$$PRG_{fish}(\mu g/kg) = \frac{THQ \times BW_c \times RfD \times AT_{nc}}{ED_{nc} \times EF \times CR_c \times 10^{-3} kg/g \times 10^{-3} mg/\mu g}$$

$$PRG_{fish-cancer} = \frac{TR \times AT_c}{SF \times EF \times CR_{adj} \times 10^{-3} kg/g \times 10^{-3} mg/\mu g}$$

where: $$CR_{adj} = \frac{ED_c \times CR_c}{BW_c} + \frac{ED_a \times CR_a}{BW_a}$$

$$PRG_{fish}\ (\mu g/kg) = \frac{\left(\frac{BW_{inf} \times AT_{inf} \times RfD}{f \times CR_{milk} \times ED_{inf}}\right) \times \left[\ln(2) \times f_{fm}\right] \times BW_a \times AT_m}{\left(h \times f_f\right) \times EF_a \times ED_a \times 10^{-3} kg/g \times 10^{-3} \mu g/g \times IR_{fish}}$$

Consumption rate - adult	CR_a	mg/day	142
Consumption rate - children	CR_c	mg/day	60
Exposure frequency	EF	days/yr	350
Exposure duration	ED	yrs	30
Exposure duaration - children	ED_c	yrs	6
Body weight - adult	BW_a	kg	70
Body weight - child	BW_c	kg	15
Averaging time - noncancer	AT_{nc}	days	2190
Averaging time - cancer	AT_c	days	25550
Averaging time - maternal	AT_m	days	10950
Target Risk	TR		1E-06
Target Hazard Quotient	THQ		1
Age-adjusted consumption rate	CR_{adj}	g-yr/kg-day	73
Maternal Daily absorbed dose	$DAI_{maternal}$	mg/kg-day	
Fraction of body weight lipid	f_{fm}		0.3
Fraction stored in fat	f_f		0.9
Fraction of fat in breast milk	f_{mbm}		0.04
Consumption rate milk	CR_{milk}	kg/day	0.98
Body weight - infant	BW_{inf}	kg	7.8
Averaging time - infant	AT_{inf}	days	365
Exposure duration - infant	ED_{inf}	days	365
Sediment Exposure Factors			
In-water worker Exposure Frequency in-water sediment	EF_{worker_sed}	days/yr	10
Exposure Frequency - Dockside worker	EF_{dock}	days/yr	50
Exposure Frequency - In-water worker	$EF_{in\text{-}water}$	days/yr	10
Tribal Fisher Exposure Frequency in-water sediment	$EF_{tr\ sed}$	days/yr	260
High-frequency Fisher Exposure Frequency	$EF_{fisher\ sed}$	days/yr	156
Exposure Frequency recreational beasch use - adult	EF_{rec_adult}	days/yr	94
Exposure Frequency recreational beasch use - child	EF_{rec_child}	days/yr	94
Exposure Frequency -Diver	EF_{diver}	days/yr	5

Exposure Duration - Tribal	ED_{tribal}	years	70
Exposure Duration - Worker	$ED_{_worker}$	years	25
Exposure Duration - In-water Worker	$ED_{_in_water}$	years	10
Sediment Ingestion Rate - in water worker	SIR_{worker}	mg/day	200
Sediment Ingestion Rate - recreational beach user - adult	$SIR_{rec\text{-}adult}$	mg/day	100
Sediment Ingestion Rate - recreational beach user - child	$SIR_{rec\text{-}child}$	mg/day	200
Sediment Ingestion Rate - Tribal Fisher - In water	SIR_{Tribal}	mg/day	50
Sediment Ingestion Rate - Tribal Fisher - Beach sedment	SIR_{Tribal_beach}	mg/day	100
Sediment Ingestion Rate - High-frequency fisher - In water	SIR_{fisher}	mg/day	50
Sediment Ingestion Rate - High-frequency fisher - Beach sediment	SIR_{fisher_beach}	mg/day	100
Sediment Ingestion Rate - Diver	SIR_{diver}	mg/day	50
Exposed Skin Surface Area - in water worker	SA_{worker}	cm^2	3300
Exposed Skin Surface Area - recreational - adult	$SA_{rec\ adult}$	cm^2	5700
Exposed Skin Surface Area - recreational - child	SA_{rec_child}	cm^2	2800
Exposed Skin Surface Area - Tribal Fisher - beach sed	SA_{tribal}	cm^2	1980
Exposed Skin Surface Area - Tribal Fisher	SA_{tribal_beach}	cm^3	5700
Exposed Skin Surface Area - High Frequency Fisher	SA_{fisher}	cm^2	1980
Exposed Skin Surface Area - High Frequency Fisher - beach sed	SA_{fisher_beach}	cm^3	5700
Exposed Skin Surface Area - Diver	SA_{diver}	cm^3	18150
Adherence Factor -recreational - adult	AF_{rec_adult}	mg/cm^2	0.3
Adherence Factor - recreational - child	AF_{rec_child}	mg/cm^2	3.3
Adherence Factor - In water worker	AF_{worker}	mg/cm^2	0.2
Adherence Factor - Tribal Fisher	AF_{tribal}	mg/cm^2	0.3
Adherence Factor - High Frequency Fisher	AF_{fisher}	mg/cm^2	0.3
Adherence Factor - Diver	AF_{diver}	mg/cm^2	0.3
Sediment Site-use factor	SUF		1.00
Sediment Ingestion Rate- recreational - age adjusted	IFS_{sed_rec}	mg-yr/kg-day	114
Dermal Contact Rate- recreational - age adjusted	DFS_{sed_rec}	mg-yr/kg-day	4282
Exposure duration - 0 - 2 yrs	$ED_{0\text{-}2}$	yrs	2
Exposure duration - 2 - 6 yrs	$ED_{2\text{-}6}$	yrs	4
Exposure duration - 6 - 16 yrs	$ED_{6\text{-}16}$	yrs	10
Exposure duration - 16 - 30 yrs	$ED_{16\text{-}30}$	yrs	14
Adjusted Sediment Ingestion Factor - Early Life Exposures	$IFSedM_{adj}$	mg-yr/kg-day	490
Adjusted Dermal Factor Sediment - Early Life Exposures	$DFSedM_{adj}$	mg-yr/kg-day	20787
Adjusted Fish Ingestion Factor - Early Life Exposures	$IFishM_{adj_rec_subs}$	g-yr/kg-day	216

Toxicity criteria

	SF (mg/kg-day)$^{-1}$	RfD (mg/kg-day)	Infant RfD (mg/kg-day)	h	ABS
Antimony		4.0E-03			
Arsenic	1.5E+00	3.0E-04			0.03
Mercury		1.0E-04			
cPAHs	7.3E+00	3.0E-04			0.13
Bis(2-ethylhexyl)phthalate	1.4E-02	2.0E-02	2.0E-02		0.1
Aldrin	1.7E+01	3.0E-05			0.1
Dieldrin	1.6E+01	5.0E-05	5.0E-05		0.1
Chlordane	3.5E-01	5.0E-04	5.0E-04		0.04
DDx	3.4E-01	5.0E-04	5.0E-04	120	0.03
DDD	2.4E-01	5.0E-04	5.0E-04	120	
DDE	3.4E-01	5.0E-04	5.0E-04	120	
DDT	3.4E-01	5.0E-04	5.0E-04	120	
PCBs	2.0E+00	2.0E-05	3.0E-05	2555	0.14
TCDD	1.3E+05	7.0E-10	7.0E-10	2550	0.03
PDBEs		1.0E-04	1.0E-04	2555	0.14
Hexachlorobenzene	1.6E+00	8.0E-04			0.1
Pentachlorophenol	4.0E-01	5.0E-03			0.25
PeCDF					

Risk= 0 **Consumption rate=** 142

		PRGs (µg/kg fillet fish tissue)					
		Cancer	**Noncancer**		**Infant**	**PRG**	**Basis**
Antimony			1.0.E+03	1.0.E+03		1.0.E+03	nc
Arsenic		6.7.E-01	7.9.E+01	6.7.E-01		6.7.E-01	ca
Mercury			2.6.E+01	2.6.E+01		2.6.E+01	nc
cPAHs		4.6.E-02	7.9.E+01	4.6.E-02			
Bis(2-ethylhexyl)phthalate		7.2.E+01	5.2.E+03	7.2.E+01		7.2.E+01	ca
Aldrin		5.9.E-02	7.9.E+00	5.9.E-02		5.9.E-02	ca
Dieldrin		6.3.E-02	1.3.E+01	6.3.E-02		6.3.E-02	ca
Chlordane		2.9.E+00	1.3.E+02	2.9.E+00		2.9.E+00	ca
DDx		3.0.E+00	1.3.E+02	3.0.E+00	9.4E+01	3.0.E+00	ca
Hexachlorobenzene		6.3.E-01	2.1.E+02	6.3.E-01		6.3.E-01	ca
PCBs		5.0.E-01	5.2.E+00	5.0.E-01	2.7E-01	2.7.E-01	infant
TCDD		7.7.E-06	1.8.E-04	7.7.E-06	6.2E-06	6.2.E-06	infant
PDBEs			2.6.E+01	2.6.E+01	8.9E-01	8.9.E-01	infant
PeCDF		0.000026	0.00061		0.00002	0.00002	

Converted the TCDD target tissue concentration to
PeCDF concentration for purposes of modeling

Whole body/Fillet Concentration Ratio			
Smallmouth Bass	**Common Carp**	**Brown Bullhead**	**Black Crappie**
1			
		14	
6	1		
6	1		
6	1	10	12
7	1	4	6
8	2	2	5
6	2		

	PRGs (µg/kg whole body fish		
	Smallmouth Bass	**Common Carp**	**Brown Bullhead**
Antimony			
Arsenic	1		
Mercury			
cPAHs			
Bis(2-ethylhexyl)phthalate			998
	0.3	0.08	
Dieldrin	0.4	0.09	
Chlordane	17	4	30
DDx	21	4	12
PCBs	2	0.5	0.4
TCDD	0.00004	0.000009	
PDBEs			

* - Values obtained from Windward chemical-specific food web model worksheets, setting total target tissue concentration to fillet concentraions, and then a single-multi-species diet.

tissue)	
Black Crappie	Multi-species
35	
19	
1	

	Brown Bullhead						Black Crappie							
	RM 3-6			RM 6-9			RM 3-6			RM 6-9				
	F	WB		F	WB		F	WB		F	WB			
Bis(2-ethylhexyl)phthalate	67	930	**14**	0									14	
Dieldrin	1	1.6	**2**	0										
Chlordane	1.4	25	**18**	1.6	4.9	**3**	0.8	9.6	**12**	0	5.5		10.46	12
DDD	3.6	8.7	**2**	2.8	17	**6**	2.1	9.5	**5**	2.4	15	**6**	4	5
DDE	12	48	**4**	15	47	**3**	6	38	**6**	7.5	74	**10**	4	8
DDT	6.8	23	**3**	6	32	**5**	2	14	**7**	3.3	13	**4**	4	5
PCBs	49	100	**2**	680	730	**1**	22	88	**4**	26	180	**7**	2	5
TCDD														
PDBEs														

	Common Carp						Common Carp						Common Ca	
	RM 0-4			RM 4-8			RM 8-12			RM 3-6			RM 6-9	
	F	WB		F	WB		F	WB		F	WB		F	WB
Bis(2-ethylhexyl)phthalate														
Dieldrin	1.9	2.3	**1**	1.8	2.5		1.4	2.1	**2**					
Chlordane	9.7	12	**1**	10	14	**1**	9	13	**1**	10	15	**2**		11
DDD	20	27	**1**	120	190	**2**	14	20	**1**	36	86	**2**	55	51
DDE	67	86	**1**	160	220	**1**	44	71	**2**	110	150	**1**	86	120
DDT	1	0.29	**0.3**	22	81	**4**	0.63	0.34	**1**	23	18	**1**		
PCBs	240	340	**1**	6800	8700	**1**	510	920	**2**	690	2500	**4**	990	990
TCDD	2.2	2.9	**1**	4.1	6	**1**	2.2	3.9	**2**					
PDBEs														

	SMB	Carp
RM 3-6	513	
RM 6-9	577	
RM 0-4	935	
RM 4-8	583	
RM 8-12	1670	

rp

1
1
1

1
1

2
1
1
2
2

	RM 2			RM 3			
	F	**WB**		**F**	**WB**		**F**
Arsenic				0.028	0.035	**1**	0.019
Bis(2-ethylhexyl)phthalate							
Dieldrin	0.42	2.4	**6**	1.4	2.5	**2**	0.38
Chlordane	1.5	9	**6**	3.6	9.1	**3**	2.1
DDD	2.9	18	**6**	3.5	25	**7**	3.8
DDE	11	69	**6**	15	98	**7**	11
DDT	0.72	5.1	**7.1**	5	11	**2**	1.6
PCBs	200	1400	**7**	34	470	**14**	140
TCDD	0.22	1.4	**6**	0.22	1.5	**7**	0.35
PDBEs							

RM 3-6	RM 6-9	RM 0-4	RM 4-8	RM 8-12
513	577	935	583	1670

RM 4		RM 5			RM 6			RM 7	
WB		**F**	**WB**		**F**	**WB**		**F**	**WB**
0.029	**2**	0.02	0.028	**1**	0.018	0.021	**1**	0.018	0.024
2.5	**7**	0.37	2.6	**7**	0.28	2	**7**	0.29	2
8.9	**4**	1.7	14	**8**	2.3	8.5	**4**	1.5	13
36	**9**	4.4	36	**8**	5.4	43	**8**	32	160
120	**11**	12	97	**8**	9.6	87	**9**	34	220
11	**7**	6.1	31	**5**	4.1	22	**5**	30	160
730	**5**	34	340	**10**	56	430	**8**	140	830
2.1	**6**	0.25	1.9	**8**	0.33	1.8	**5**	5.5	18

	RM 8			RM 9			RM 10		
		WB		F	WB		F	WB	
1	0.017	0.023	**1**	0.017	0.021	**1**	0.015	0.022	**1**
7	0.66	3.7	**6**	0.63	2.9	**5**	0.27	1.7	**6**
9	2.8	9.1	**3**	1.6	13	**8**	1.3	10	**8**
5	5.7	60	**11**	2.3	27	**12**	1.9	28	**15**
6	15	120	**8**	130	110	**1**	7.5	76	**10**
5.3	10	41	**4**	3.7	4.2	**1**	2.3	20	**9**
6	47	470	**10**	79	690	**9**	100	720	**7**
3	0.54	3.3	**6**	0.42	2.9	**7**	0.34	2.4	**7**

	RM 11		
F	**WB**		
0.016	0.019	**1**	1
0.25	1.5	**6**	6
1.3	8.8	**7**	6
0.75	5.5	**7**	9
5.4	40	**7**	7
0.74	5.4	**7**	5
780	3600	**5**	8
0.44	2.5	**6**	6

Whole body/Fillet Concentration Ratio		
Smallmouth Bass	Common Carp	Brown Bullhead
1		
		14
6	1	
6	1	10
9	2	4
7	1	4
5	1	4
8	2	2
6	2	

Black Crappie
12
5
8
5
5