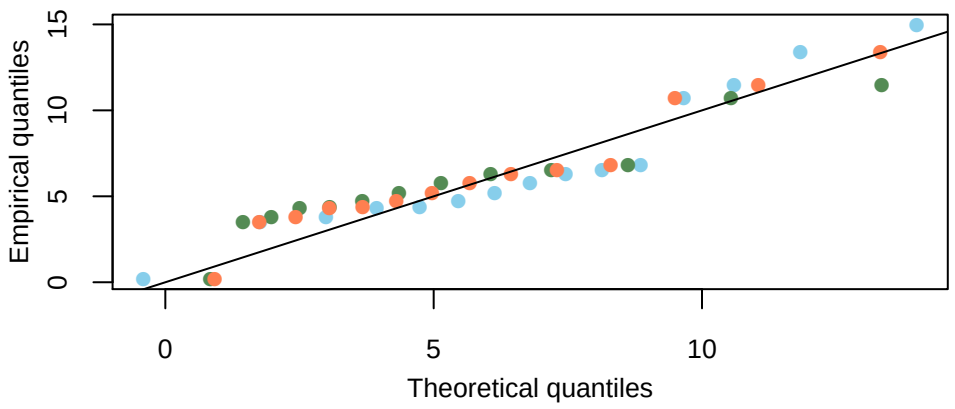
Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Manganese

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Mercury

Legend

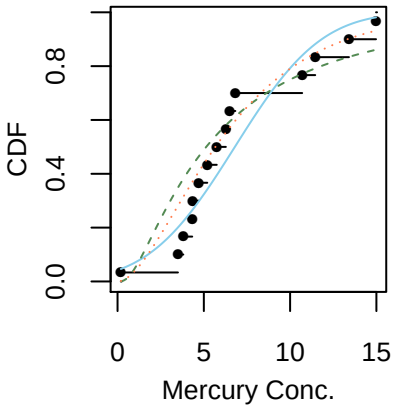
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

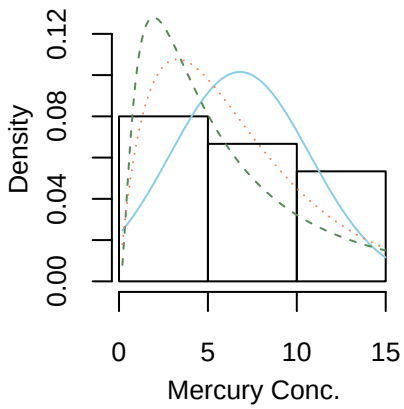


ECDF, Histogram & Q−Q (Detects Only)

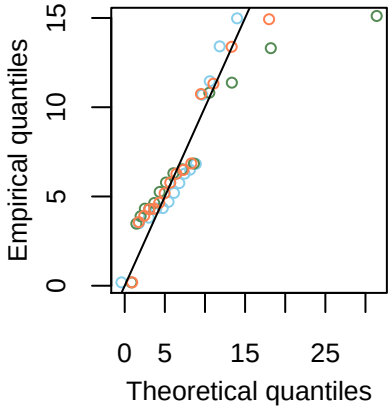
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 0.19 J	Arithmetic Mean = 6
N (detect) = 15	SD (log detect) = 1	Max (detect) = 15 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.15	0.031	–	–	–	–	87.6177	89.0338
Lognormal	0.00037	0.0017	–	–	–	–	95.276	96.6921
Gamma	–	–	0.2144	0.228	0.7197	0.763	88.3005	89.7166

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

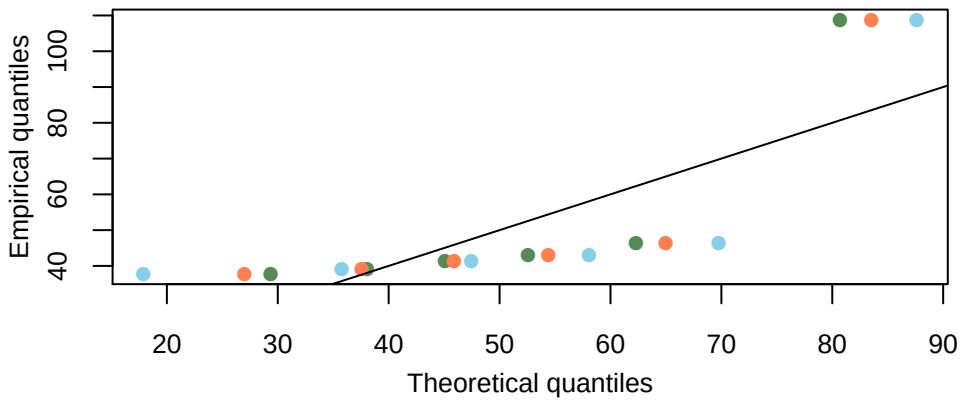
Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Mercury

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Nickel

Legend

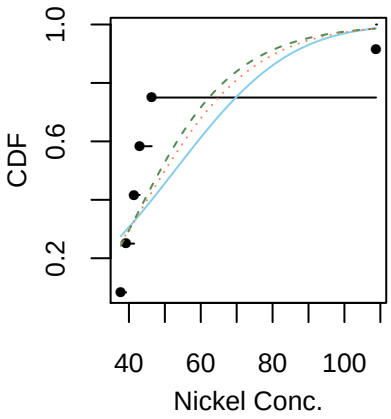
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

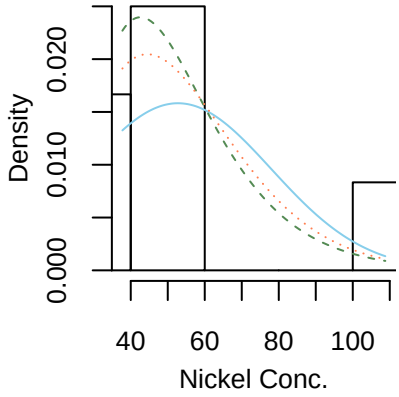


ECDF, Histogram & Q−Q (Detects Only)

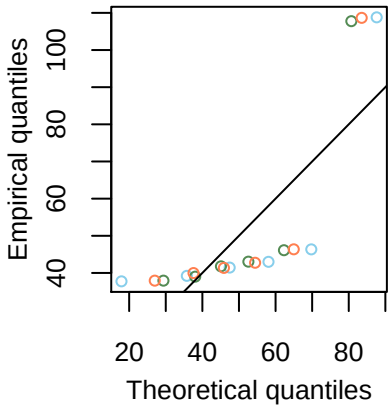
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 38 J	Arithmetic Mean = 53
N (detect) = 6	SD (log detect) = 0.4	Max (detect) = 110 J	Arithmetic SD = 28

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00046	0.0011	–	–	–	–	59.7544	59.338
Lognormal	0.0027	0.0065	–	–	–	–	55.5747	55.1583
Gamma	–	–	NA	NA	NA	NA	56.8528	56.4363

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

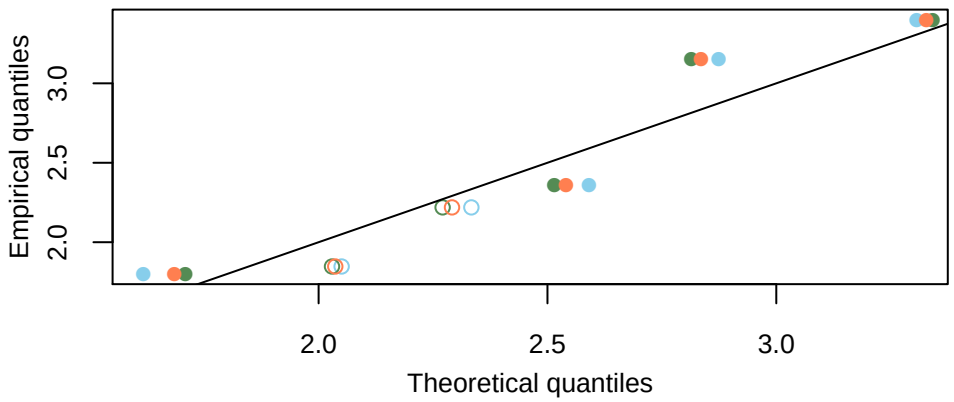
DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Nickel

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Thallium

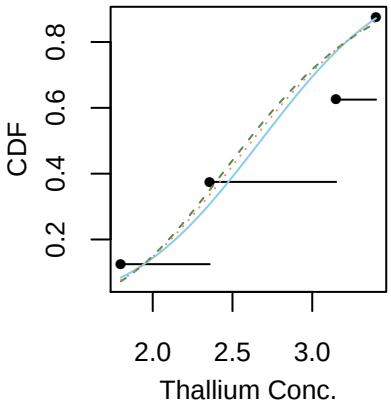
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

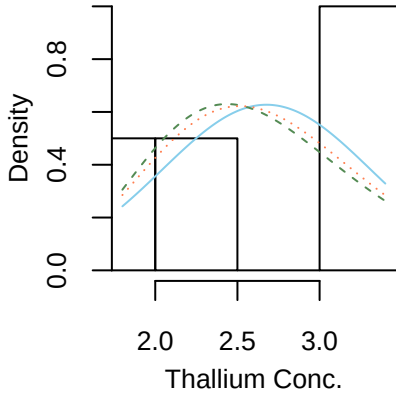


ECDF, Histogram & Q−Q (Detects Only)

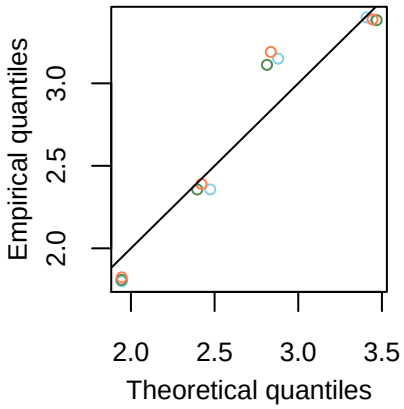
ECDF



Histogram



Q−Q



N = 6	FOD = 67%	Min (detect) = 1 J	Kaplan Meier Mean = 2
N (detect) = 4	SD (log detect) = 0.29	Max (detect) = 3 J	Kaplan Meier SD = 0.66

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.29	0.42	–	–	–	–	15.1131	14.6966
Lognormal	0.38	0.73	–	–	–	–	14.4811	14.0647
Gamma	–	–	NA	NA	NA	NA	14.6344	14.218

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.64	N<5	–	–	–	–	11.7308	10.5034
Lognormal	0.59	N<5	–	–	–	–	11.9514	10.724
Gamma	–	–	NA	NA	NA	NA	11.839	10.6116

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

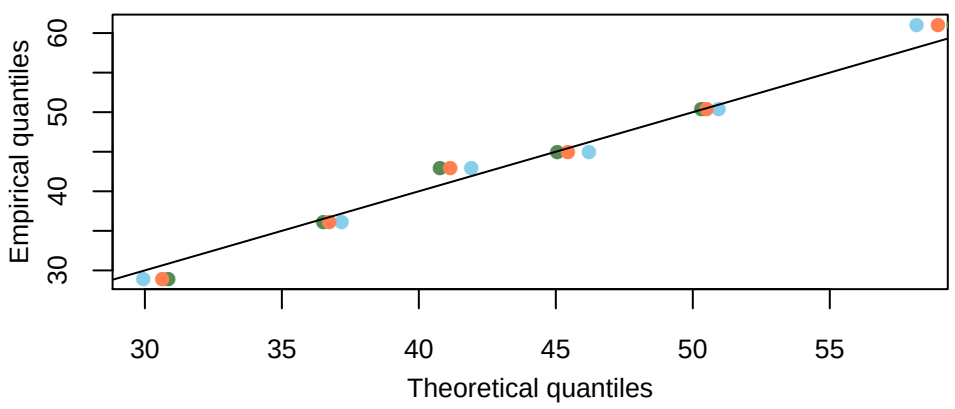
DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Thallium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Vanadium

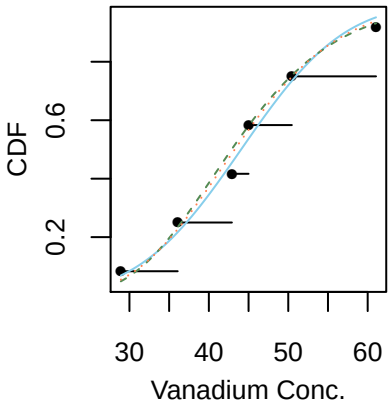
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

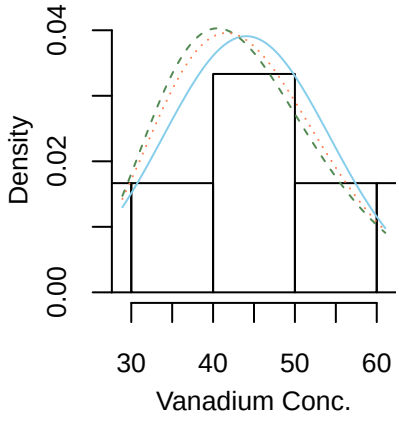


ECDF, Histogram & Q−Q (Detects Only)

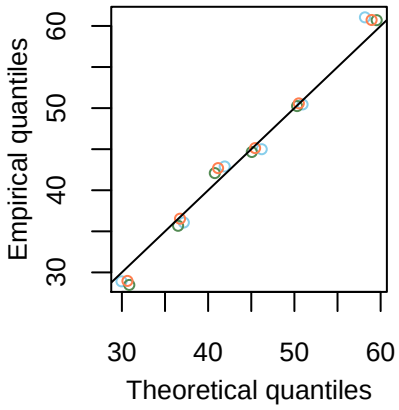
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 29 J	Arithmetic Mean = 44
N (detect) = 6	SD (log detect) = 0.26	Max (detect) = 61 J	Arithmetic SD = 11

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.99	0.98	–	–	–	–	48.902	48.4855
Lognormal	0.99	0.86	–	–	–	–	48.8776	48.4611
Gamma	–	–	NA	NA	NA	NA	48.8062	48.3898

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

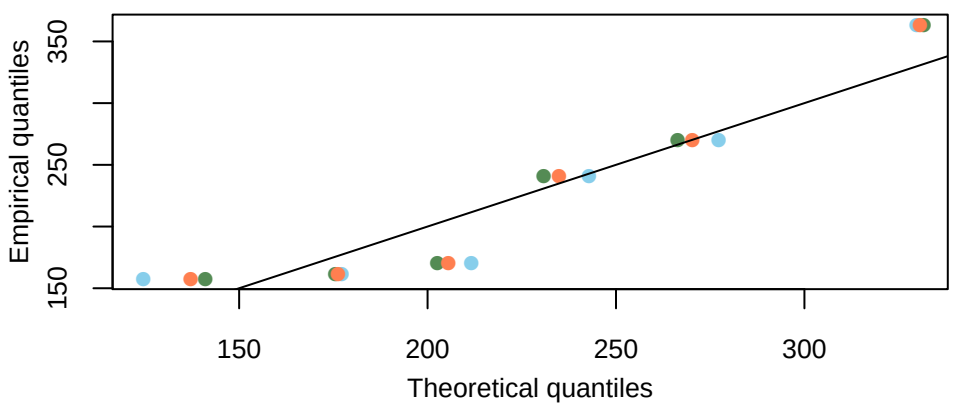
DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Vanadium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Zinc

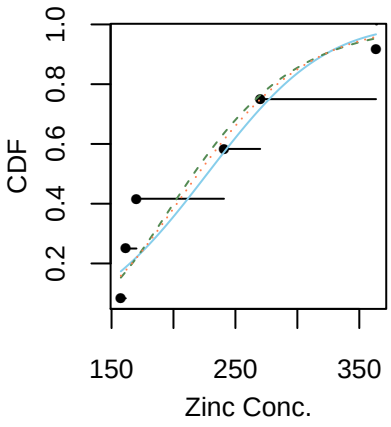
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

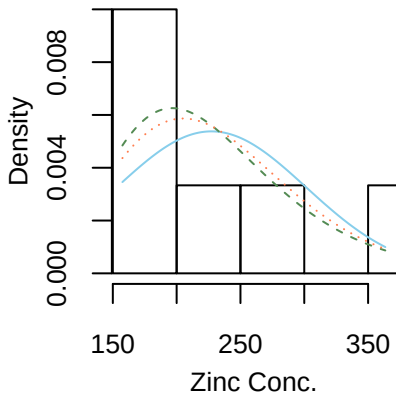


ECDF, Histogram & Q−Q (Detects Only)

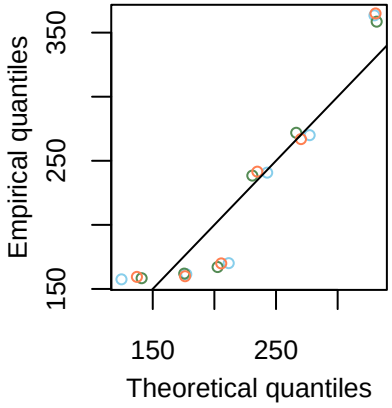
ECDF



Histogram



Q−Q



N = 6	FOD = 100%	Min (detect) = 160 J	Arithmetic Mean = 230
N (detect) = 6	SD (log detect) = 0.34	Max (detect) = 360 J	Arithmetic SD = 81

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.21	0.24	–	–	–	–	72.7065	72.29
Lognormal	0.29	0.23	–	–	–	–	71.4602	71.0438
Gamma	–	–	NA	NA	NA	NA	71.7729	71.3564

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Zinc

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **484**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Benzo[a]pyrene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.071 J	Arithmetic Mean = 0.16
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.27 J	Arithmetic SD = 0.1

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Benzo[a]pyrene

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.019 J	Arithmetic Mean = 0.039
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.062 J	Arithmetic SD = 0.022

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Dibenz[a,h]anthracene

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 67%	Min (detect) = 0.003 J	Kaplan Meier Mean = < 4 detects
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.0078 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Aldrin

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Heptachlor

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Heptachlor Epoxide

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

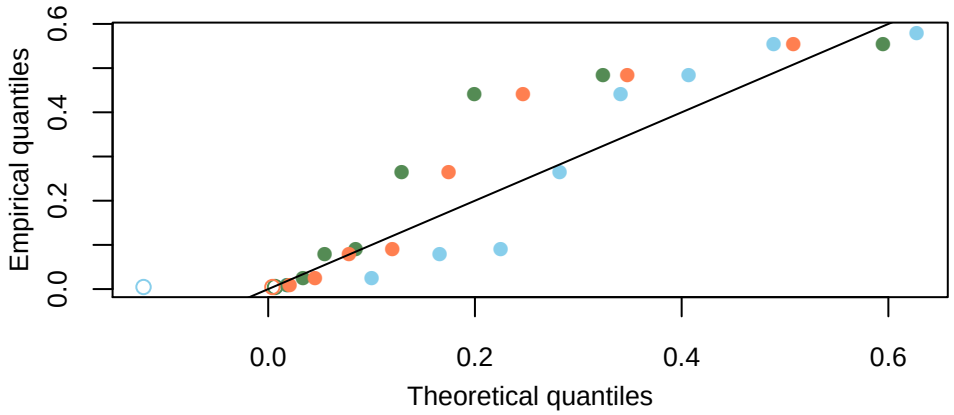
Figure
489

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

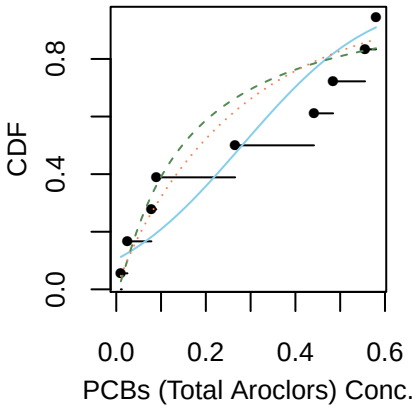
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

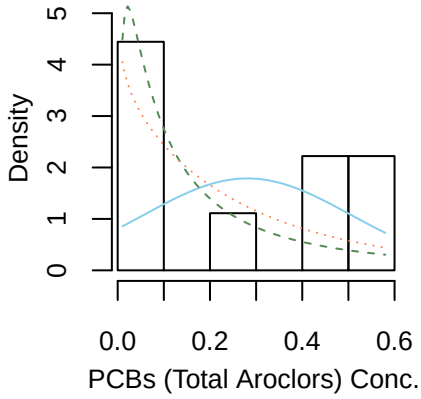


ECDF, Histogram & Q−Q (Detects Only)

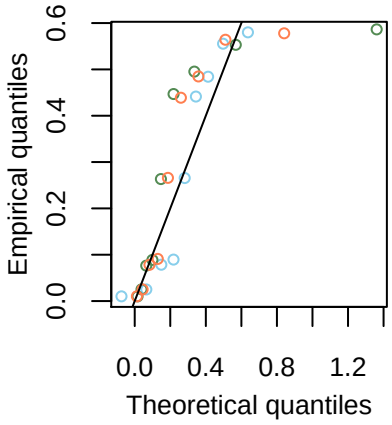
ECDF



Histogram



Q−Q



N = 10	FOD = 90%	Min (detect) = 0.01 J	Kaplan Meier Mean = 0.25
N (detect) = 9	SD (log detect) = 1.5	Max (detect) = 0.58 J	Kaplan Meier SD = 0.23

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.045	0.069	–	–	–	–	2.76145	3.36662
Lognormal	0.11	0.3	–	–	–	–	−2.43875	−1.83358
Gamma	–	–	0.215	0.281	0.5	0.777	−4.55609	−3.95092

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.097	0.16	–	–	–	–	2.55047	2.94492
Lognormal	0.11	0.27	–	–	–	–	1.07233	1.46677
Gamma	–	–	0.2345	0.294	0.5113	0.771	−0.903232	−0.508783

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **490**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Tollgate Marsh
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Tollgate Marsh−Trichloroethene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **491**

Media:
Marsh Sediment (All Samples)

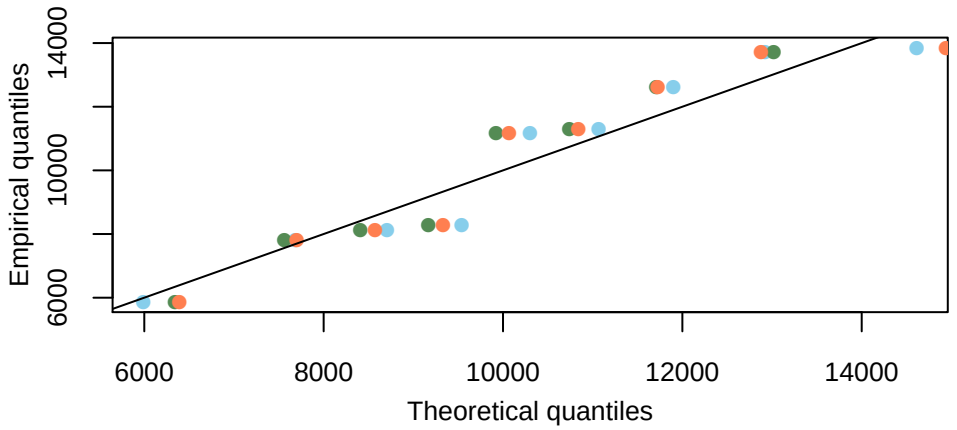
Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Aluminum

Legend

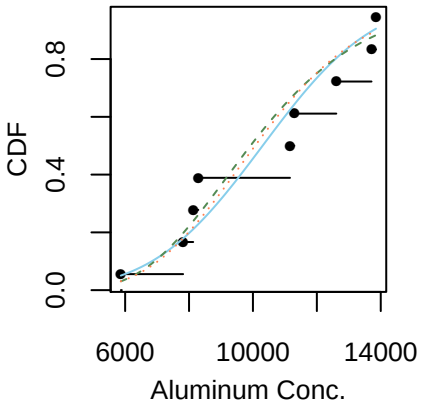
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

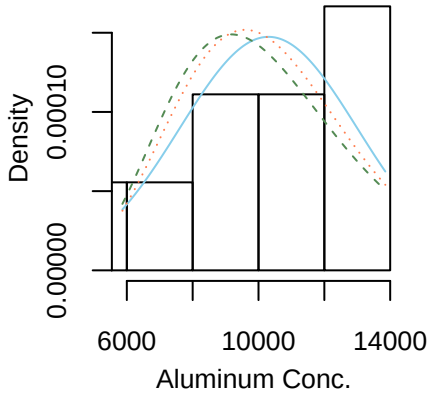


ECDF, Histogram & Q−Q (Detects Only)

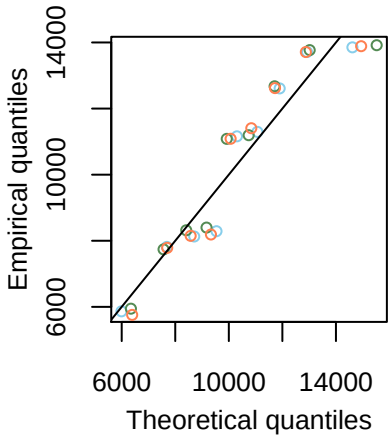
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 5,900 J	Arithmetic Mean = 10,000
N (detect) = 9	SD (log detect) = 0.3	Max (detect) = 14,000 J	Arithmetic SD = 2,900

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.39	0.35	–	–	–	–	171.801	172.196
Lognormal	0.33	0.31	–	–	–	–	172.323	172.718
Gamma	–	–	0.2093	0.279	0.4497	0.722	172.042	172.436

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Aluminum

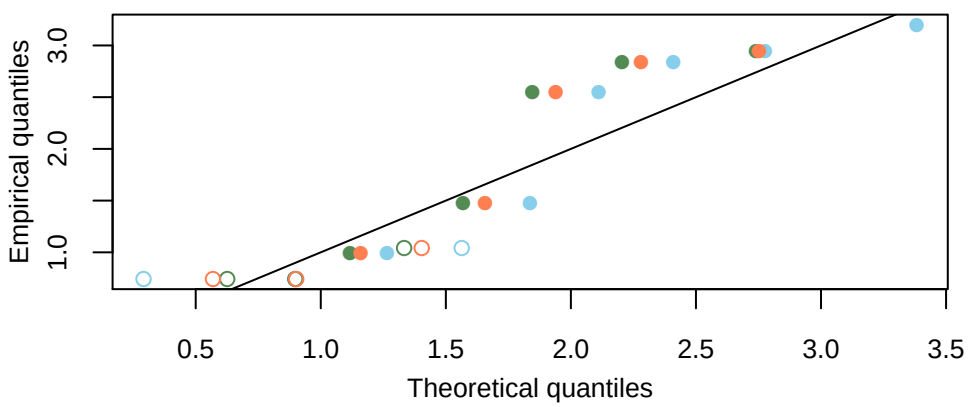
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **492**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Antimony

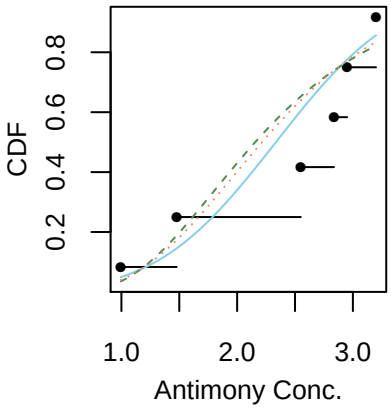
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

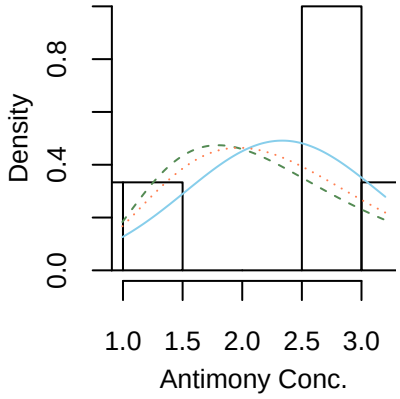


ECDF, Histogram & Q−Q (Detects Only)

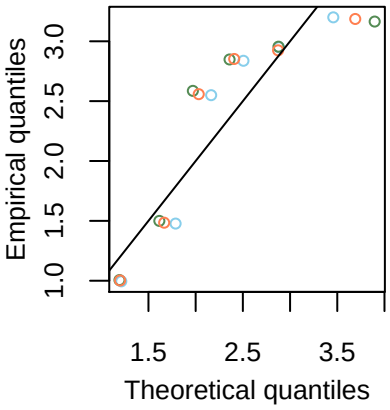
ECDF



Histogram



Q−Q



N = 9	FOD = 67%	Min (detect) = 1 J	Kaplan Meier Mean = 1
N (detect) = 6	SD (log detect) = 0.47	Max (detect) = 3 J	Kaplan Meier SD = 0.95

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.061	0.21	–	–	–	–	28.9978	29.3923
Lognormal	0.087	0.18	–	–	–	–	27.7397	28.1342
Gamma	–	–	0.2358	0.282	0.6439	0.73	27.7343	28.1287

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.23	0.22	–	–	–	–	18.5277	18.1112
Lognormal	0.11	0.081	–	–	–	–	20.059	19.6426
Gamma	–	–	NA	NA	NA	NA	19.3917	18.9752

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Antimony

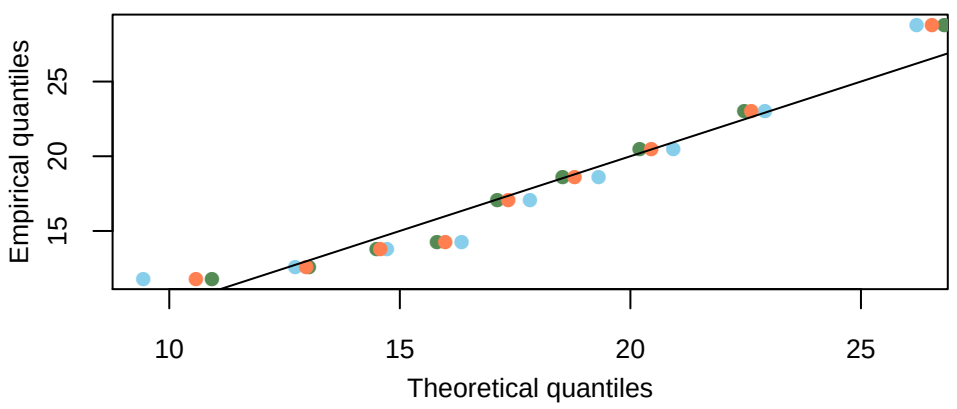
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **493**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Arsenic

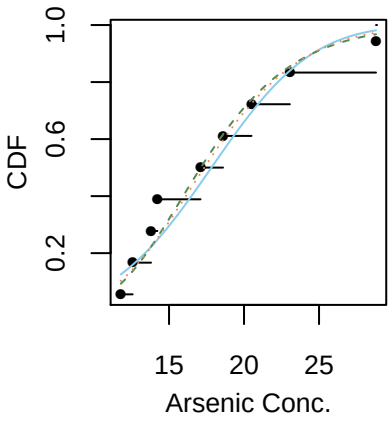
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

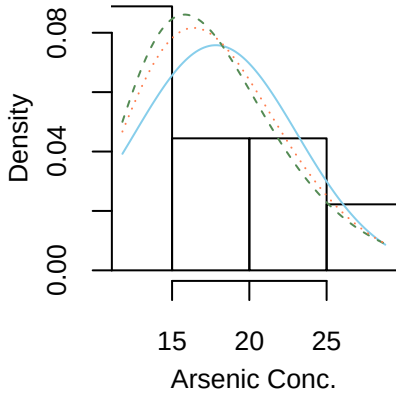


ECDF, Histogram & Q−Q (Detects Only)

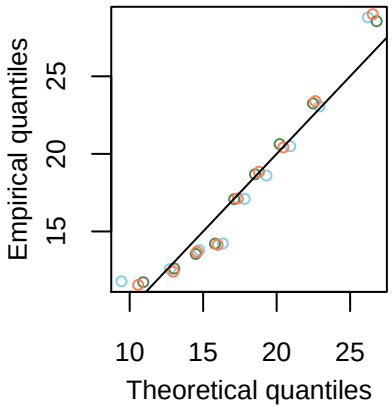
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 12 J	Arithmetic Mean = 18
N (detect) = 9	SD (log detect) = 0.3	Max (detect) = 29 J	Arithmetic SD = 5

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.41	0.5	–	–	–	–	59.4339	59.8284
Lognormal	0.76	0.58	–	–	–	–	57.8513	58.2457
Gamma	–	–	0.1931	0.279	0.2537	0.722	58.2261	58.6205

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Arsenic

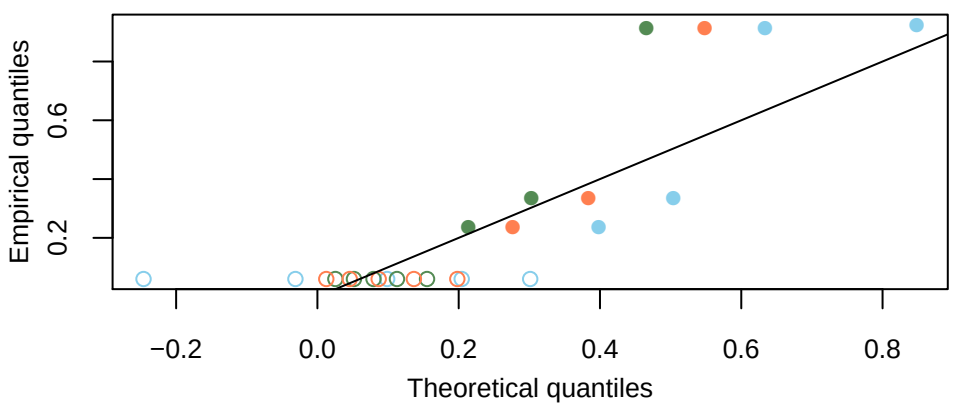
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **494**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Cadmium

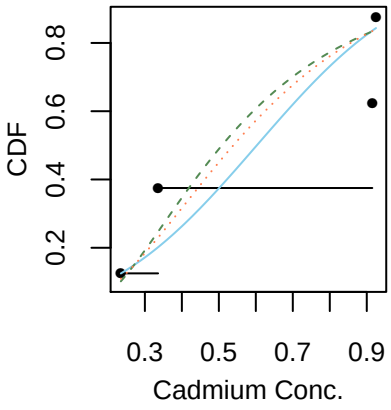
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

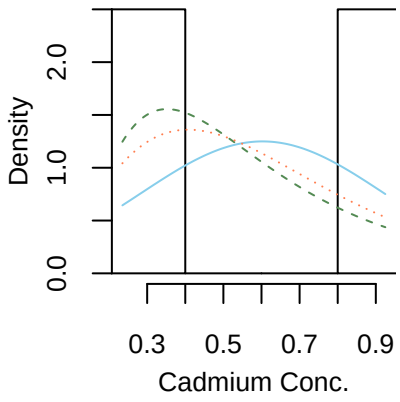


ECDF, Histogram & Q−Q (Detects Only)

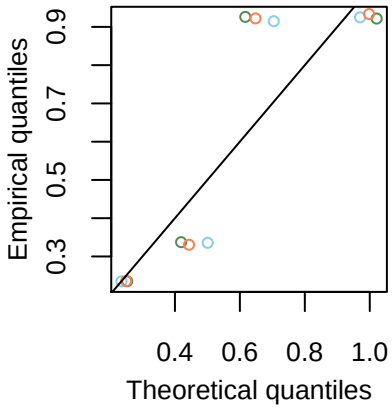
ECDF



Histogram



Q−Q



N = 9	FOD = 44%	Min (detect) = 0.24 J	Kaplan Meier Mean = 0.31
N (detect) = 4	SD (log detect) = 0.7	Max (detect) = 0.92 J	Kaplan Meier SD = 0.34

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0012	0.018	–	–	–	–	10.3092	10.7037
Lognormal	0.0065	0.0034	–	–	–	–	−1.70638	−1.31193
Gamma	–	–	NA	NA	NA	NA	0.306703	0.701152

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.099	N<5	–	–	–	–	6.21933	4.99192
Lognormal	0.18	N<5	–	–	–	–	5.938	4.71058
Gamma	–	–	NA	NA	NA	NA	5.84933	4.62192

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Cadmium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **495**

Media:
Marsh Sediment (All Samples)

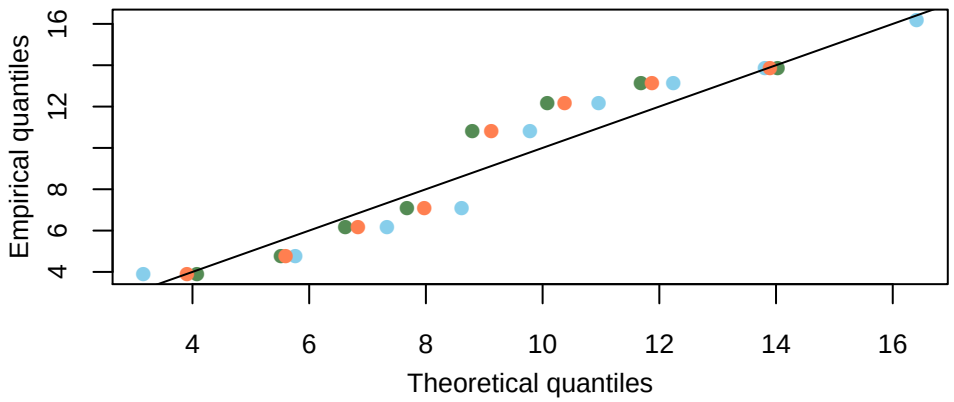
Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Cobalt

Legend

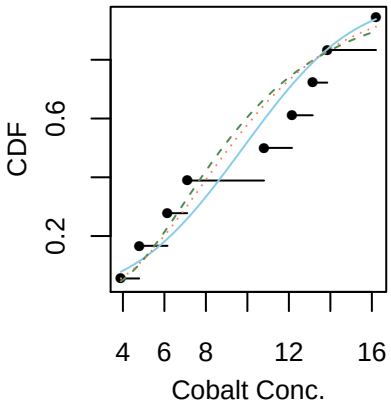
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

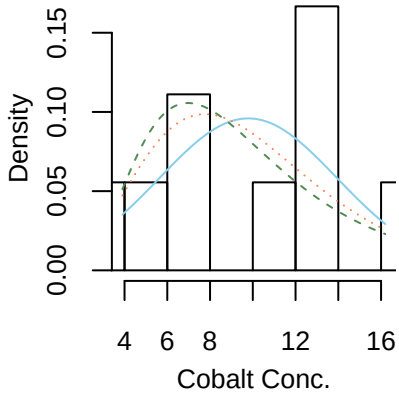


ECDF, Histogram & Q−Q (Detects Only)

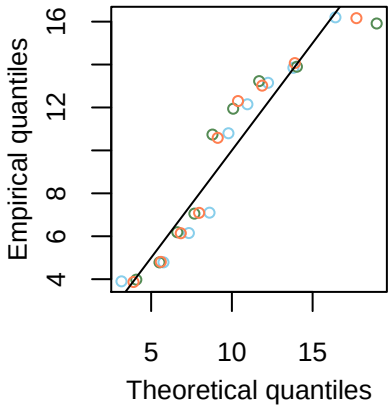
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 3 J	Arithmetic Mean = 9
N (detect) = 9	SD (log detect) = 0.51	Max (detect) = 16 J	Arithmetic SD = 4

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.5	0.61	–	–	–	–	55.1956	55.5901
Lognormal	0.36	0.29	–	–	–	–	55.5534	55.9479
Gamma	–	–	0.2004	0.282	0.3863	0.73	55.0906	55.4851

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Cobalt

Media:
Marsh Sediment (All Samples)

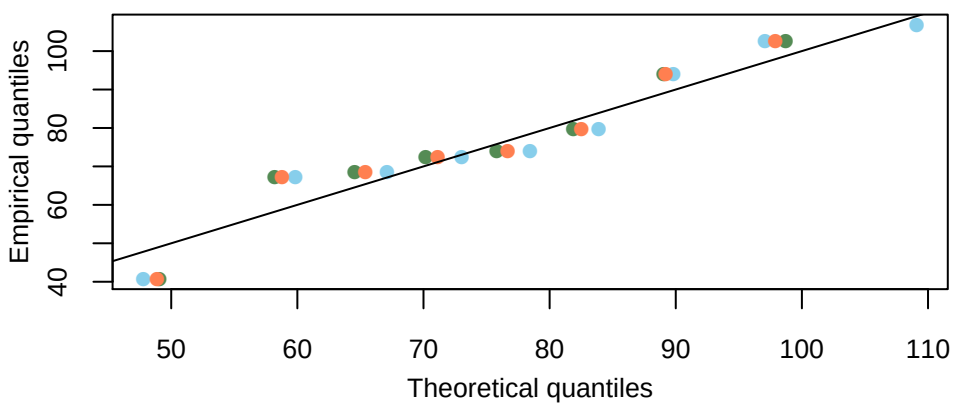
Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Copper

Legend

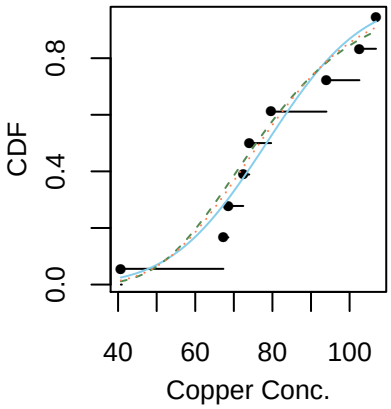
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

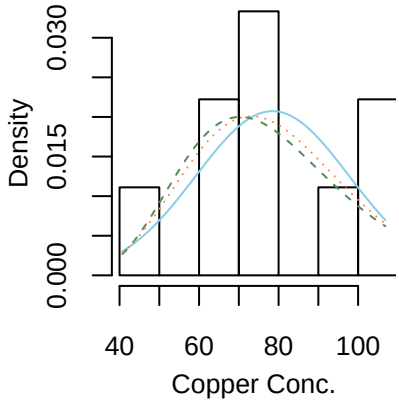


ECDF, Histogram & Q−Q (Detects Only)

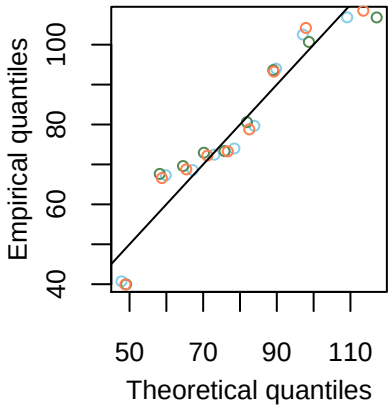
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 41 J	Arithmetic Mean = 78
N (detect) = 9	SD (log detect) = 0.29	Max (detect) = 110 J	Arithmetic SD = 20

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.62	0.54	–	–	–	–	82.7673	83.1617
Lognormal	0.24	0.19	–	–	–	–	84.0836	84.478
Gamma	–	–	0.2025	0.279	0.3647	0.722	83.4529	83.8473

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Copper

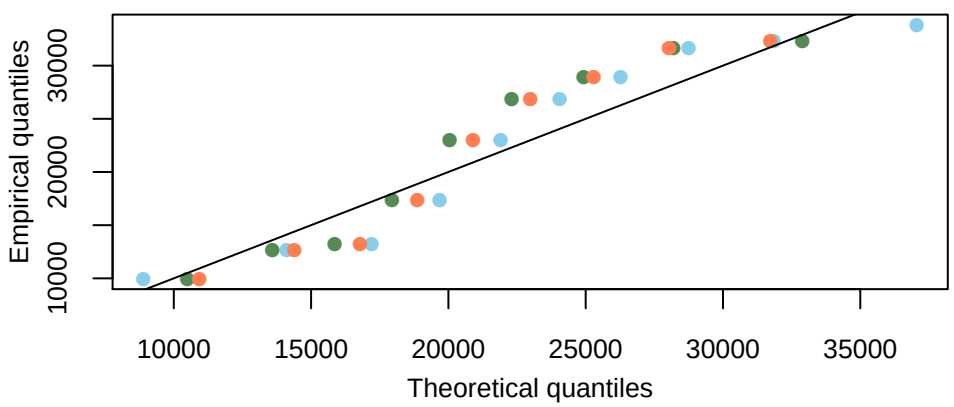
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **497**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Iron

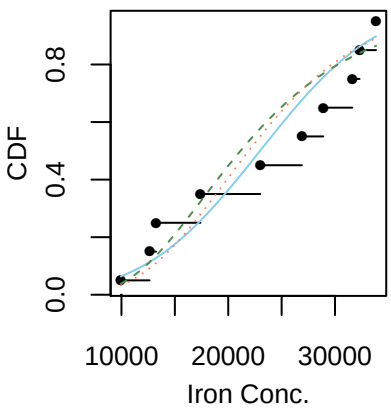
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

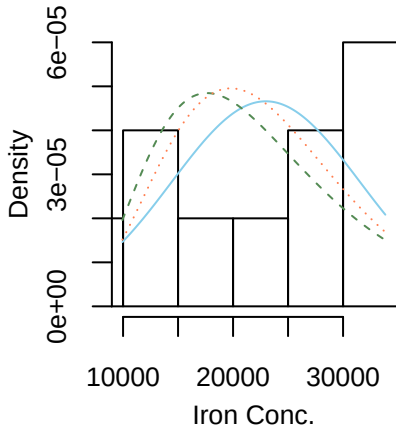


ECDF, Histogram & Q−Q (Detects Only)

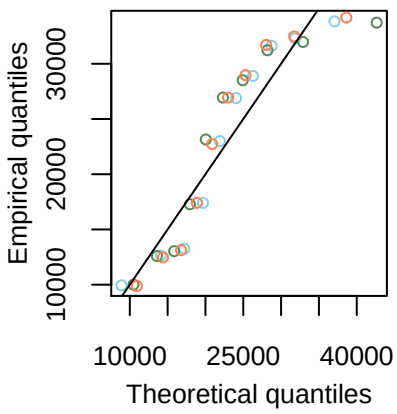
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 9,900 J	Arithmetic Mean = 23,000
N (detect) = 10	SD (log detect) = 0.45	Max (detect) = 34,000 J	Arithmetic SD = 9,000

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.22	0.59	–	–	–	–	213.478	214.083
Lognormal	0.14	0.28	–	–	–	–	214.51	215.115
Gamma	–	–	0.2113	0.267	0.6462	0.729	214.012	214.617

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

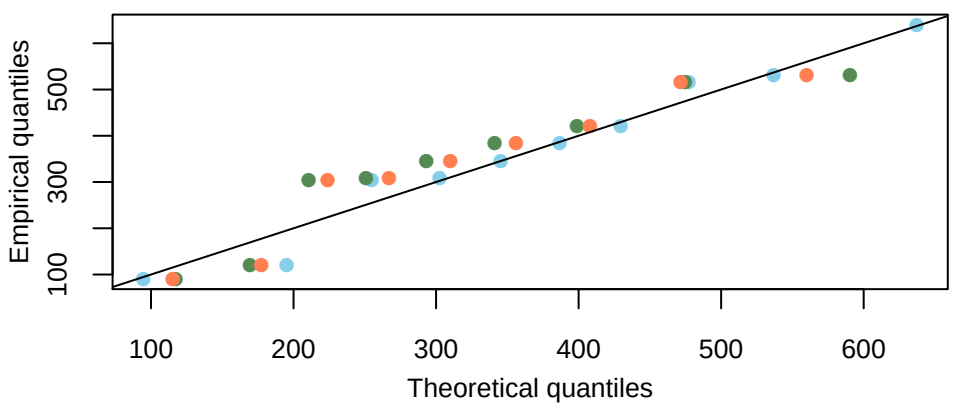
DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Iron

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Manganese

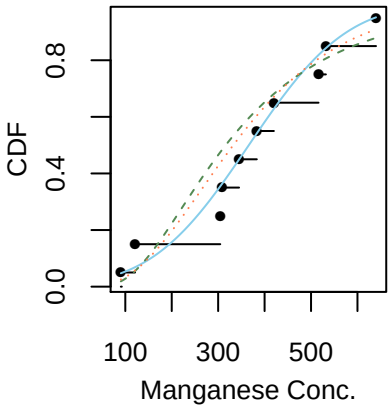
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

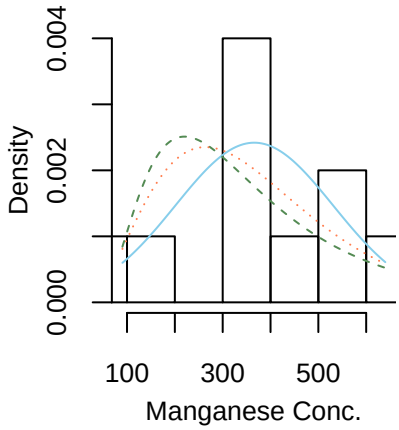


ECDF, Histogram & Q−Q (Detects Only)

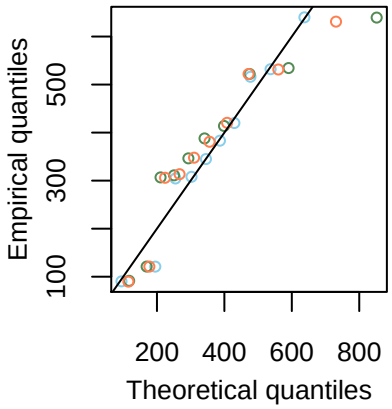
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 90 J	Arithmetic Mean = 370
N (detect) = 10	SD (log detect) = 0.63	Max (detect) = 640	Arithmetic SD = 170

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.79	0.65	–	–	–	–	134.489	135.094
Lognormal	0.076	0.029	–	–	–	–	137.369	137.974
Gamma	–	–	0.2373	0.27	0.4844	0.736	135.687	136.293

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Manganese

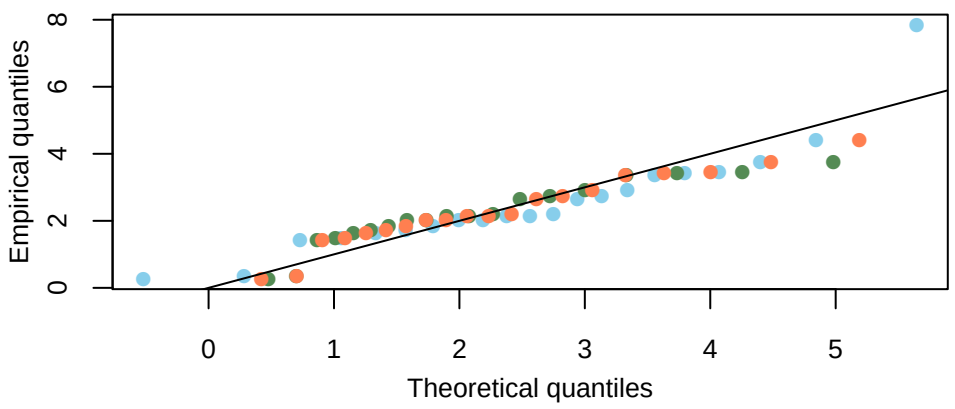
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **499**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Mercury

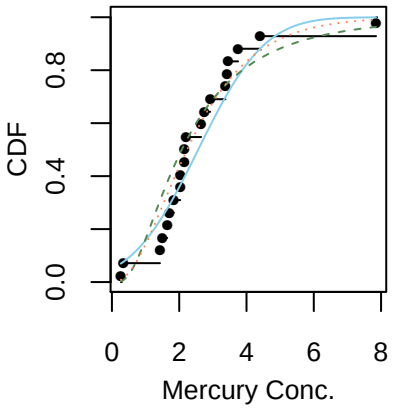
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

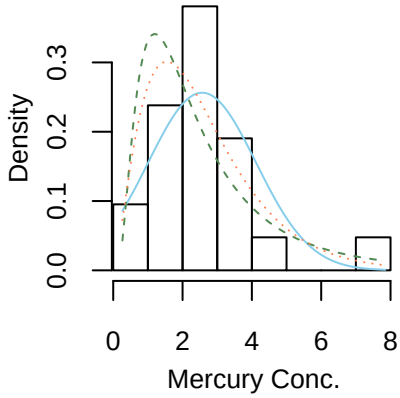


ECDF, Histogram & Q−Q (Detects Only)

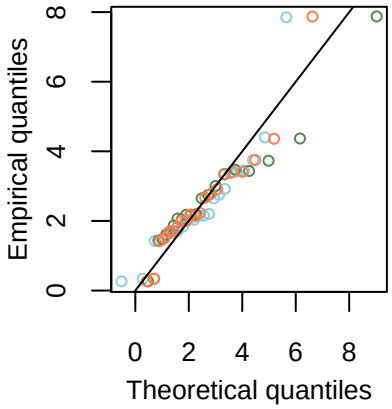
ECDF



Histogram



Q−Q



N = 21	FOD = 100%	Min (detect) = 0.26 J	Arithmetic Mean = 2
N (detect) = 21	SD (log detect) = 0.76	Max (detect) = 7 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0048	0.16	–	–	–	–	82.1772	84.2662
Lognormal	0.004	0.012	–	–	–	–	81.742	83.8311
Gamma	–	–	0.1702	0.192	0.7054	0.754	77.6182	79.7072

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

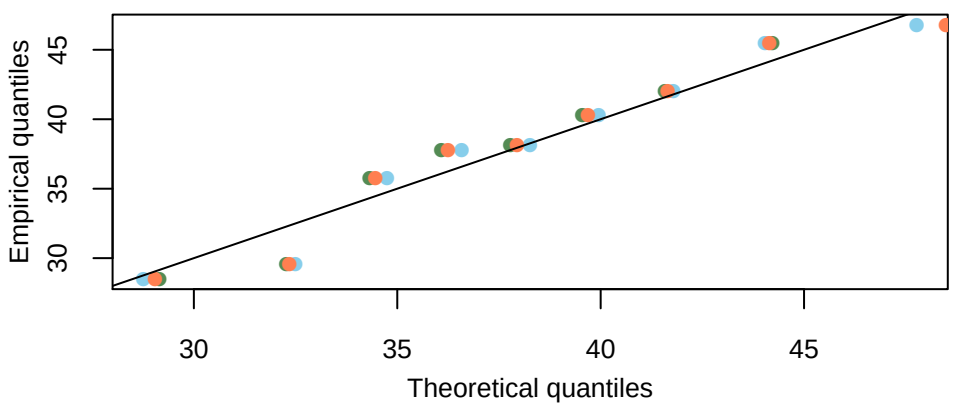
DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Mercury

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Nickel

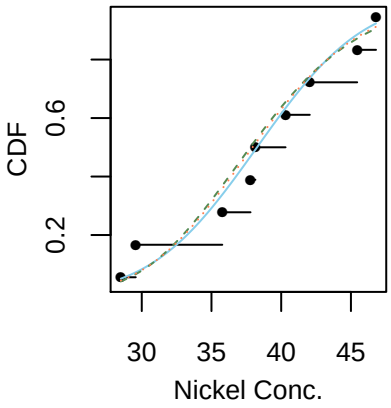
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

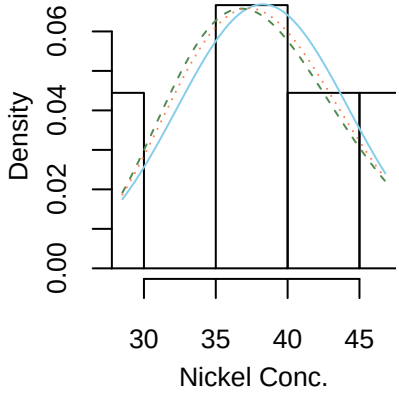


ECDF, Histogram & Q−Q (Detects Only)

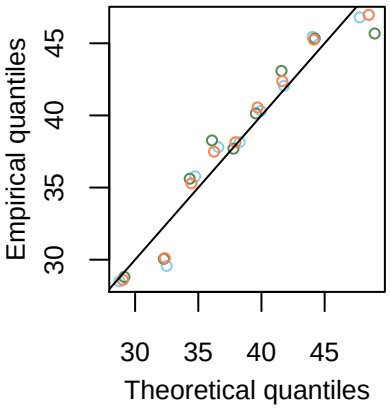
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 28 J	Arithmetic Mean = 38
N (detect) = 9	SD (log detect) = 0.17	Max (detect) = 47 J	Arithmetic SD = 6

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.64	0.89	–	–	–	–	61.6909	62.0853
Lognormal	0.44	0.66	–	–	–	–	62.2265	62.6209
Gamma	–	–	0.1573	0.279	0.309	0.721	61.9985	62.3929

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Nickel

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **501**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 9	FOD = 33%	Min (detect) = 1 J	Kaplan Meier Mean = < 4 detects
N (detect) = 3	SD (log detect) = 0	Max (detect) = 3 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Thallium

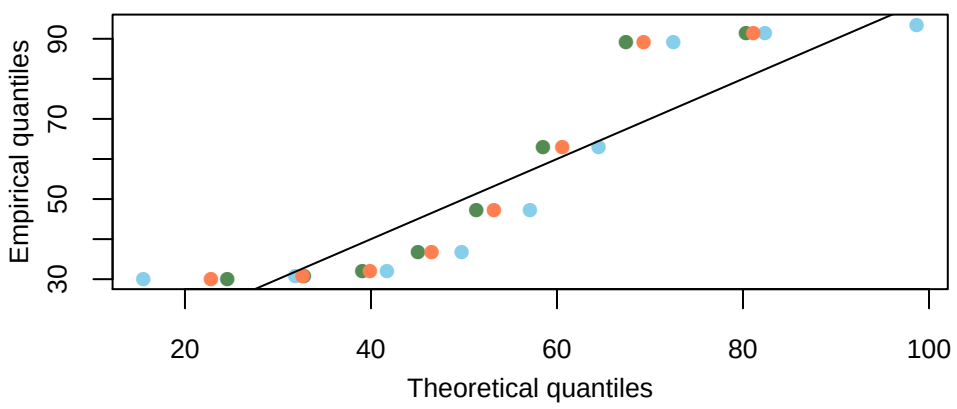
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **502**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Vanadium

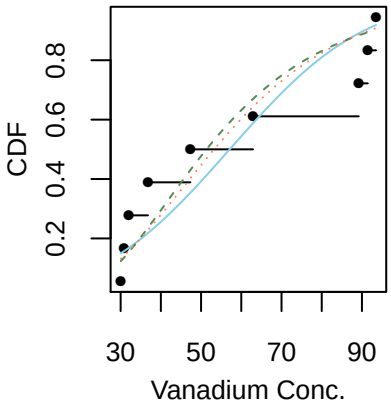
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

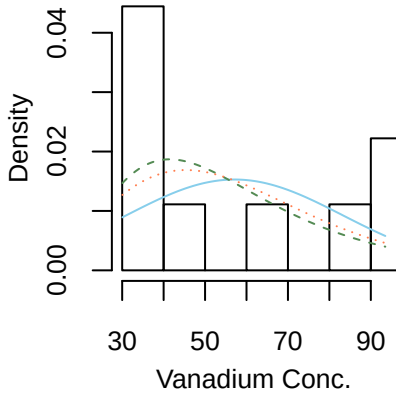


ECDF, Histogram & Q−Q (Detects Only)

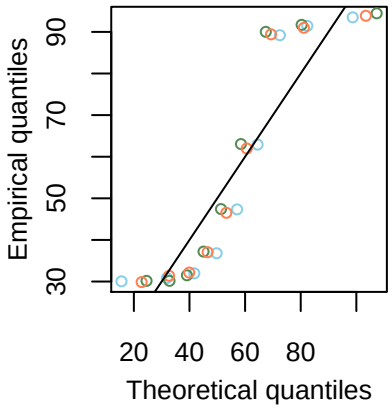
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 30 J	Arithmetic Mean = 57
N (detect) = 9	SD (log detect) = 0.49	Max (detect) = 94 J	Arithmetic SD = 28

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.033	0.28	–	–	–	–	88.2523	88.6467
Lognormal	0.063	0.35	–	–	–	–	86.5629	86.9574
Gamma	–	–	0.2193	0.282	0.6736	0.73	86.8451	87.2396

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Vanadium

Media:
Marsh Sediment (All Samples)

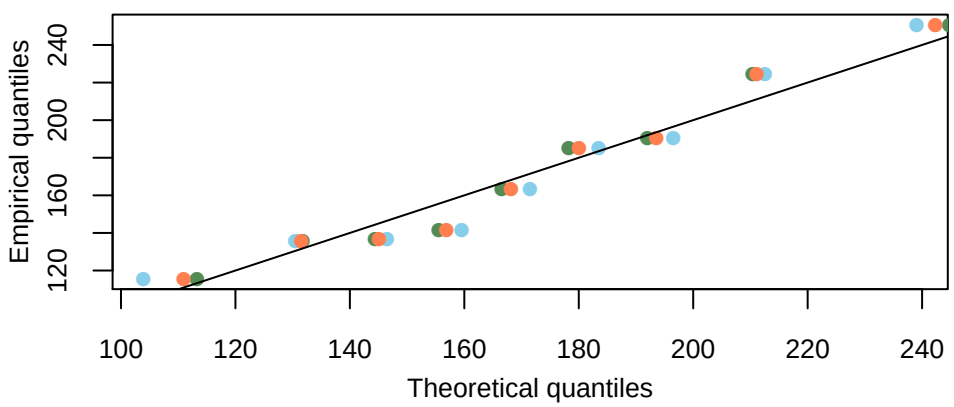
Exposure Unit:
Oritani Marsh

Chemical (mg/kg):
Zinc

Legend

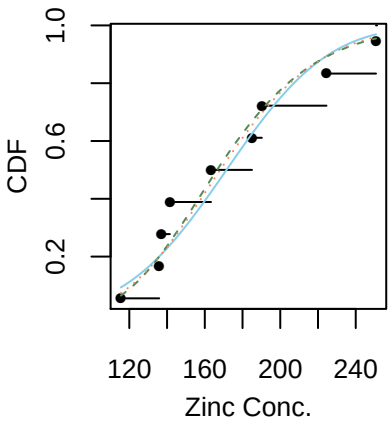
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

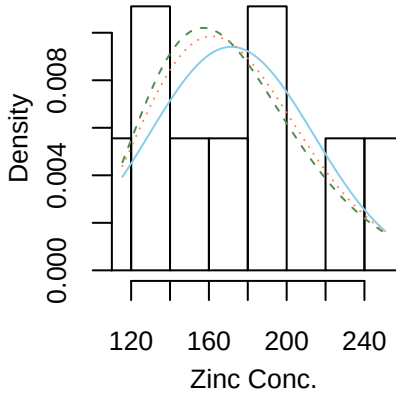


ECDF, Histogram & Q−Q (Detects Only)

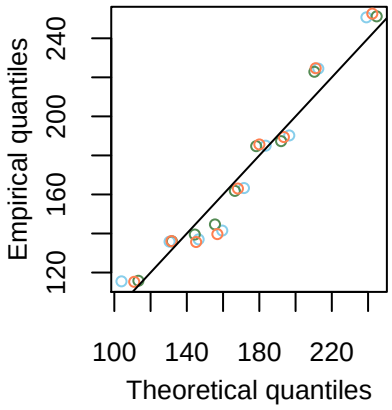
ECDF



Histogram



Q−Q



N = 9	FOD = 100%	Min (detect) = 120 J	Arithmetic Mean = 170
N (detect) = 9	SD (log detect) = 0.26	Max (detect) = 250 J	Arithmetic SD = 45

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.53	0.44	–	–	–	–	96.995	97.3894
Lognormal	0.78	0.53	–	–	–	–	96.054	96.4485
Gamma	–	–	0.1986	0.279	0.2809	0.722	96.2601	96.6546

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Zinc

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **504**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Benzo[a]pyrene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 100%	Min (detect) = 0.056 J	Arithmetic Mean = 0.13
N (detect) = 2	SD (log detect) = 0	Max (detect) = 0.2 J	Arithmetic SD = 0.1

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Benzo[a]pyrene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **505**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 50%	Min (detect) = 0.0083 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0083 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Dibenz[a,h]anthracene

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Aldrin

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 50%	Min (detect) = 0.0012 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0012 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Heptachlor

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 50%	Min (detect) = 0.0023 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0023 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

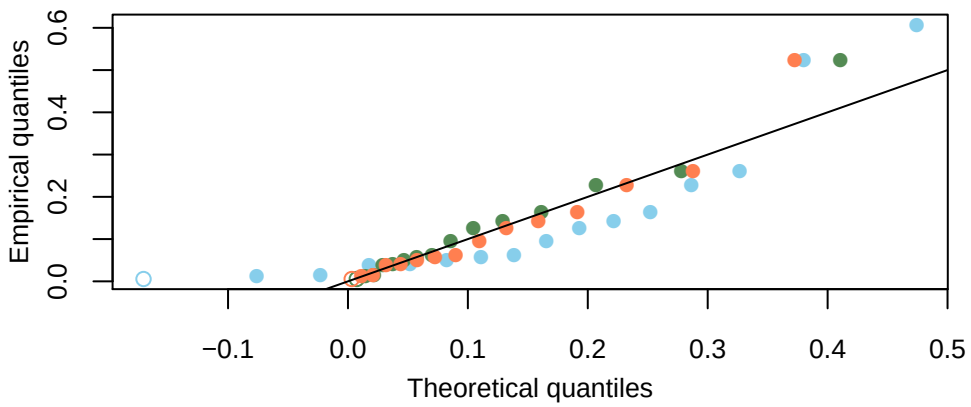
Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Heptachlor Epoxide

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

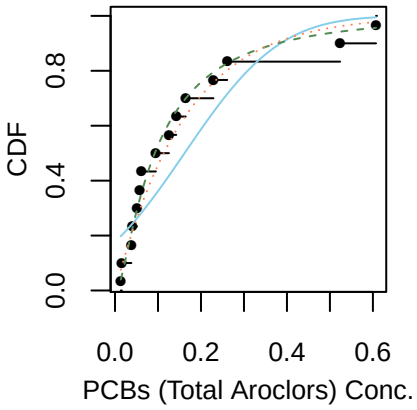
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

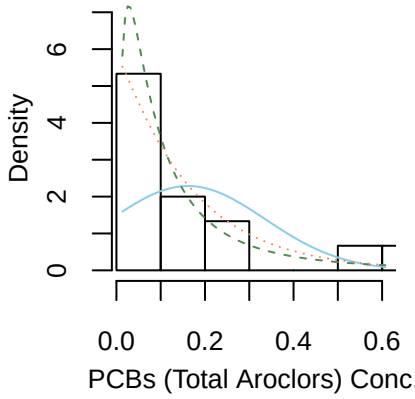


ECDF, Histogram & Q−Q (Detects Only)

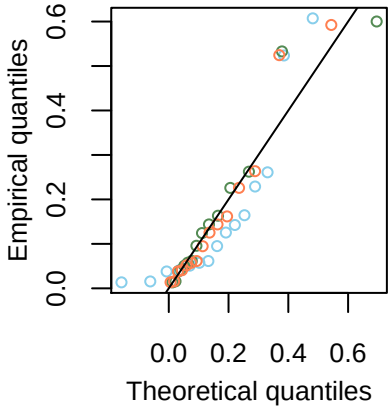
ECDF



Histogram



Q−Q



N = 16	FOD = 94%	Min (detect) = 0.014 J	Kaplan Meier Mean = 0.15
N (detect) = 15	SD (log detect) = 1.1	Max (detect) = 0.61 J	Kaplan Meier SD = 0.17

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	8e−04	0.034	–	–	–	–	−6.71699	−5.17181
Lognormal	0.93	0.91	–	–	–	–	−24.9004	−23.3552
Gamma	–	–	0.1393	0.227	0.2478	0.796	−24.4929	−22.9477

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.0013	0.036	–	–	–	–	−5.81211	−4.39601
Lognormal	0.87	0.92	–	–	–	–	−21.9888	−20.5727
Gamma	–	–	0.1566	0.228	0.3313	0.763	−20.6619	−19.2458

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **510**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Oritani Marsh
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 2	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Oritani Marsh−Trichloroethene

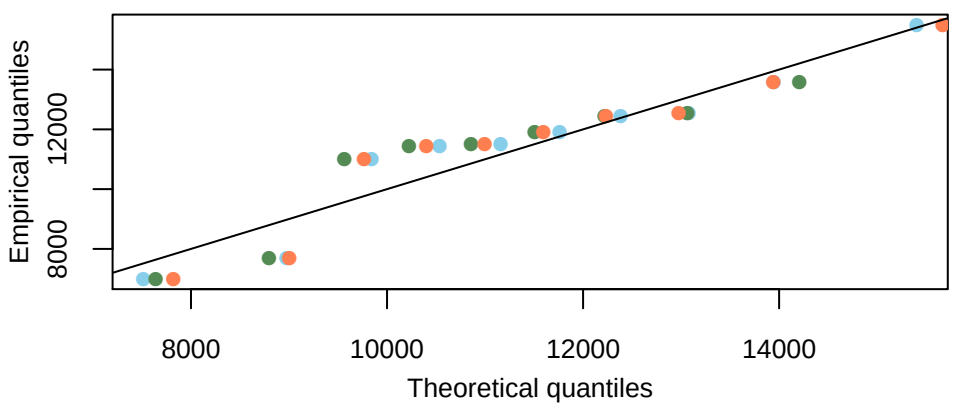
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **511**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Aluminum

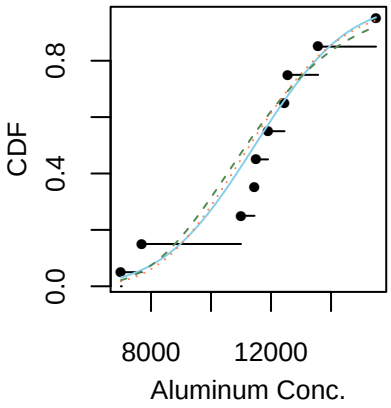
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

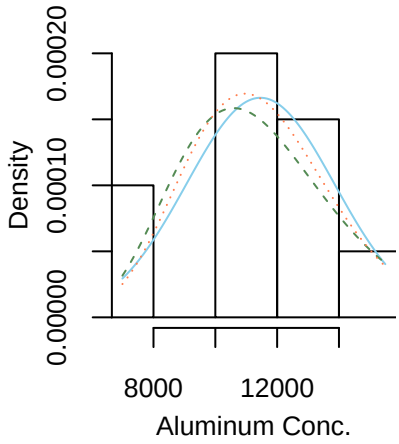


ECDF, Histogram & Q−Q (Detects Only)

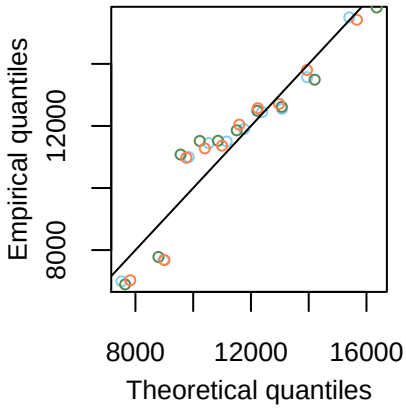
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 7,000 J	Arithmetic Mean = 11,000
N (detect) = 10	SD (log detect) = 0.24	Max (detect) = 16,000 J	Arithmetic SD = 2,500

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.38	0.15	–	–	–	–	188.029	188.634
Lognormal	0.11	0.032	–	–	–	–	189.531	190.136
Gamma	–	–	0.2504	0.266	0.6544	0.725	188.981	189.587

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

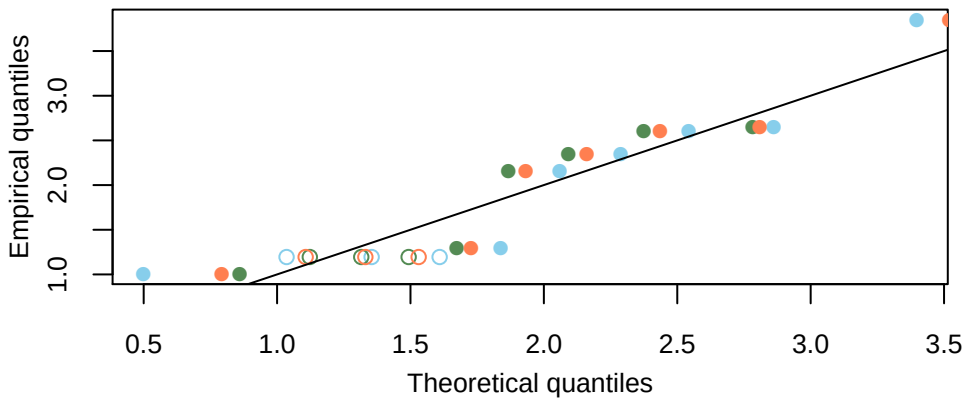
Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Aluminum

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Antimony

Legend

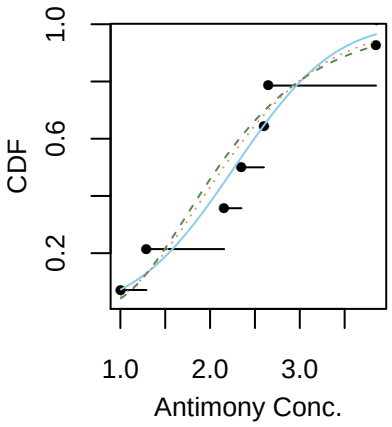
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

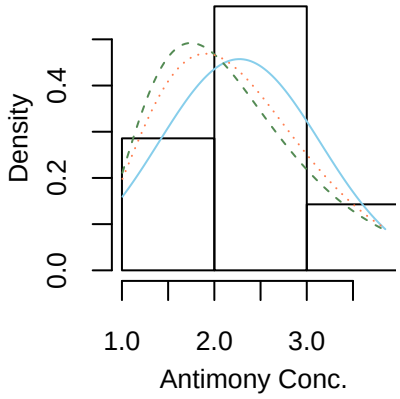


ECDF, Histogram & Q−Q (Detects Only)

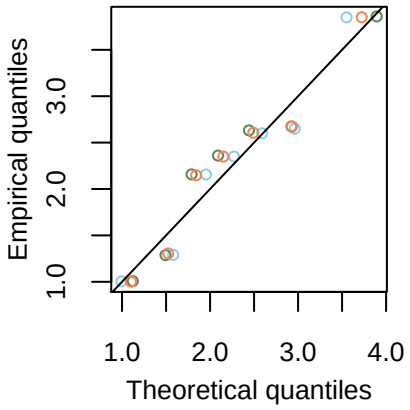
ECDF



Histogram



Q−Q



N = 10	FOD = 70%	Min (detect) = 1 J	Kaplan Meier Mean = 1
N (detect) = 7	SD (log detect) = 0.46	Max (detect) = 3 J	Kaplan Meier SD = 0.9

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.083	0.052	–	–	–	–	29.8475	30.4527
Lognormal	0.15	0.07	–	–	–	–	27.2532	27.8583
Gamma	–	–	0.2695	0.267	0.6407	0.729	27.7548	28.3599

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.71	0.53	–	–	–	–	21.9565	21.8483
Lognormal	0.53	0.25	–	–	–	–	22.1885	22.0803
Gamma	–	–	NA	NA	NA	NA	21.8303	21.7221

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Antimony

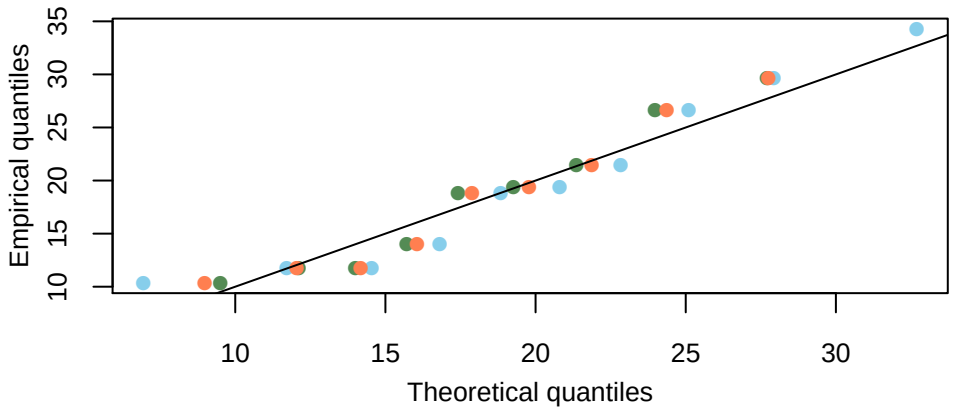
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **513**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Arsenic

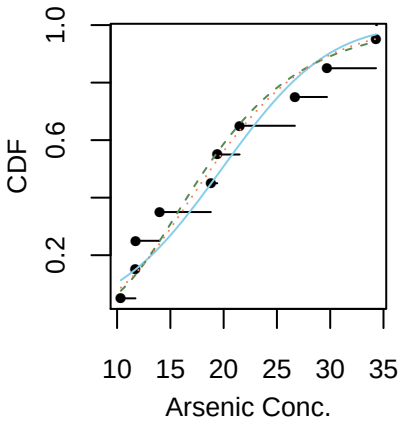
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

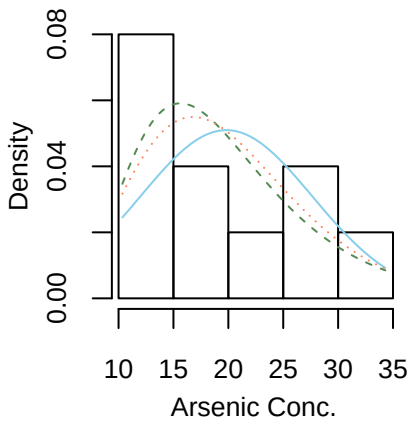


ECDF, Histogram & Q−Q (Detects Only)

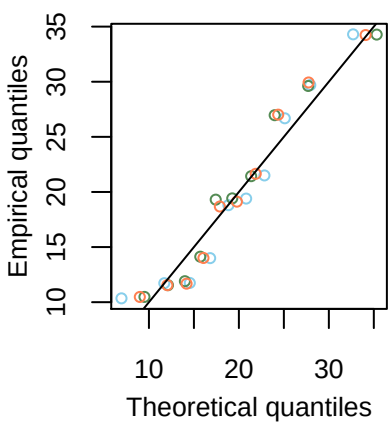
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 10 J	Arithmetic Mean = 20
N (detect) = 10	SD (log detect) = 0.42	Max (detect) = 34 J	Arithmetic SD = 8

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.4	0.67	–	–	–	–	73.5312	74.1363
Lognormal	0.54	0.72	–	–	–	–	72.165	72.7702
Gamma	–	–	0.1623	0.267	0.3085	0.729	72.3224	72.9276

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

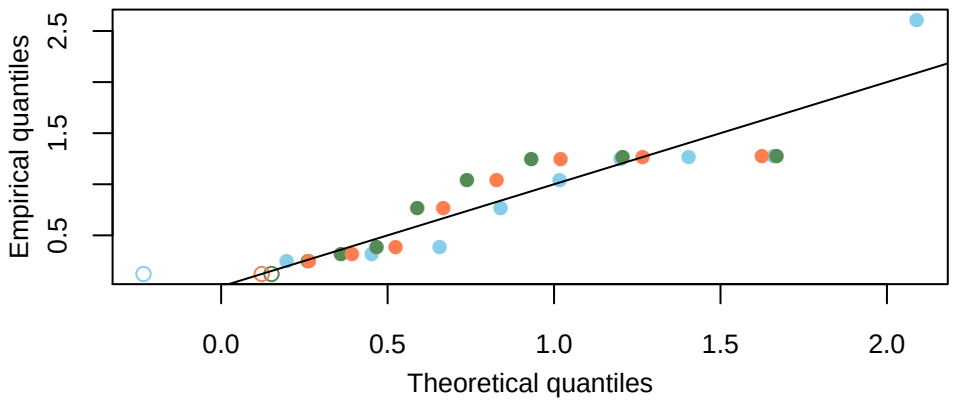
Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Arsenic

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Cadmium

Legend

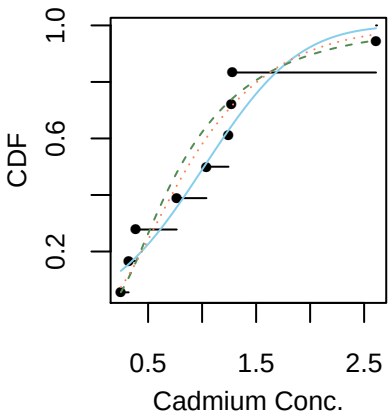
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

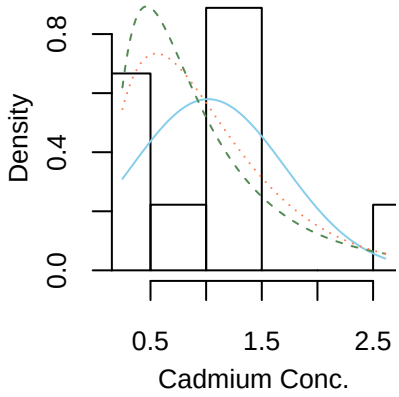


ECDF, Histogram & Q−Q (Detects Only)

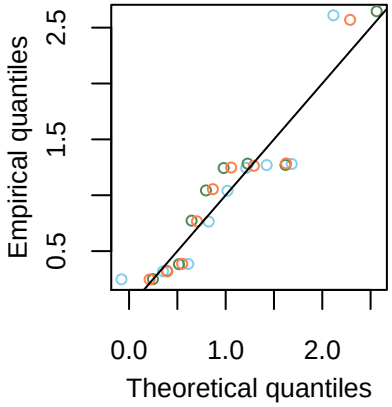
ECDF



Histogram



Q−Q



N = 10	FOD = 90%	Min (detect) = 0.25 J	Kaplan Meier Mean = 0.93
N (detect) = 9	SD (log detect) = 0.78	Max (detect) = 2 J	Kaplan Meier SD = 0.71

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.11	0.19	–	–	–	–	25.4205	26.0257
Lognormal	0.59	0.43	–	–	–	–	21.8509	22.456
Gamma	–	–	0.1591	0.274	0.3233	0.748	21.3214	21.9266

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.11	0.11	–	–	–	–	22.8175	23.2119
Lognormal	0.44	0.46	–	–	–	–	19.8652	20.2596
Gamma	–	–	0.1737	0.282	0.3764	0.73	19.7598	20.1542

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

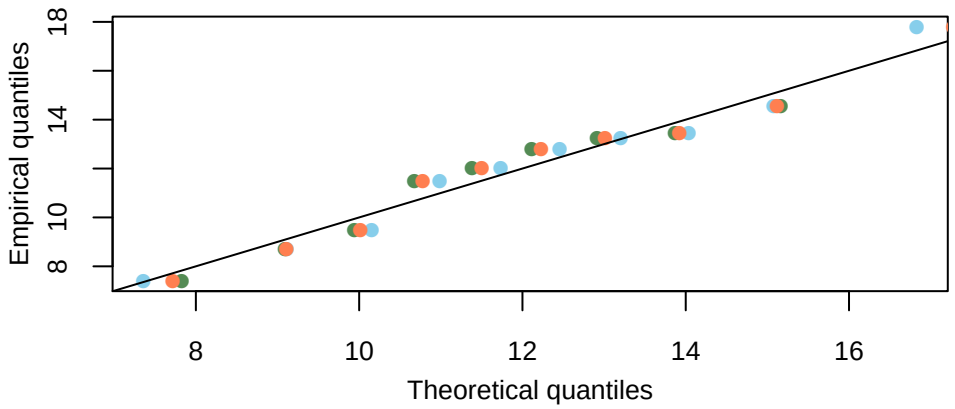
DRAFT

Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Cadmium

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Cobalt

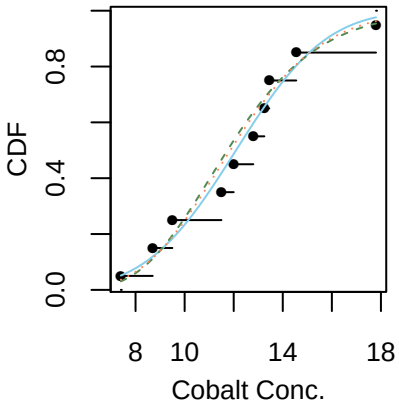
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

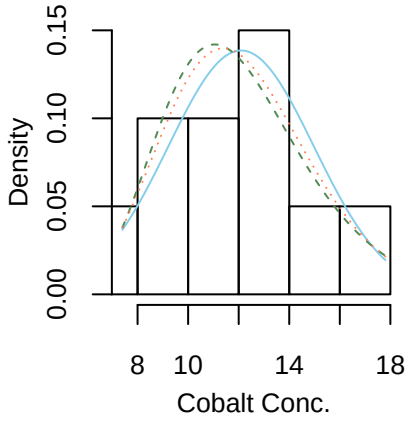


ECDF, Histogram & Q−Q (Detects Only)

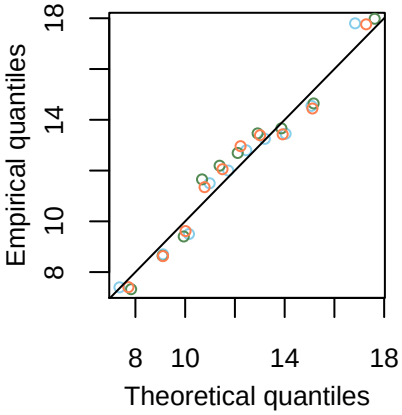
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 7 J	Arithmetic Mean = 12
N (detect) = 10	SD (log detect) = 0.26	Max (detect) = 18 J	Arithmetic SD = 3

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.92	0.92	–	–	–	–	53.5301	54.1353
Lognormal	0.87	0.59	–	–	–	–	53.6489	54.2541
Gamma	–	–	0.1499	0.267	0.2308	0.725	53.4519	54.0571

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Cobalt

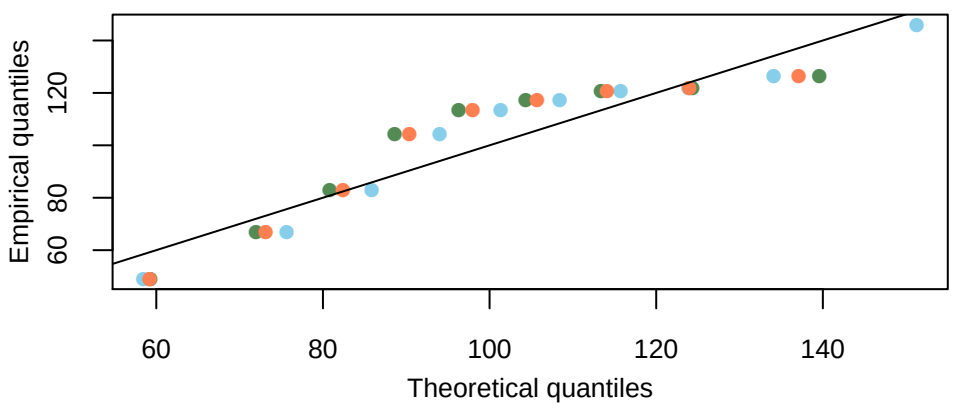
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **516**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Copper

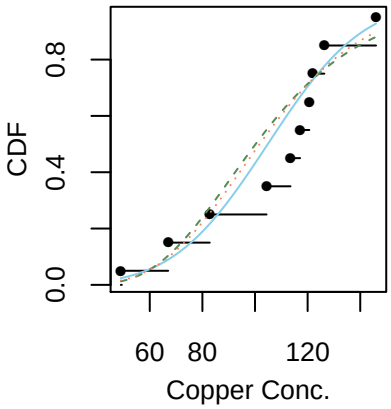
Legend
Normal
Lognormal
Gamma
Detect
Nondetect (ROS)

Q−Q Plot (All Data)

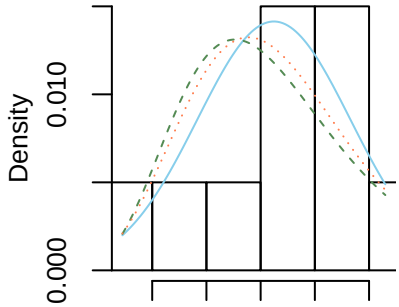


ECDF, Histogram & Q−Q (Detects Only)

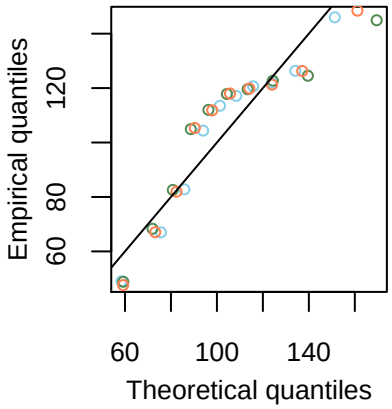
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 49 J	Arithmetic Mean = 100
N (detect) = 10	SD (log detect) = 0.34	Max (detect) = 150 J	Arithmetic SD = 30

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.38	0.22	–	–	–	–	99.1755	99.7807
Lognormal	0.078	0.082	–	–	–	–	101.703	102.308
Gamma	–	–	0.2432	0.267	0.62	0.725	100.655	101.26

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

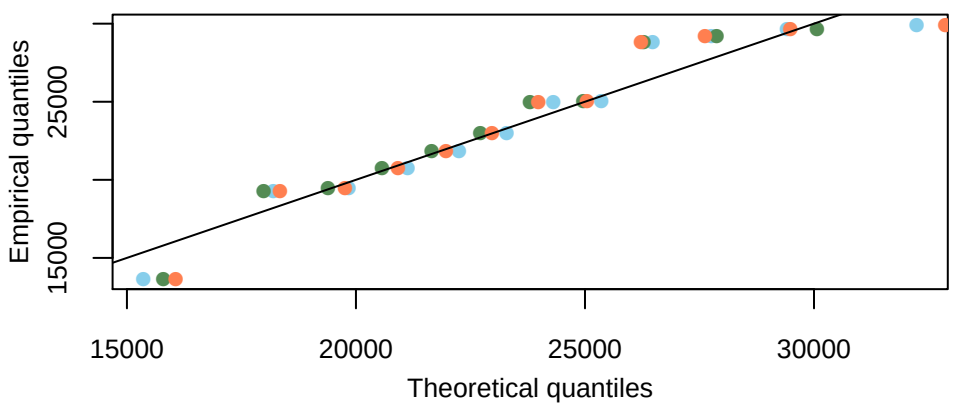
DRAFT

Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Copper

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Iron

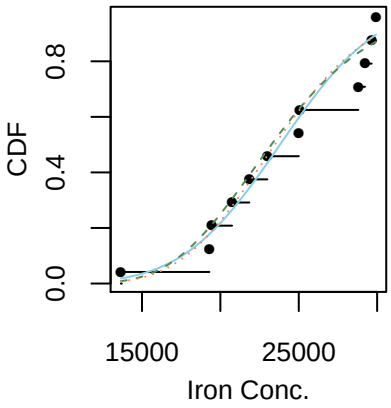
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

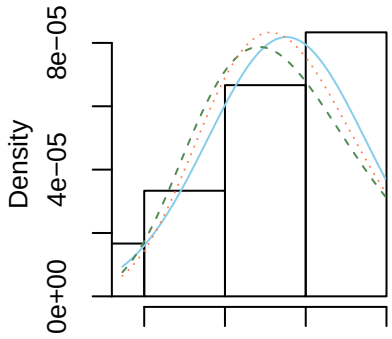


ECDF, Histogram & Q−Q (Detects Only)

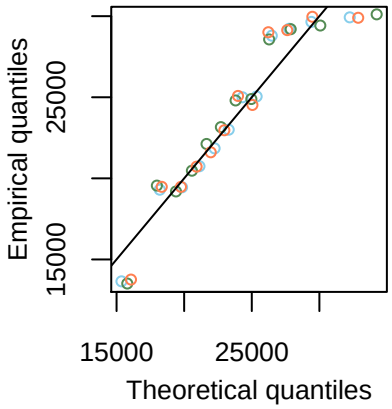
ECDF



Histogram



Q−Q



N = 12	FOD = 100%	Min (detect) = 14,000 J	Arithmetic Mean = 24,000
N (detect) = 12	SD (log detect) = 0.23	Max (detect) = 30,000 J	Arithmetic SD = 5,100

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.38	0.44	–	–	–	–	241.859	242.829
Lognormal	0.17	0.6	–	–	–	–	243.385	244.355
Gamma	–	–	0.1814	0.266	0.4172	0.725	242.788	243.757

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

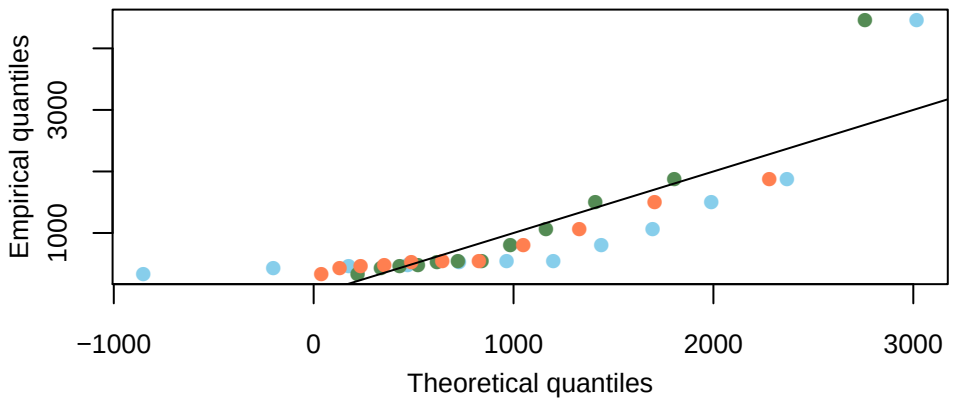
Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Iron

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Manganese

Legend

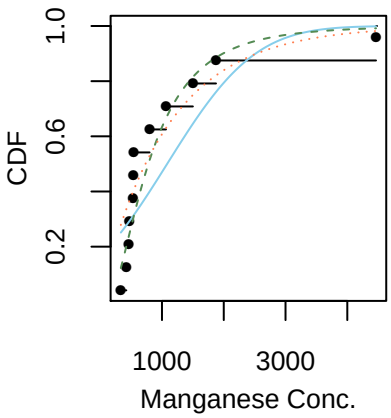
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

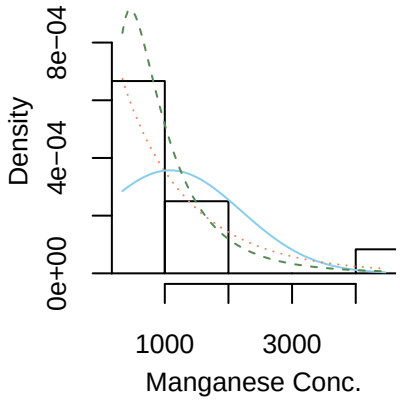


ECDF, Histogram & Q−Q (Detects Only)

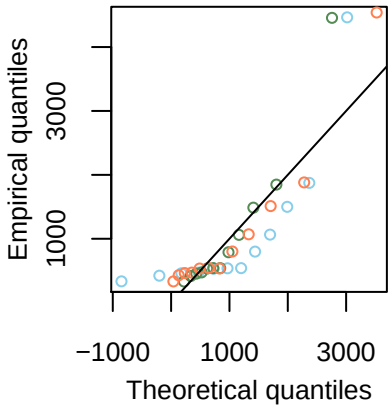
ECDF



Histogram



Q−Q



N = 12	FOD = 100%	Min (detect) = 330 J	Arithmetic Mean = 1,100
N (detect) = 12	SD (log detect) = 0.76	Max (detect) = 4,500 J	Arithmetic SD = 1,200

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.00026	0.022	–	–	–	–	206.499	207.469
Lognormal	0.069	0.017	–	–	–	–	190.3	191.27
Gamma	–	–	0.2786	0.281	1.029	0.777	196.091	197.061

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Manganese

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

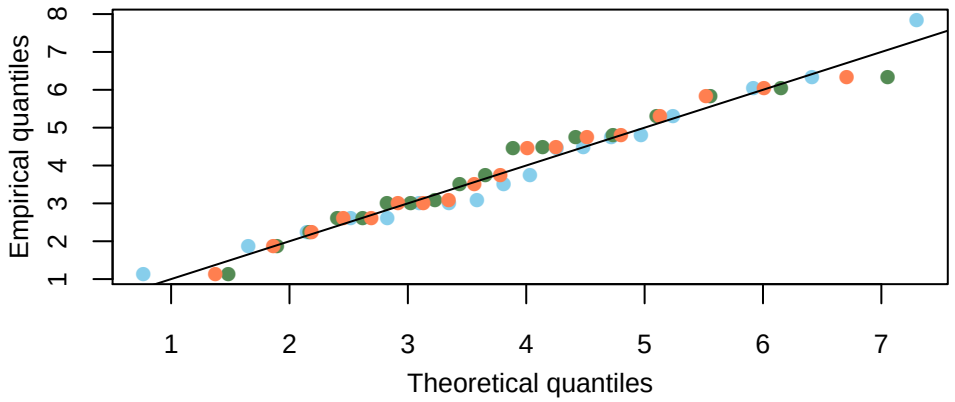
Figure **519**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Mercury

Legend

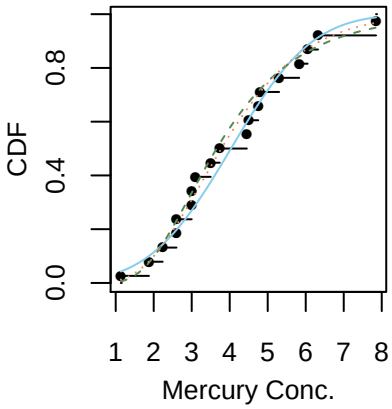
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

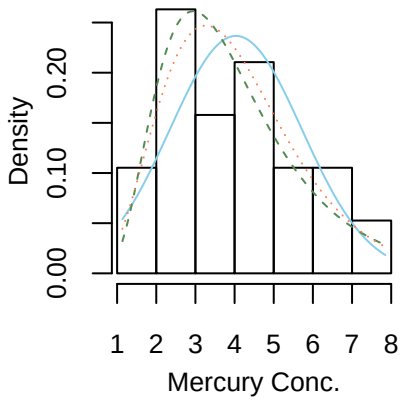


ECDF, Histogram & Q−Q (Detects Only)

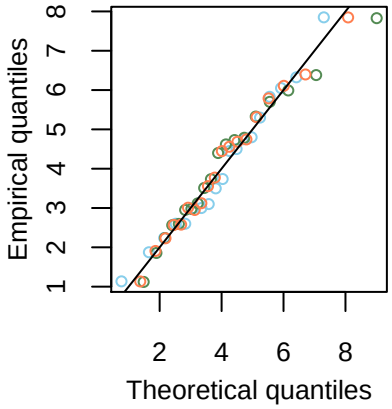
ECDF



Histogram



Q−Q



N = 19	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 4
N (detect) = 19	SD (log detect) = 0.48	Max (detect) = 7 J	Arithmetic SD = 1

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.88	0.59	–	–	–	–	77.7593	79.6481
Lognormal	0.69	0.5	–	–	–	–	78.1086	79.9975
Gamma	–	–	0.1193	0.199	0.1694	0.742	76.8908	78.7797

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

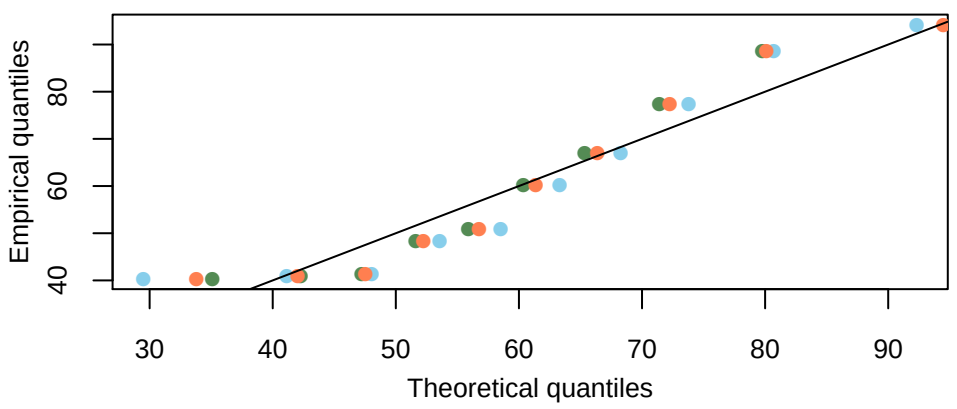
Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Mercury

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Nickel

Legend

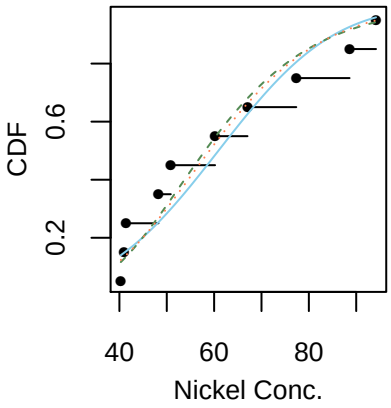
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

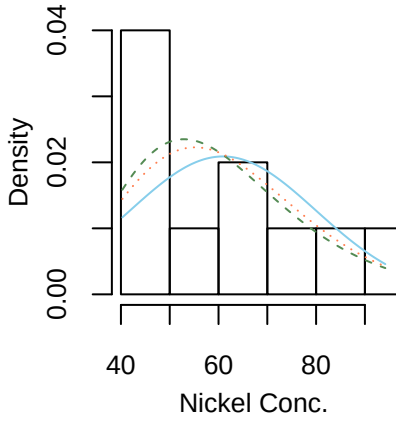


ECDF, Histogram & Q−Q (Detects Only)

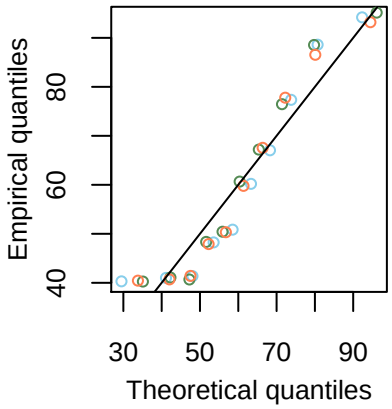
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 40 J	Arithmetic Mean = 61
N (detect) = 10	SD (log detect) = 0.32	Max (detect) = 94 J	Arithmetic SD = 20

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.17	0.37	–	–	–	–	91.3689	91.974
Lognormal	0.25	0.67	–	–	–	–	89.9502	90.5554
Gamma	–	–	0.1804	0.267	0.4222	0.725	90.261	90.8662

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

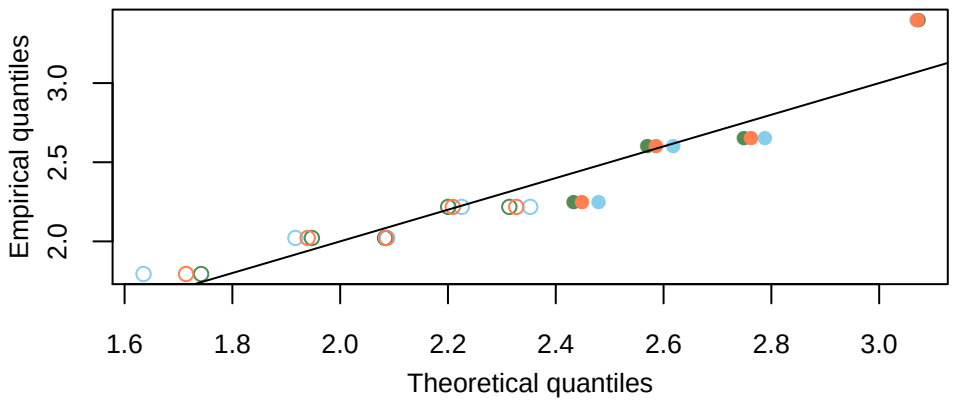
Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Nickel

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Thallium

Legend

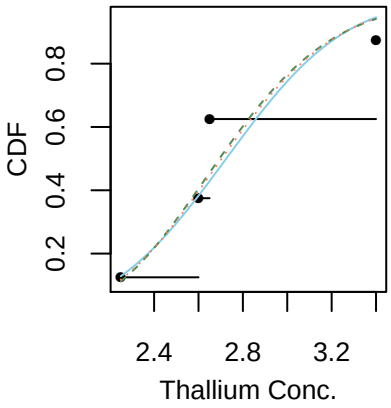
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

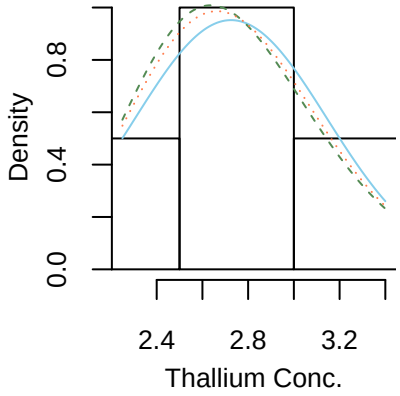


ECDF, Histogram & Q−Q (Detects Only)

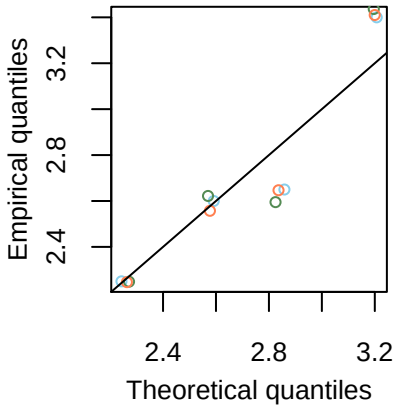
ECDF



Histogram



Q−Q



N = 10	FOD = 40%	Min (detect) = 2 J	Kaplan Meier Mean = 2
N (detect) = 4	SD (log detect) = 0.17	Max (detect) = 3 J	Kaplan Meier SD = 0.56

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.16	0.1	–	–	–	–	15.1789	15.5733
Lognormal	0.48	0.21	–	–	–	–	13.5915	13.9859
Gamma	–	–	0.2391	0.279	0.4154	0.721	14.0442	14.4387

Goodness of Fit (Detects Only)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.47	N<5	–	–	–	–	8.39389	7.16648
Lognormal	0.62	N<5	–	–	–	–	8.02053	6.79312
Gamma	–	–	NA	NA	NA	NA	8.12772	6.90031

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Thallium

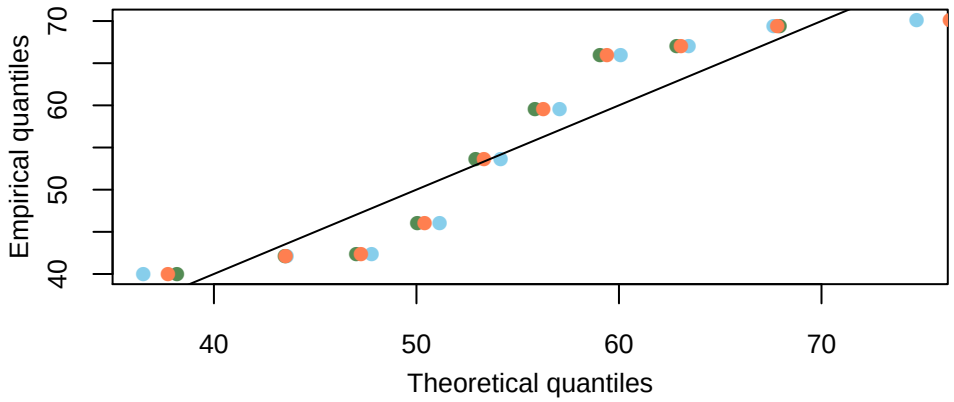
Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **522**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Vanadium

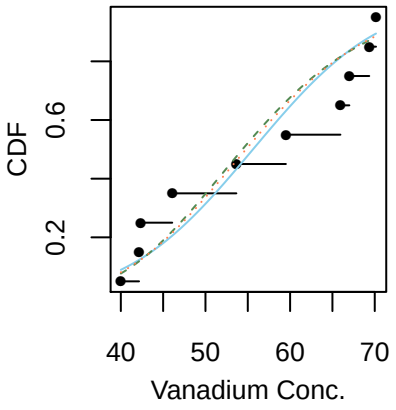
Legend
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

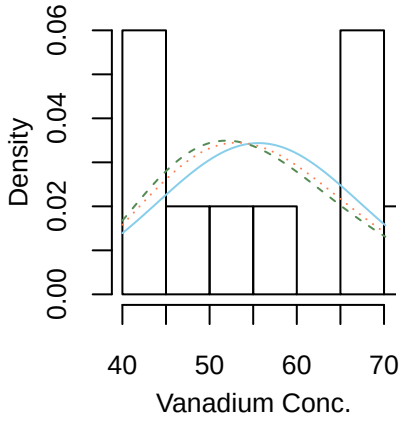


ECDF, Histogram & Q−Q (Detects Only)

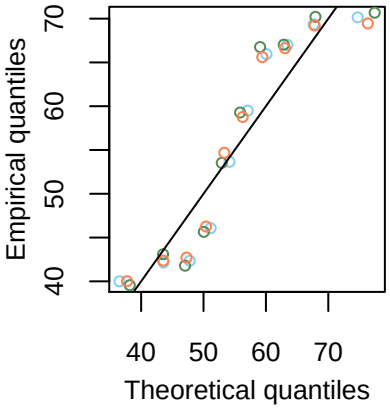
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 40 J	Arithmetic Mean = 56
N (detect) = 10	SD (log detect) = 0.23	Max (detect) = 70 J	Arithmetic SD = 12

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.096	0.3	–	–	–	–	81.4112	82.0164
Lognormal	0.089	0.29	–	–	–	–	81.5511	82.1562
Gamma	–	–	0.2148	0.266	0.6121	0.725	81.4371	82.0423

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Vanadium

Media:
Marsh Sediment (All Samples)

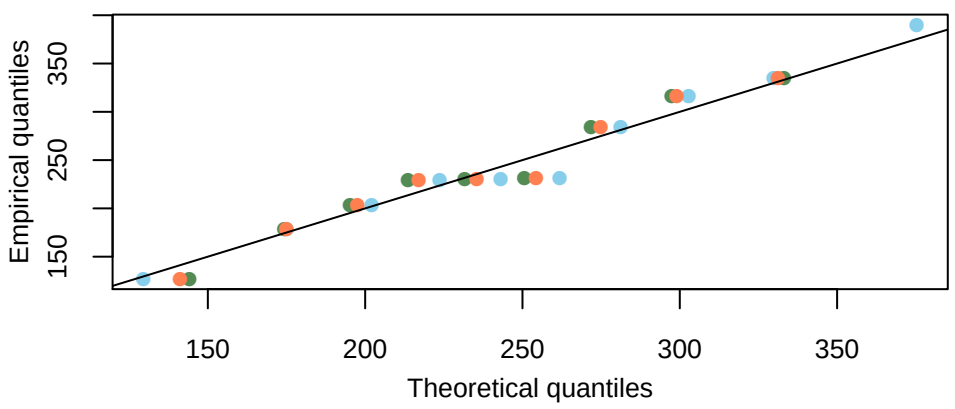
Exposure Unit:
Berry's Creek Marsh

Chemical (mg/kg):
Zinc

Legend

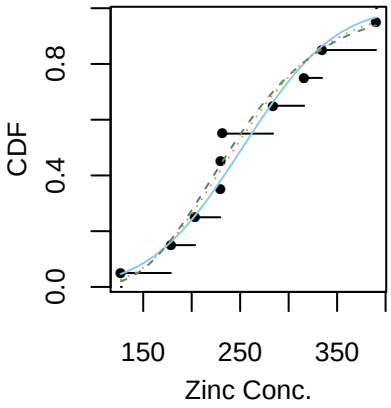
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

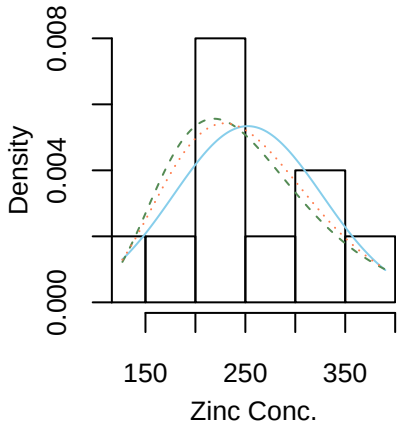


ECDF, Histogram & Q−Q (Detects Only)

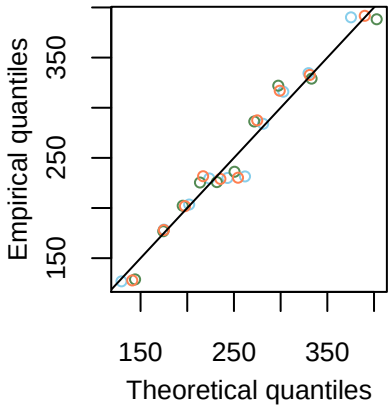
ECDF



Histogram



Q−Q



N = 10	FOD = 100%	Min (detect) = 130 J	Arithmetic Mean = 250
N (detect) = 10	SD (log detect) = 0.33	Max (detect) = 390 J	Arithmetic SD = 79

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.93	0.27	–	–	–	–	118.652	119.257
Lognormal	0.86	0.77	–	–	–	–	118.804	119.409
Gamma	–	–	0.1716	0.267	0.2091	0.725	118.5	119.105

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Zinc

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Benzo[a]pyrene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.11 J	Arithmetic Mean = 0.18
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.3 J	Arithmetic SD = 0.1

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Benzo[a]pyrene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **525**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 100%	Min (detect) = 0.02 J	Arithmetic Mean = 0.053
N (detect) = 3	SD (log detect) = 0	Max (detect) = 0.077 J	Arithmetic SD = 0.029

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Dibenz[a,h]anthracene

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Aldrin

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **527**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Heptachlor

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 33%	Min (detect) = 0.0015 J	Kaplan Meier Mean = < 4 detects
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0015 J	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

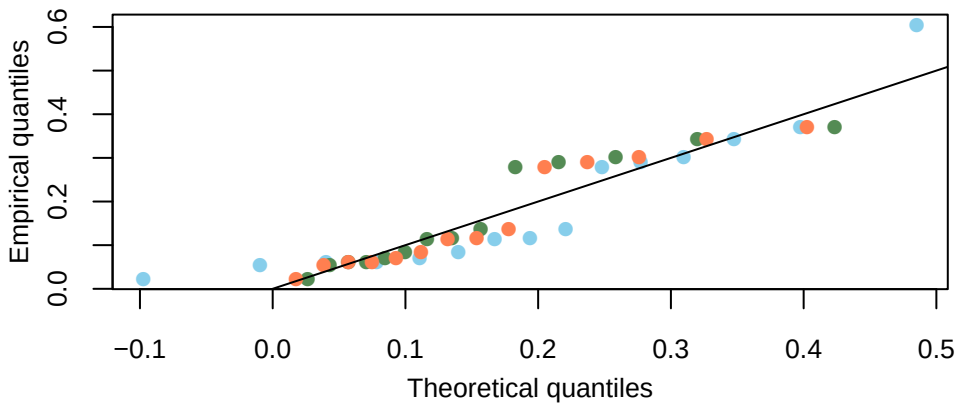
Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Heptachlor Epoxide

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

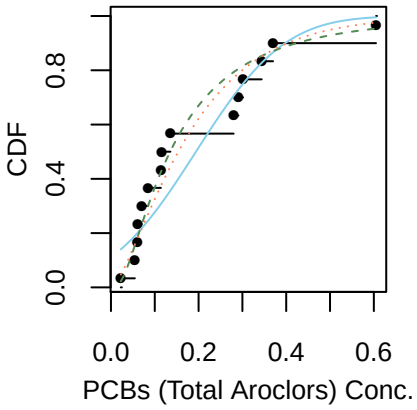
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

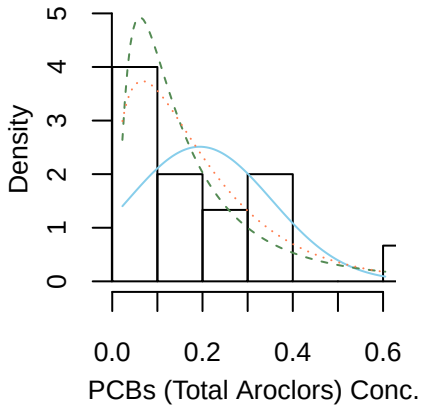


ECDF, Histogram & Q−Q (Detects Only)

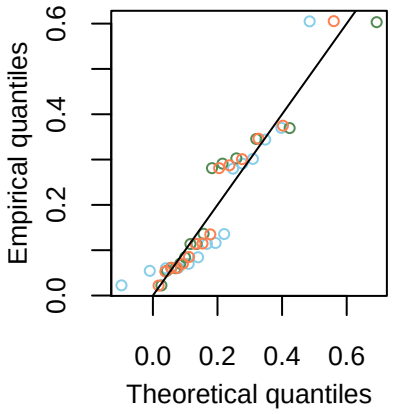
ECDF



Histogram



Q−Q



N = 15	FOD = 100%	Min (detect) = 0.023 J	Arithmetic Mean = 0.19
N (detect) = 15	SD (log detect) = 0.92	Max (detect) = 0.61 J	Arithmetic SD = 0.16

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.019	0.022	–	–	–	–	−8.62736	−7.21126
Lognormal	0.55	0.18	–	–	–	–	−16.9378	−15.5217
Gamma	–	–	0.1726	0.228	0.4834	0.763	−16.6344	−15.2183

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **530**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
Berry's Creek Marsh
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 3	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Berry's Creek Marsh−Trichloroethene

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **531**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Aluminum

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 8,600 J	Arithmetic Mean = 8,600
N (detect) = 1	SD (log detect) = 0	Max (detect) = 8,600 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Aluminum

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure
532

Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Antimony

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Antimony

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure
533

Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Arsenic

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 15 J	Arithmetic Mean = 15
N (detect) = 1	SD (log detect) = 0	Max (detect) = 15 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Arsenic

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure
534

Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Cadmium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Cadmium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure
535

Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Cobalt

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 6 J	Arithmetic Mean = 6
N (detect) = 1	SD (log detect) = 0	Max (detect) = 6 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Cobalt

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **536**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Copper

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 110 J	Arithmetic Mean = 110
N (detect) = 1	SD (log detect) = 0	Max (detect) = 110 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Copper

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure
537

Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Iron

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 14,000 J	Arithmetic Mean = 14,000
N (detect) = 1	SD (log detect) = 0	Max (detect) = 14,000 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Iron

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **538**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Manganese

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 160 J	Arithmetic Mean = 160
N (detect) = 1	SD (log detect) = 0	Max (detect) = 160 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Manganese

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

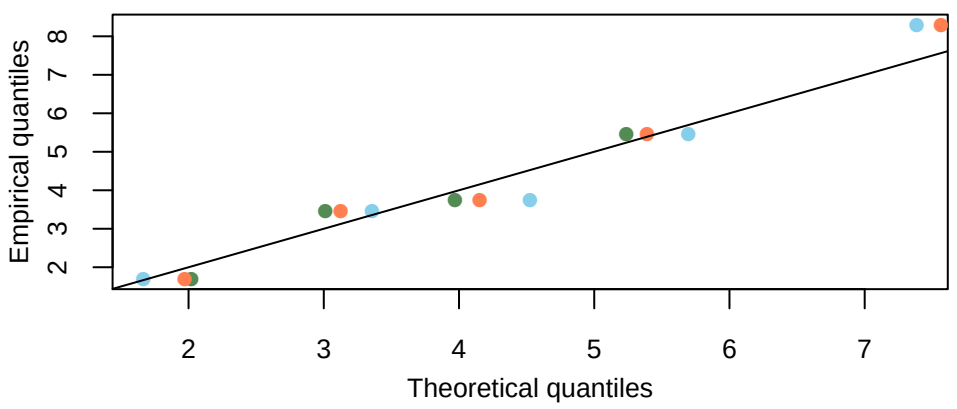
Figure
539

Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Mercury

Legend

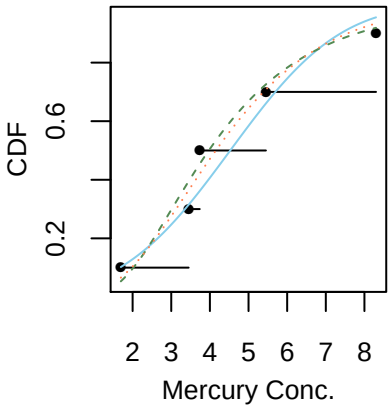
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

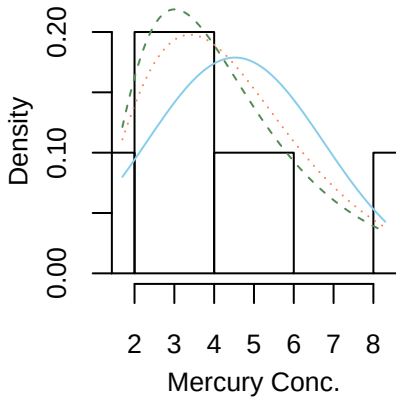


ECDF, Histogram & Q−Q (Detects Only)

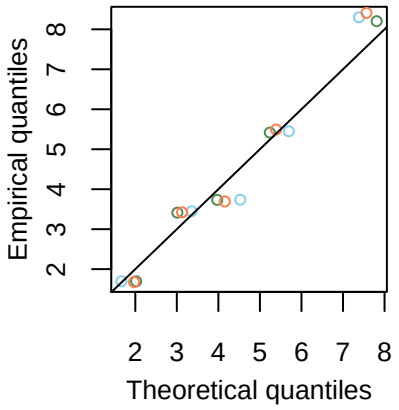
ECDF



Histogram



Q−Q



N = 5	FOD = 100%	Min (detect) = 1 J	Arithmetic Mean = 4
N (detect) = 5	SD (log detect) = 0.59	Max (detect) = 8 J	Arithmetic SD = 2

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.76	N<5	–	–	–	–	26.2147	25.4336
Lognormal	0.92	N<5	–	–	–	–	25.5885	24.8074
Gamma	–	–	NA	NA	NA	NA	25.4857	24.7045

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

DRAFT

Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Mercury

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **540**

Media:
Marsh Sediment (All Samples)

Exposure Unit:
ENCAP Restoration Area

Chemical (mg/kg):
Nickel

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 42 J	Arithmetic Mean = 42
N (detect) = 1	SD (log detect) = 0	Max (detect) = 42 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Nickel

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **541**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Thallium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Thallium

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure
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Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Vanadium

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 78 J	Arithmetic Mean = 78
N (detect) = 1	SD (log detect) = 0	Max (detect) = 78 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Vanadium

Exhibit 1: EPC Distributions
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Berry's Creek Study Area Remedial Investigation

Figure **543**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Zinc

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 140 J	Arithmetic Mean = 140
N (detect) = 1	SD (log detect) = 0	Max (detect) = 140 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Zinc

Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Benzo[a]pyrene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.35 J	Arithmetic Mean = 0.35
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.35 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Benzo[a]pyrene

Exhibit 1: EPC Distributions
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Figure
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Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Dibenz[a,h]anthracene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Dibenz[a,h]anthracene

Exhibit 1: EPC Distributions
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Figure
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Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Aldrin

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.0016 J	Arithmetic Mean = 0.0016
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.0016 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Aldrin

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

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Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Heptachlor

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Heptachlor

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

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Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Heptachlor Epoxide

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 100%	Min (detect) = 0.002 J	Arithmetic Mean = 0.002
N (detect) = 1	SD (log detect) = 0	Max (detect) = 0.002 J	Arithmetic SD = NA

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Heptachlor Epoxide

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure
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Media:
Marsh Sediment (All Samples)

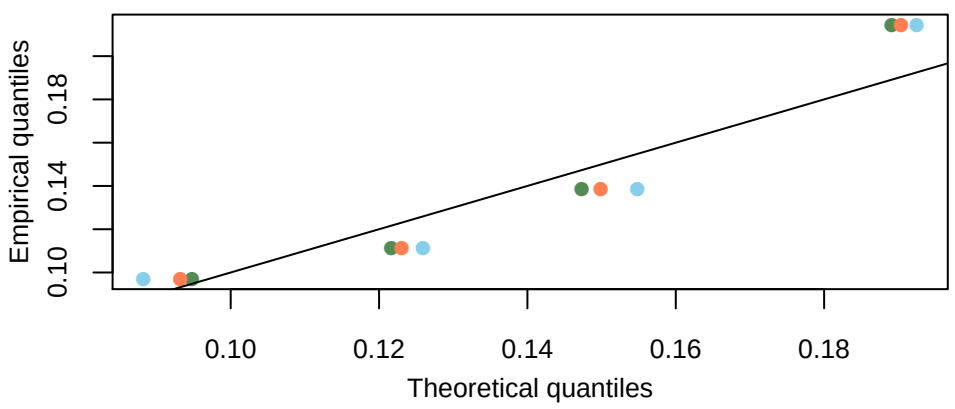
Exposure Unit:
ENCAP Restoration Area

Chemical (mg/kg):
PCBs (Total Aroclors)

Legend

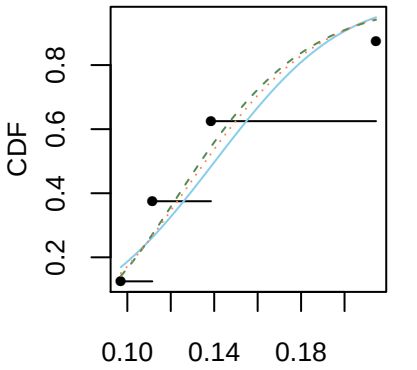
- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

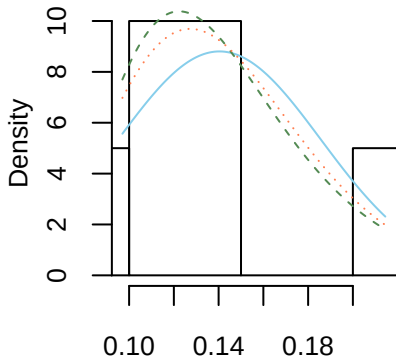


ECDF, Histogram & Q−Q (Detects Only)

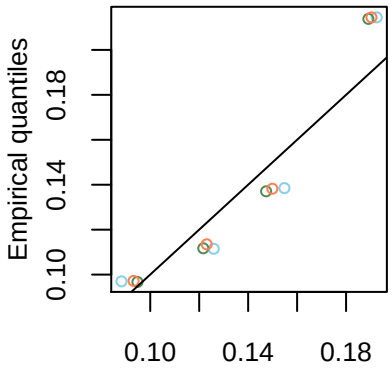
ECDF



Histogram



Q−Q



N = 4	FOD = 100%	Min (detect) = 0.097 J	Arithmetic Mean = 0.14
N (detect) = 4	SD (log detect) = 0.35	Max (detect) = 0.21 J	Arithmetic SD = 0.052

Goodness of Fit (All Data)

Distribution	S−W (p−value)	Lilliefors (p−value)	K−S (statistic)	K−S (crit val)	A−D (statistic)	A−D (crit val)	AIC	BIC
Normal	0.36	N<5	–	–	–	–	−9.40173	−10.6291
Lognormal	0.64	N<5	–	–	–	–	−10.3595	−11.5869
Gamma	–	–	NA	NA	NA	NA	−10.1012	−11.3286

Goodness of Fit (Detects Only)

All Detects

Selected distribution highlighted in green.

Notes:
– = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection

K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−PCBs (Total Aroclors)

Exhibit 1: EPC Distributions
Attachment M5: Uncertainty Evaluation
Berry's Creek Study Area Remedial Investigation

Figure **550**

Media:
Marsh Sediment (All Samples)
Exposure Unit:
ENCAP Restoration Area
Chemical (mg/kg):
Trichloroethene

Legend

- Normal
- Lognormal
- Gamma
- Detect
- Nondetect (ROS)

Q−Q Plot (All Data)

Number of detects <4.

ECDF, Histogram & Q−Q (Detects Only)

Number of detects <4.

N = 1	FOD = 0%	Min (detect) = ND	Kaplan Meier Mean = < 4 detects
N (detect) = 0	SD (log detect) = 0	Max (detect) = ND	Kaplan Meier SD = < 4 detects

Goodness of Fit (All Data)

Number of detects <4.

Goodness of Fit (Detects Only)

Number of detects <4.

Selected distribution highlighted in green.

Notes:
− = not calculated
A−D = Anderson−Darling
AIC = Akaike information criterion
BIC = Bayesian information criterion
ECDF = empirical cumulative distribution function
FOD = frequency of detection
K−S = Kolmogorov−Smirnov
N = number of samples
Q−Q = quantile−quantile
ROS = Regression on order statistics
S−W = Shapiro−Wilk
SD = standard deviation

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Distribution: Marsh Sediment (All Samples) in Former ENCAP Restoration Area−Trichloroethene

Exhibit 1: EPC Distributions
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