USEPA comments on Appendix D Toxins of BDCP "Effects Analysis"

General Comments

1. Information presented in this document is incomplete and out of date.
2. This appendix needs to be integrated with and make reference to the Flows, Turbidity, Temperature, and Salinity Appendix. The effect of changes in flows, temperature, turbidity, and salinity impact toxicity of contaminants (e.g., copper toxicity is a function of temperature). The copper section describes copper toxicity varying with temperature. Similarly, restoration is intended to increase aquatic productivity which will increase dissolved organic carbon and pH which are known to, respectively, reduce dissolved oxygen and increase toxicity of contaminants like ammonia.
3. Discuss or clarify the role of modeling and analysis completed for the Flows, Turbidity, Temperature, and Salinity Appendix in the toxins analysis.
4. Interactive and cumulative effects need to be identified and addressed. Changes in flow will likely change residence times which may subsequently increase the impact of copper and other contaminants in fish, particularly in the south delta. Stabilized flow conditions support more stable populations of overbite clams in the western delta and eastern Suisun Bay, which may subsequently increase the impacts of selenium on sturgeon and other benthic feeding fish.
5. The T&E analysis should cover all state and federally listed species, not just the covered ***fish*** species.
6. We understand the effects analysis is focused on threatened and endangered (T & E) species, however we want to remind DWR that if the Army Corps of Engineers is to use this NEPA document to support a CWA Section 404 permit, the direct, secondary (indirect is NEPA language), and cumulative impacts of BDCP projects must be estimated and disclosed for non T & E wildlife and aquatic resources per NEPA and CWA. Estimation and disclosure of impacts to wildlife and other aquatic life are also required under NEPA. Specifically relevant to the CWA Section 404 permit are the direct, secondary, and cumulative impacts of project actions on designated uses of Delta waterways that have been adopted by the State of California under the delegated CWA Water Quality Standards program. Please let us know if this information is located somewhere else in the document.
7. The document should identify all adopted water quality and tissue objectives for the Delta and SF Bay waters (such as Suisun Bay) and determine whether proposed water operations or restoration projects have the potential to cause or contribute to violations of water quality standards. If projects will cause or contribute to violations, then this must be disclosed now so that project specific environmental documents can be prepared in the future for the responsible regulatory agency.
8. Methods used to evaluate the impact of the preliminary proposal on exposure of T & E species and other wild and aquatic life to toxins must be robust enough to inform regulatory decisions.
9. We recommend describing how this Appendix D (and other companion appendices) and the Effects Analysis are being used, e.g., to refine alternatives, inform EIR/EIS for impact analysis, preferred alternative selection, and mitigation.

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10. We recommend describing the analytical process and decision rules used to reach the conclusions in each section. Identify the components of the preliminary proposal that could be 'drivers' affecting water quality. For example, describe the actions associated with the Delta Conveyance (water operations, construction, dredging, etc…) that may impact or drive changes in T & E species exposure to toxins.
11. Provide more specificity on time lines for exposure. The document concludes that "short term exposure" and "restoration over time" are reasons that BDCP actions will not substantially increase the potential exposure of fish to toxins. Short-term exposure is not defined and this is used with respect to toxins such as copper and organochlorines, which the document identifies in other sections as persistent, that may take a substantial amount of time (potentially many decades) to leave an area such as the Yolo Bypass. Similarly, restoration "over time" is not defined, and it is not explained how phasing restoration over 50 years (term of the permit) will physically alter export rates of toxins.

Executive Summary

1. Table D-1 is confusing. The explanation says it is an overview of conclusions drawn from the toxins analysis but in the notes at the end the color coding says it is probability of [species] occurrence in the area. The color coding terms "none, low, moderate, and high" are defined at the beginning of the table. The text for the Executive Summary says that Table D-1 provides an overview of the conclusions drawn from the toxin analyses yet the table appears to be a summary of the geographic distribution of the covered fish species.
    a. The Appendix needs two summary tables. The first should indicate times/places in the Delta where proposed projects have the potential to cause or contribute to violations of adopted basin plan objectives (one part of water quality standards). The second table should indicate whether the increase in toxins will cause harm to T&E species.
    b. Recommend combining the definition of terms and color coding in one place.
    c. Reconcile the color coding with the term definitions, is it species presence? Or is it species/life stage occurrence with toxins.
    d. Using consistent coloring with Table D-7. Table D-1 appears to be a condensed version of Table D-7 which is in black and white and uses similar but not identical terms (none, low, medium, high). These tables should be consistent with one another.
2. It would be helpful to provide text in the Executive Summary to accompany and explain the table.

Section D.2 Organization of Appendix

1. Provide estimates of direct, indirect (secondary in CWA), and cumulative impacts from changes in species exposure to toxins that result from preliminary proposal actions for each T & E species as well as other aquatic species and aquatic dependent wildlife. Describe where this information is located in the EIS if it is not included here. Describe why this information is not included here if it is provided elsewhere in the document.
2. We recommend including an analysis of dissolved oxygen and harmful algal blooms (HAB) or

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explicitly explain why both are being excluded or where analyses of these water quality characteristics are located in the EIS/EIR. Changes in flow could cause violations of both parameters (dissolved oxygen objective and narrative toxicity objective) and BDCP proposes to make changes in flow. The basin plan amendment for dissolved oxygen in the Stockton deep water ship channel can be viewed at: http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/san_joaquin_oxygen/basin_plan_amendment_5-2004/draft_final_staff_rpt.pdf.

3. Please review the most current 303(d) list for other DO impairments.
4. Provide a citation/endnote listing the groups that recognize the stressors included in this section as significant to determining the potential of the Bay-Delta ecosystem to support covered species. This will support the statement of "wide recognition," increase the integrity of the document, and support the choices to include specific stressors and exclude others. Examples include DSC ISB stressors panel work, IEP POD documents, CWA Section 303(d) list of water quality impairments that identify toxins as sources of aquatic resource designated use impairments, and NRC other stressors work/assignment.
5. Improve the description of the current state of toxins in the Delta. This piece is mostly missing from each section. The following information should be provided describing the current state of each toxin in its relevant section.
   a. Stressors listed as the source of designated use impairments in the Delta on the CWA 303(d) List of Impaired Waterbodies.
   b. Provide water quality criteria/objectives adopted by CA in the water quality control plans. The Sacramento and San Joaquin River Basin Plan is available here http://www.swrcb.ca.gov/centralvalley/water_issues/basin_plans/index.shtml and the Sacramento-San Joaquin River Delta Water Quality Control Plan is available here http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/wq_control_plans/2006wqcp/index.shtml.
   c. When numeric water quality objectives have not been provided by the state, provide the federal guidance criteria (we realize they are provided in some sections).
   d. Disclose whether or not the stressor is exceeding water quality objectives or federal guidance criteria. Include information about where water quality objectives are exceeded and how often. A map is a good way to communicate these concepts.
   e. Identify the stressors that have been documented to cause aquatic toxicity and when. Identify the sources.
   f. Identify the stressors that have adopted TMDLs with waste load and load allocations limiting discharges to the Delta. Identify the stressors that have TMDLs in development.
   g. Provide the waste load and load allocations, and other requirements of TMDL implementation plans, and how they may affect or be implemented by the preliminary proposal.
6. Expand discussion of pesticides beyond organochlorine, pyrethroid, and organophophates and their individual impact on species. The discussion provided is focused only on insecticides -- pyrethroids (an ongoing concern), OPs (decreasing use and decreasing concern), and OCs (a continuing concern). Appendix D does not discuss any of the other pesticides used within the

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Delta and entering from upstream inputs (detailed information on use is available from California Dept of Pesticide Regulation). There are a wide variety of pesticides, including herbicides, fungicides, and insecticides, are applied in and upstream of the Delta. Water samples in the Delta frequently contain complex mixtures of these pesticides. See this article for more information – Kathryn Kuivila & Michelle Hladik, Understanding the Occurrence and Transport of Current-Use Pesticides in the San Francisco Estuary Watershed, 6(3) SAN FRANCISCO ESTUARY & WATERSHED SCI. 1, 1-19 (2008).

Section D.3.1 Selection of Water Quality Stressors for Analysis

1. Describe the process for selecting water quality stressors for analysis.
2. This section does not adequately consider impacts from upstream urban and agricultural areas.
3. The emphasis on land *area* (e.g, 9% urban) is misleading because significant pollution is often associated with intensity of activities (urban), concentrated hot spots or location-specific practices (selenium , methylmercury, and agricultural pesticides).
4. The small percentage of urban land in the Delta is not a legitimate reason to provide less detail on urban toxins and how they may change as a result of the preliminary proposal. The Delta is the receptor of urban runoff from very large urban and agricultural centers located immediately upstream of the Delta. The document states many times, including this section, that urban land use accounts for only 9% of the Delta area. This statement is used as a reason to provide less detail on urban contaminants and indicates that pollutants/toxins in urban runoff should not be a big concern. However, contaminants are the source of aquatic toxicity and impairments to aquatic resource designated uses in the Delta. And contaminants-caused impairments persist in the Delta, despite the small percentage of urban land use coverage in the Delta.
   a. Recommend balancing the discussion by identifying the Delta is the downstream collector of toxins in runoff from large urban and agricultural areas and discussing the potential for urban growth in the Delta over the permit cycle of 50 years.
   b. Recommend explicitly describing the reasons a more rigorous analysis was not provided or has not been done.
5. Support this statement "Rural developments associated with agricultural land use have minimal water quality impacts," by providing a citation and/or explanation for the statement. OR remove the statement if it is not supported by academic literature or water quality monitoring data.
   a. Provide examples of the types of water quality impacts rural developments have, especially in the Delta with septic systems located below sea level.
   b. Describe and reference water quality data that show the levels of rural development water quality impacts as minimal compared to other sources.
6. Recommend consulting the CWA Section 303(d) List (http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml) and using it as a source for informing the choice of toxins to consider evaluating in this section.

Section D.4 Methods

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1. Methods used in this analysis need to be clearly described in Appendix D.
2. Methods need to be robust enough to inform regulatory decisions if this document is to be used to support regulatory decisions.
3. Quantification is possible for the Flows, Turbidity, Temperature, and Salinity Appendix. Explain why these models, or quantitative tools such as the selenium assessment model, are not being used to inform potential changes in T & E species exposure to toxins.
4. Use CA adopted water quality objectives and TMDL load and waste load allocations as referents.
   a. These are available in water quality control plans and TMDLs. Use both the narrative and numeric objectives and list load allocations and waste load allocations (if applicable).
   b. This is very important because the CWA restricts permitting under Section 404 to those projects that do not "cause ***or contribute*** (emphasis added) to violations of any applicable State water quality standard" (40 CFR 230.1(b)(1)). Water quality standards include water quality criteria (called objectives in California plans) and adopted designated uses (CA term is beneficial uses) which address aquatic resources and habitat for a broad range of species.
   c. This step is also important for compliance with adopted TMDLs. TMDL load allocations and waste load allocations (if applicable) should be used to compare the impact of proposed actions on toxin loads to the Delta for compliance with adopted TMDLs.
   d. The Corps and State Board need this information in the NEPA document if they are to use it as the foundation for decision making in CWA 404 and 401 permit and certification processes.
5. This document should identify all potential violations of water quality objectives. This information is necessary for BDCP actions evaluated at the project level that seek CWA permits and certifications. It is also important to ensure that project specific environmental documents for programmatic actions are prepared in the future.
6. NEPA and CWA require disclosure of impacts on more than just T & E species. Please identify the location in the EIS that evaluates the impact of toxins on other wildlife and aquatic life that are not listed species.
7. Operations may not be the only significant source of changes to T & E species exposure to toxins. Please include an evaluation of Delta Conveyance construction impacts on exposure of each of the toxins considered in this Appendix D to T & E species. For example, dredging that is done for constructing the pipeline will pull sediments into the water column potentially contributing to low dissolved oxygen levels and exposure to persistent sediment-bound toxins such as organochlorines and pyrethroid pesticides.

Section D.5.1 Mercury

1. Describe the current status of methylmercury water quality problem.
   a. Use the updated 2010 303(d) List instead of the 2007 citation. It is available at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
   b. We recommend providing a map showing the 303(d) waters with designated uses impaired by methylmercury in the Delta, locations of the greatest source loads, and locations where monitoring data show levels of methylmercury that exceed load and/or objectives. The map

should also identify the location of all proposed projects and whether they would increase methylmercury or not.

c. Monitoring data can be accessed through the Lines of Evidence (LOE) links provided on the 303(d) List which can be accessed by the link provided above.

d. Describe how often large and small fish tissue objectives are exceeded and where.

2. Update the text to be consistent with the Delta Methylmercury TMDL adopted by CVRWQCB on April 22, 2010 and approved by the USEPA on 20 October 2011.

   a. Describe the recently-adopted methylmercury tissue objectives for the Bay Delta and TMDL These objectives can be converted to a water column value for methyl and total mercury. Include a similar description of the San Francisco Bay mercury TMDL if projects occur in their area of jurisdiction.

   b. Discuss how small fish tissue objectives were developed to protect *least terns*, a state and federally listed species and evaluate whether proposed restoration projects may increase methyl mercury levels in small fish consumed by *least terns*.

   c. Describe how TMDL implementation requirements apply to actions in the preliminary proposal.

   d. Important documents read and incorporate include:

      i. The TMDL document or resolution R5-2010-0043 *available at* http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/resolutions/r5-2010-0043_res.pdf

      ii. Staff Report on Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Methylmercury and Total Mercury in the Sacramento-San Joaquin Delta Estuary *available at* http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/april_2010_hg_tmdl_hearing/apr2010_bpa_staffrpt_final.pdf.

3. Improve the discussion of mercury location, environmental fate, and transport by describing and including these studies:

   a. Methylmercury cycling, bioaccumulation, and export from agricultural and non-agricultural wetlands in the Yolo Bypass. http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/other_technical_reports/ybwa_hg_final_rpt.pdf

   b. Methylmercury concentrations and loads in the Central Valley and Freshwater Delta and Mercury and suspended sediment concentrations and loads in the Central Valley and Freshwater delta. Both can be read at: http://mercury.mlml.calstate.edu/reports/reports/

   c. Ackermman, J.T., and Eagles-Smith, C.A., 2010, Agricultural wetlands as potential hotspots for mercury bioaccumulation: Experimental evidence using caged fish. Environmental Science and Technology, v. 44 p. 1451-1457.

4. Determine whether wetland restoration will increase methyl mercury levels in water and fish tissue and cause violations of tissue objectives. If violations are expected, then document all violations and determine their impact both individually and cumulatively.

5. Water operations

   a. Explain why quantification is not possible or meaningful. Quantification is possible for the

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Flows, Turbidity, Temperature, and Salinity Appendix. Explain why these models and their results are not being used to inform potential changes in T & E species exposure to toxins.

b. Describe the methylmercury load reductions required in the Basin Plan amendment for flood conveyance, water management and water storage and state whether this project will address these. Determine whether proposed changes in water management will increase methylmercury levels in water and fish tissue and cause or contribute to violations of adopted objectives. Document all expected violations in the new table D-2.
c. Describe how changes in circulation caused by operations impact mercury and methylmercury exposure to T & E species and other aquatic and wildlife.
d. Quantitative estimates of the impact of water operations on the production, transport, and impact of methylmercury on T & Species (identified by loads and water column and fish tissue concentrations) and other aquatic and wildlife in the Delta must be provided in order to determine whether or not the Delta Conveyance Project and its operations cause or contribute to violations of water quality standards. If this information is not provided, the Army Corps of Engineers may need to supplement the NEPA documentation and/or federal regulations at 40 CFR 230.12(a)(3)(iv) may prohibit the Army Corps of Engineers from granting a CWA Section 404 permit.
e. Provide a clear conclusion statement describing the effect of operations on mercury and melthylmercury exposure to T & Species and other aquatic and wildlife in the Delta.
    i. Include impacts to the dominant harvested fishes of the delta – striped bass, largemouth bass and other centrarchid fish, and the various catfish. These fish are heavily harvested both in expensive tournaments that attract fishermen from across the continent and for subsistence, especially of many minority populations.
    ii. This will help to address the economic impacts and economic justice aspects of fish harvest in the delta and how they are affected by changes in fish uptake of contaminants caused by preliminary proposal actions.

6. Restoration
    a. Describe the actions BDCP agencies would be required to carry out under the MeHG TMDL. BDCP agencies manage controllable factors that contribute to MeHG production, and they are subject to requirements under the recently adopted MeHG TMDL. Largely, this relates to monitoring and control studies in open water and flood plain environments. We recommend reading the TMDL and staff report and updating this document accordingly.
    b. Page D-11 contains the observation that the effects of the preliminary proposal on exposure of T & E species to methylmercury cannot be quantified due to the complexity of processes producing methylmercury. Phase 1 of the TMDL requires control studies in which action agencies are required to participate. BDCP should be prepared to commit to these requirements and use the information to provide better estimates (ideally quantitative) of T & E species exposure to methylmercury when the restoration projects reach the project level of detail, for example in the CWA Section 404 permit application phase.
    c. Describe how changes in water circulation and velocity caused by operating the Delta Conveyance Project will impact mercury and methylmercury exposure to T & E species and other aquatic and wildlife throughout the Delta.

d. Provide a clear conclusion statement describing the effect of operations on mercury and melthylmercury exposure to T & Species (identified by loads and water column and fish tissue concentrations) and other aquatic and wildlife in the Delta.

7. Modeling results
   a. Please provide details on the quantitative modeling such as inputs, equations, chosen constants and results.
   b. Describe modeling results and provide a context for interpretation such as water quality objectives.
8. Conclusions
   a. Short term impacts to populations of Delta T & E species cannot be disregarded given record low abundances.
   b. A robust and valid quantification of the effect of the preliminary proposal on mercury and methylmercury exposure to T & E species is a necessary piece of information on which to base CWA permits and certifications.

Section D.5.2 Selenium

1. This section reflects an outdated understanding of the state of selenium water quality problems in the Delta. Please read the following resources, follow up with endnote citations, and update the document accordingly:
   a. Unabridged Advanced Notice of Proposed Rule-making on Water Quality Challenges in the San Francisco Bay Delta Estuary *available at* http://www.epa.gov/region9/water/watershed/sfbay-delta/pdf/BayDeltaANPR-fr_unabridged.pdf
   b. Nonpoint Source Program Success Story: Grasslands Bypass Project Reduces Selenium in the San Joaquin Basin *available at* http://water.epa.gov/polwaste/nps/success319/upload/ca_sanjoaquin.pdf
   c. **Ecological Assessment of Selenium in the Aquatic Environment**
      Editor(s): Peter M. Chapman, *Golder Associates, Vancouver, British Columbia, Canada*; William J. Adams, *Pace University*; Marjorie Brooks, *University of Wyoming, Laramie, USA*; Charles G. Delos, *U.S. Environmental Protection Agency, Washington, D.C., USA*; Samuel N. Luoma, *U.S. Geological Survey, Menlo Park, California, USA*; William A. Maher, *University of Canberra, Australia*; Harry M. Ohlendorf, *CH2M HILL Inc., Sacramento, California, USA*; Theresa S. Presser, *U.S. Geological Survey, Menlo Park, California, USA*; Patrick Shaw, *Environmental Canada, Vancouver, Canada*
   d. **Selenium TMDLS**
      i. Grasslands Marshes Selenium TMDL http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/grasslands_se/index.shtml
      ii. Salt Slough Selenium TMDL http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/salt_slough_se/index.shtml
      iii. San Joaquin River Selenium TMDL http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/san_joaquin_se/index.shtml

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iv. DRAFT North San Francisco Bay Selenium TMDL http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/seleniumtmdl.shtml

e. Model development CASCaDE II http://cascade.wr.usgs.gov/

2. Provide background on the state of knowledge about the selenium problem and processes in the Delta and upstream watersheds.
3. Describe the current status of selenium water quality problem.
   a. Explicitly identify that water column selenium concentrations are not reliable indicators of risk to biota.
   b. Use the updated 2010 303(d) List instead of the 2007 citation. It is available at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
   c. List CA adopted water quality objectives and note that EPA is developing regulatory criteria for selenium in the Bay-Delta to protect more sensitive species. This is the result of a biological opinion concluding that the existing criteria are not protective.
   d. Discuss the update to selenium water quality guidance criteria. Currently, in response to concerns that the existing regulatory standards for selenium are not protective, EPA Region 9 is developing regulatory criteria for selenium that will be applicable to wildlife and aquatic species in the Bay-Delta. Working with the US FWS and NOAA Fisheries, this process is preparing an analysis of species effects levels, including Bay-Delta listed species sensitivity to dietary selenium. EPA expects to complete the work and issue the public draft proposal in mid-2012. Please see the EPA website for information that should be of use in revising the selenium section of Appendix D: http://www.epa.gov/region9/water/ctr/.
   e. Recommend a map showing the 303(d) impaired waters and the greatest sources of loads.
   f. Identify areas using a map that are and are not in compliance/meeting existing Se objectives.
   g. Describe locations and conditions under which selenium concentration in species are elevated in the Delta.
   h. Provide and discuss wildlife selenium objectives for leasts tern and river otters developed for TMDLs by San Francisco Bay Water Board. Discuss the anticipated update to selenium objectives and the reasons for the update which are based on current objectives not being protective enough of aquatic resources.
   i. We recommend updating this document with text that summarizes the North Bay Selenium TMDL regarding Se sources and controls and using the quantitative model to estimate the impact of BDCP on the availability of selenium for biological uptake and impairment. Also be sure to evaluate USGS work on the CASCaDE II model Model development CASCaDE II http://cascade.wr.usgs.gov/
   j. A quantitative assessment model for selenium that includes the Delta was developed for the North Bay TMDL. http://www.swrcb.ca.gov/rwqcb2/water_issues/programs/TMDLs/northsfbayselenium/TM-6_Modeling_Final_Report_02-10.pdf.
4. The Effects Analysis should consider whether changes in Delta Conveyance would alter transport and deposition of selenium in the Delta.
   a. Describe how changes in circulation and residence times caused by operations alternatives could impact selenium exposure and toxicity to T & E species and other aquatic and wildlife.

Stabilized flow conditions are likely to allow more stable populations of overbite clams in the western delta and eastern Suisun Bay, which can be expected to increase the impacts of selenium on sturgeon and other benthic feeding fish. Some of these changes are described here http://www.mercurynews.com/science/ci_18903921.

b. Describe the impact of Delta Conveyance operations increasing the amount of San Joaquin River water that flows through the Delta (water that is generally cycled back through the pumps prior to entering the Delta using the current system) on selenium loads and potential for toxicity to T & E species.

c. The discussion of mitigating factors, such as reduced selenium loads resulting from TMDLs should come second. The San Joaquin Basin is important to discussion of selenium effects in the Delta and Bay because: a) the Basin is the main controllable source of selenium in the B-D watershed; b) there is a program in place to reduce (or largely eliminate) these loads, although the means of accomplishing reductions to protective levels are controversial and/or uncertain; and c) during certain periods, Delta operations strongly influence the amount of selenium that enters the Delta (capturing San Joaquin selenium loads in export supplies).

5. Estimation of exposure of T & E species to selenium toxicity is incomplete without providing information of foodweb characteristics because they are significant variables in selenium exposure and toxicity. The potential for selenium toxicity should be evaluated using foodweb and estuarine dynamics models that link selenium bioavailability, bioaccumulation and exposure. We recognize that the effects of toxins on foodwebs is addressed in a separate appendix, however, conclusions regarding the impacts of the preliminary proposal cannot be complete without including a description of foodweb pathways mediating bioavailability for exposure and bioaccumulation.
6. Identify species with increased probability of experiencing selenium toxicity as a result of Delta Conveyance operations or other preliminary project actions.
7. Discuss what needs to be learned about the processes driving the variations in selenium concentrations in Bay Delta foodwebs (e.g., inter-annual variations in clam uptake)
8. Revise and fact check the text on pages D19-D20 on the Grasslands area of the westside San Joaquin Basin (not the Delta) with the Bay Delta ANPR (see comment #1 for link) and the SFEI Grasslands Bypass Project http://www.sfei.org/grassland/.
9. The statement "Decreased Sacramento River flows into the Delta as a result of the preliminary proposal are expected to result in minimal effects on selenium water concentrations in the Delta," is unsupported by text in the document. Concluding that the potential for the preliminary proposal to have minimal effect on T & E species seems premature especially since a few pages earlier the text of Appendix D states that diet-based differences in bioaccumulation have not been accounted for in this chapter.

Section D.5.3 Copper

1. Include urban run-off sources of copper, especially from brake pads, a potential reference can be found here http://pubs.acs.org/doi/abs/10.1021/es048715f and there is more information

here http://www.suscon.org/bpp/index.php.

2. The conclusion "it is not expected that the preliminary proposal would substantially change the exposure of fish to copper," does not appear to be supported given following:
   a. Statement from previous paragraph, "Mobilization of copper from increased flow at the weir at the upstream end of the Yolo Bypass, where copper concentrations are elevated, could have a temporary adverse effect on juvenile fish, namely salmonids, splittail, and smelt that rear in that area."
   b. Very low levels of copper interfere with the nasal epithelium of salmon and hinder their ability to return to their spawning grounds years later. The various successful efforts to ban copper in brake pads is largely due to this work. A seminal abstract concludes for coho salmon "copper is broadly toxic to the salmon olfactory nervous system. Consequently, short-term influxes of copper to surface waters may interfere with olfactory-mediated behaviors that are critical for the survival and migratory success of wild salmonids." (Baldwin et al. 2003 available at: http://training.fws.gov/EC/Resources/pesticides/Aquatic%20Effects/Sublethal%20Effects%20of%20Copper%20on%20Coho%20Salmon.pdf
   c. Impairments to coho develop at concentration of 2ug/L –Sandahl *et al* (2007) ES & T 41:2998-3004.
   d. Destroying the ability of salmon to find their natal streams for even just a few years appears to be a significant consequence of the preliminary project.
3. Be more specific about time frames and describe how long the first phases of inundation will take. This sentence in section D.5.3.2.1, page D-23, line 31"there is potential for increased copper concentrations in Yolo Bypass discharge during the first phases of inundation, which should decrease over time as the copper is flushed out of the soils." ends with a nonspecific declaration. Describe how much time it will take for copper to be 'flushed out of the soils'.
4. Describe the mechanisms for 'flushing' in the Yolo Bypass. This area is a wide, shallow basin, and thus not likely to include high-velocity flows for scouring. Even if copper (from mining legacy) partitions into the dissolved phase for transport downstream, it could take decades to leave the system.

Section D.5.4 Ammonia/Ammonium

1. Describe the current status of ammonia as a water quality problem.
   a. Identify the quality criteria/objectives are used to evaluate ammonia and ammonium.
   b. Identify waters listed as impaired due to ammonia/ammonium. The current 303(d) list is available at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
   c. Provide a balanced and comprehensive description of the research on ammonia/ammonium in the Bay Delta and where ammonia/ammonium is thought to have impacts that may be connected to the POD.
2. Make a clear statement about the impact of water operations on the toxicity of ammonia/ammonium on the Delta and describe the technical information/analyses with

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citations that support this conclusion.

3. Two or three of the proposed Delta Conveyance intake pumps would be located upstream of the Sacramento Regional WWTP outfall. These are the intakes that would be used more often. The conclusion has not been substantiated that no violations of the draft 2009 US EPA chronic criteria for mussels present are expected if 7Q10 low flows are experienced in the Sacramento River prior to full compliance with the new NPDES permit.
4. Describe the impact of water operations prior to ammonium and nitrate removal.
5. Acknowledge that the permit for the SRWTP is being appealed and the ammonia limit may not be upheld.
6. Extend analysis down to Suisun Bay.

Section D.5.5 Pyrethroid Pesticides

1. Describe the current status of pyrethroid water quality problem.
   a. Refer to the updated 2010 303(d) List. It is available at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
   b. List CA adopted water quality objectives, even if only narrative toxicity criteria, located in the Sacramento River and San Joaquin River Water Quality Control Plan.
   c. Recommend a map showing the 303(d) impaired waters and the greatest sources of loads. You will need to extend outside of the Delta for this exercise.
   d. Identify areas using a map that showed aquatic toxicity in urban runoff from pyrethroids and the location of the Sac Regional WWTP outfall that also discharges pyrethroids.
   e. Describe how often are water quality objectives exceeded.
   f. Discuss upcoming Central Valley Basin Plan Amendment and TMDL for Pesticides (including pyrethroids).
2. Water operations – Evaluate loss of assimilation capacity from taking cleaner Sacramento River water out of the system as well as loss of circulation and volume in the southern Delta water ways. It is also important to evaluate specific Delta Conveyance actions, such as dredging, on the exposure of T & E species to pyrethroids.
3. Document that Don Weston has found toxic levels of pyrethroid insecticides in both the American River and in proposed restoration areas of the Yolo Bypass. The source of the pyrethroid insecticides appears to be from wet weather urban runoff.
4. Restoration – Discuss potential for pesticides to be used in mosquito abatement programs over wetlands after restoration takes place.

Section D.5.6 Organochlorine Pesticides

1. Describe the current status of organochlorine water quality problem.
   a. Refer to the updated 2010 303(d) List. It is available at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
   b. List CA adopted water quality objectives, even if only narrative toxicity criteria. You can it in the Sacramento River and San Joaquin River Water Quality Control Plan.
   c. Recommend providing a map showing the 303(d) impaired waters and the greatest sources

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of loads. You will need to extend outside of the Delta for this exercise.

   d. Describe how often and where water quality objectives are exceeded.
   e. Discuss upcoming Central Valley Organochlorine Basin Plan Amendment and TMDL.
2. Typo – organophosphate is incorrectly used (should be organochlorine) in a number of different places in this section.
3. Evaluate the short term effects of increases in organochlorine exposure from flooding Yolo Bypass on juvenile salmon. The mobilization of organochlorines from inundating farmland may have a potential for high impacts on young salmon and other species that we expect to use those inundated habitats. The greater uptake of mercury for salmon in the Yolo Bypass suggests that other, more toxic materials are also likely to be picked up and bioaccumulated readily. Growth dilution may make this less important in the adults that survive to grow several orders of magnitude larger than the fish in the bypass, but the short term effects on the juveniles should be addressed more thoroughly.
4. Water operations – Evaluate loss of assimilation capacity from taking cleaner Sacramento River water out of the system as well as loss of circulation and volume in the southern Delta water ways. It is also important to evaluate specific Delta Conveyance actions, such as dredging, on the exposure of T & E species to organochlorines.

Section D.5.7 Organophosphate Pesticides

1. Describe the current status of organophosphate water quality problem in the Delta.
   a. Refer to the updated 2010 303(d) List. It is available at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
   b. List CA adopted water quality objectives, even if only narrative toxicity criteria. You can it in the Sacramento River and San Joaquin River Water Quality Control Plan.
   c. Recommend providing a map showing the 303(d) impaired waters and the greatest sources of loads. You will need to extend outside of the Delta for this exercise.
   d. Describe how often and where water quality objectives are exceeded.
   e. Discuss upcoming Central Valley Pesticides Basin Plan Amendment and TMDL, organophosphates are addressed in Phase I.
2. Water operations – Evaluate loss of assimilation capacity from taking cleaner Sacramento River water out of the system as well as loss of circulation and volume in the southern Delta water ways.
3. The statement, "Because the organophosphates are distributed throughout the Delta, changes in hydrology and mixing in the Delta due to preliminary proposal water operations should not affect the distribution or mobilization of these chemicals," is not supported by information provided in the document.

Section D.5.8 Endocrine Disruptors

Section D.5.9 Other Urban contaminants

1. Nonnative Aquatic Vegetation Control – need to mention BO's are up for renewal on Weedar,

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Rodeo, R-11. NMFS recently delayed release.

Section D.6.1 Summary of Conclusions

1. This section contains unsupported conclusions that operations and restoration will not negatively impact T & E species by altering availability of and exposure to toxins.
2. Define short-term in number of years or a range of years.
3. Identify which toxins are expected to be flushed out in the short-term.
4. Identify how long each toxin is expected to remain active in the Delta system.
5. Explain how restoration occurring throughout the Delta and over time will minimize the effects of toxins on fish through short-term flushing.
6. The statement 'available data suggest that species exposure and concentration to toxins is relatively low compared to sublethal and lethal amounts" is contradicted in many publications.
   a. Bailey et al., *supra* note 202; Howard Bailey et al., *Joint Acute Toxicity of Diazinon and Chlorpyrifos to Ceriodaphnia dubia*, 16 ENVTL. TOXICOLOGY & CHEMISTRY 2304, 2304-08 (1997);
   b. Michael Lydy & K. R. Austin, *Toxicity Assessment of Pesticide Mixtures Typical of the Sacramento–San Joaquin Delta using Chironomus tentans*, 48 ARCHIVES OF ENVTL. CONTAMINATION & TOXICOLOGY 49, 49–55 (2004).
   c. M. Faust et al., *Additive Effects of Herbicide Combinations on Aquatic Non-Target Organisms*, 134 SCI. OF THE TOTAL ENV'T (Supplement 2) 941, 941-52 (1993).
   d. Teresa Norberg-King et al., *Application of Toxicity Identification Evaluation Procedures to the Ambient Waters of the Colusa Basin Drain, California,* 10 ENVTL. TOXICOLOGY & CHEMISTRY 891, 891-900 (1991).
   e. Debra Denton et al., *Joint Acute Toxicity of Esfenvalerate and Diazinon to Larval Fathead Minnows* (*Pimephales promelas*), 22 ENVTL. TOXICOLOGY & CHEMISTRY 336, 336-41 (2003).
   f. David Ostrach et al., *Maternal Transfer of Xenobiotics and Effects on Larval Striped Bass in the San Francisco Estuary,*105 PROCEEDINGS OF THE NAT'L ACAD. OF SCI. 19354, 19354-59 (2008).
   g. Kathryn Kuivila & G.E. Moon, *Potential Exposure of Larval and Juvenile Delta Smelt to Dissolved Pesticides in the Sacramento-San Joaquin Delta, California,* 39 AM. FISHERIES SOC'Y SYMP. 229, 229-42 (2004).
   h. William Bennett, *Critical Assessment of the Delta Smelt Population in the San Francisco Estuary, California*, 3 SAN FRANCISCO ESTUARY & WATERSHED SCI. 1, 1-70 (2005), *available at* http://repositories.cdlib.org/jmie/sfews/vol3/iss2/art1
   i. And soon to be published in Estuaries and Coasts, "Life Histories, Salinity Zones, and Sublethal Contributions of Contaminants to Pelagic Fish Declines Illustrated with a Case Study of San Francisco Estuary, California, USA."
7. Please provide the data with cited sources that suggest that species exposure and concentration to toxins is relatively low compared to sublethal and lethal amounts.
8. Define long-term in number of years or a range of years.
9. The conclusion that preliminary proposal water operations are expected to have little to no effect on toxic constituents in the ***Delta ecosystem*** (emphasis added) is not supported by information presented in this document. First, this appendix does not evaluate the Delta

ecosystem but it evaluates impacts to T & E species. Second, it does not seem logical that toxins with a documented history of persistence, such as mercury, copper, and organochlorines, will be flushed out in the short-term. These problems have persisted for many decades and may last many more decades due to chemical characteristics and a large supply. Third, it relies on mitigating factors that BDCP does not control (TMDL implementation). Fourth, it assumes that increases in toxins that result from BDCP actions spread out over time and space will reduce the impact of the toxins on fish. And finally these conclusions are not on based robust quantitative or qualitative evaluations.

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