United States Department of the Interior

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U. S. Environmental Protection Agency
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Subject: Water Quality Changes in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, Advanced Notice of Proposed Rulemaking, February 2011

Dear Mr. Marshall:

Thank you for the opportunity to comment on the unabridged Advanced Notice of Proposed Rulemaking, *Water Quality Changes in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (ANPR). The U.S. Fish and Wildlife Service (Service) recognizes the level of effort necessary to gather, review and synthesize Bay-Delta water quality information. Water quality in California, especially in the Bay-Delta, continues to be of high interest to the Service due to its significant influence on the health of California's fish and wildlife resources including federally-listed species. The Service offers these attached comments in response to your ANPR.

Sincerely,

Jennifer Norris
Acting Field Supervisor

Attachment

cc: Maria Rea, National Marine Fisheries Service
Don Glaser, Bureau of Reclamation
John McCamman, Department of California Fish and Game
Theresa Presser, U.S. Geological Survey
Michael Fris, U.S. Fish and Wildlife Service, Region 8, Endangered Species Program
Damian Higgins, U.S. Fish and Wildlife Service, Region 8, Environmental Contaminants

UFWS Comments On
Unabridged Advanced Notice of Proposed Rulemaking for
Water Quality Challenges in the San Francisco Bay/
Sacramento-San Joaquin Delta Estuary
U.S. Environmental Protection Agency
Region 9

General Comments

The Service believes the Environmental Protection Agency (EPA) should not limit the scope of its interests in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta) water quality concerns to just the Bay-Delta proper. What happens in the Sacramento and San Joaquin Valleys directly and indirectly impacts the Bay-Delta. This connectivity should be recognized in any rulemaking.

We appreciate the fact that mercury is identified in the Advanced Notice of Proposed Rulemaking (ANPR) and that it's being addressed through Regional Board TMDLs. It is important to identify the significant conflict that may exist between creating and restoring wetlands and floodplains, and reducing methylmercury production by wetlands.

Many of the questions in the ANPR asked by EPA suggest that a centralized data management system needs to be developed for the Bay-Delta. EPA should work with the Interagency Ecological Program (IEP), San Francisco Estuary Institute (SFEI), Surface Water Ambient Monitoring Program (SWAMP), U.S. Geological Survey (USGS) and other ongoing efforts to create a joint action/data management/dissemination center. This need has surfaced over the years during other efforts but has not yet been met. Such a center would coordinate, manage, and disseminate restoration, monitoring, and research data of all kinds from all relevant sources.

We believe numerous valuable guidance documents already exist that can inform your ANPR effort regarding habitat restoration principles and successes. CALFED Science Program documents provide extensive information on ecological restoration principles in the Bay-Delta and its watershed, and CALFED Ecosystem Restoration Program (ERP)-related documents provide insight into successes and failures of various restoration efforts over the last 15 years. These and other such documents, including agency recovery plans and restoration manuals, and ecosystem and species conceptual models prepared for the Delta Regional Ecosystem Restoration Implementation Plan (DRERIP) effort may be helpful for your future planning.

Specific Responses to EPA Questions

Contaminants (general)

1. Are there contaminants, other than those named above (Ammonia, Selenium, Pesticides, Contaminants of Emerging Concern), causing adverse impacts to aquatic resource designated uses in the Bay Delta Estuary and that should receive more focused review?

EPA should consider mercury in its reviews. Through the TMDL process, the State of California has begun a five-year study focused on developing BMP's to control or reduce methylmercury production. We are hopeful this effort will provide tools to address methylmercury concerns and recommend EPA consider results of this effort as well. We believe it would be a significant achievement to reduce methylmercury production to levels recommended in the Delta TMDL, while simultaneously implementing wetland creation and restoration recommended by the Central Valley Project Improvement Act (CVPIA), CALFED Bay-Delta Program (CALFED), Bay Delta Conservation Program (BDCP), and Delta Vision.

2. How can pollutant-specific water quality criteria effectively address or incorporate interactive effects between multiple contaminants and other physical, chemical, and biological stressors?

One of the objectives of FIFRA is to ensure pesticides "*will not cause unreasonable harm to the environment*", thus allowing some harm to occur. During registration, the EPA evaluates each pesticide individually. While a single pesticide may not cause unreasonable harm, mixtures of multiple pesticides, on purpose or in the environment after use, can cause unreasonable harm. Accordingly, we believe it's important for EPA to consult under the ESA with the U.S. Fish and Wildlife Service and National Marine Fisheries Service (NMFS) on pesticide registration. While consultations are under way for some pesticides and listed species in California (salmonids and the California red-legged frog), consultations on many other pesticides and species have not begun.

The potential combinations of registered pesticides and chemicals, the exposure potential and ultimate toxicities are clearly too large to effectively address. We believe the best way to resolve this concern is through efforts to keep pollutants from entering sensitive environments entirely. We recommend EPA evaluate its registration process, education efforts, regulatory avenues and best management practices to determine which would effectively reduce or eliminate non-target pesticide toxicity.

3. What methods can be used in developing and implementing TMDLs to effectively address or incorporate interactive effects between multiple contaminants and other physical, chemical, and biological stressors on individual water bodies or for water bodies within a watershed?

The most effective way to reduce the effects of multiple contaminants is to minimize the overall levels of pollutants that enter the environment/water in the first place. To improve compliance, implementation of current regulations should be accompanied by incentives from many State and Federal agencies and programs such as:

- Increased implementation of best agricultural management practices to reduce pesticide drift and runoff in key areas of the Bay-Delta by focusing and expanding efforts of current programs;
- Focused easements and land acquisition programs on key areas of the Bay-Delta to implement best management practices and habitat restoration;

- Developed or increased implementation of education and incentive programs for urban pesticide use, water conservation, and stormwater runoff control and treatment (e.g. Urban Pesticide Pollution Prevention Project (UP3 Project) www.UP3Project.org);

- Increased education and implementation of mosquito prevention measures and the use of more effective larval controls rather than adulticide fogging/spraying;

- Partnering with NRCS and others to focus existing education and incentive programs onto key areas of the Bay-Delta; and
- Encouraging actions to increase or focus current or new incentive programs that will reduce pesticide drift and runoff.

An individual action such as runoff control can address multiple pollutants. We believe these actions will expand many useful programs already in place in the Bay-Delta and its watershed. Implementing actions through existing programs should take less time and require little reprogramming of funds by the various agencies. Impacted parties would be more receptive to incentive programs than new regulations or stricter enforcement. Many actions have already been vetted via the CVPIA and CALFED programs.

4. What information exists about how climate change impacts will effect contaminant pollution (generally or for individual contaminants)?

The Service's Regional Environmental Contaminants Coordinator in Alaska recently summarized potential impacts that global climate change will have on contaminants (May be found at http://alaska.fws.gov/climate/lecture.htm, scroll to the bottom). Although focused on issues related to climate change in the Arctic, many of the impacts are relevant to the lower 48 states and California. These potential impacts are:

- Temperature increases. At warmer temperatures chemicals can more easily move from soil into the air leading to increased transport of pollutants. Warmer temperatures would result in increased metabolism which can lead to increased uptake of contaminants. These temperatures would cause changes to primary production leading to increased contaminant uptake or new exposure pathways for some contaminants. Increased temperatures would result in increased toxicity of some contaminants and decrease in others. It's also known that contaminants can lower temperature tolerance of organisms.

- Increased storm energy or frequency. Global climate change predictions include increased erosion, release of stored contaminants, and loss of protective shoreline leading to erosion of landfills, caps, dredge spoils, contaminated soils, pipeline crossings, sewage lagoons, etc. Climate change predictions include increased floodplain methylmercury production and changes in contaminant deposition rates.

- Increased potential for fires. Increased fires related to global climate change would increase mercury mobilization.

- Global climate change induced change in diet. As ecosystems change related to global climate change, species diets will also change with an associated change in contaminant uptake.

- Increase in invasive species. As ecosystems change related to global climate change, invasive species populations will also change possibly resulting in increased pesticide use or change in use patterns.

Ammonia

1. What, if any, information is available on the sources or impacts of total ammonia nitrogen in the Bay Delta Estuary that is not reflected or cited above?

Please refer to ongoing research being conducted by Dr. Richard Dugdale and colleagues at San Francisco State University on the effects of ammonia on diatom blooms in Suisun Bay. This effort, in addition to an isotope tracking study by Dr. Carol Kendall (USGS), appears to be the total of current research being conducted directly on the effects of ammonia in the Bay-Delta.

2. Is there any information available that suggests site-specific water quality standards for total ammonia nitrogen in the Bay Delta Estuary may be more effective than current standards due to unique hydrological, chemical, biological, or physical conditions?

It should be noted that the proposed EPA national ammonia criteria are based upon direct toxicity to sensitive species like mussels and that the effects of ammonia in the Estuary being discussed are not necessarily from direct toxicity but impacts associated with phytoplankton uptake inhibition. Although the full effects of uptake inhibition to higher trophic levels in Suisun Bay are not quantified, the reduction in primary productivity in a productivity-limited system is concerning. Thus it would seem that a site-specific objective, based upon the effects ammonia has in the Estuary, may be more appropriate and should be investigated.

3. What information is needed to determine effective site-specific water quality standards for total ammonia nitrogen, including narrative or numeric criteria?

Dr. Dugdale's work (identified in response to question 1) suggests spring phytoplankton blooms are prevented at 4 μM/L and inhibition may begin as early as 1 μM/L. Laboratory and in situ experiments are needed to evaluate and establish necessary protective numeric criteria. Reductions in ammonia from the Sacramento Regional Wastewater Treatment facility are not expected to be realized until 2020. In the interim, narrative criteria should be determined to maintain beneficial uses.

In addition to the evaluation of ammonia criteria, nutrient criteria also need to be evaluated for the Bay-Delta. In 2007, EPA published "*Technical Approach to Develop Nutrient Numeric Endpoints for California Estuaries.*" EPA should work with the California Central Valley Regional Water Quality Control Board to develop numeric endpoints for nitrogen, phosphorus and N:P ratios in the Bay-Delta.

4. What information is available on nonpoint sources of total ammonia nitrogen and how they may most effectively and efficiently be controlled?

Runoff from agricultural fertilizer application and animal waste are potential sources of ammonia in the Bay-Delta. The Service is not aware of any efforts to quantify these sources or identify ways to reduce their presence in runoff in the Central Valley.

Selenium

1. What, if any, additional information is available to better characterize selenium sources, loadings and impacts within the watershed of the Bay Delta Estuary?

We recommend efforts to improve the selenium mass balance for Sacramento/San Joaquin Rivers to improve model inputs and assessments.

2. What data, studies, and analytical techniques (for example, models) could be used to improve our understanding of the physical processes, including surface-groundwater interactions, controlling selenium mobilization and transport to and within the Bay Delta Estuary?

The Luoma and Presser selenium model being used by the EPA for developing site-specific criteria for the Estuary is of high quality and is flexible enough to be used in freshwater systems inland.

3. What data are needed to track selenium impacts in the Bay Delta ecosystem as currently configured, and to evaluate potential impacts of selenium under changed flow and transport conditions into and within the Delta?

We recommend maintaining and expanding current USGS monitoring of benthic invertebrates in the Estuary. We also recommend tissue from juvenile salmonids be sampled in areas of the San Joaquin River at greatest risk to selenium exposure to assess the level of risk posed by selenium to salmonid species. Habitat use by juvenile salmonids in the San Joaquin River should also be monitored where risks are the greatest for selenium exposure to assess the level of risk posed by selenium to salmonid species. We also recommend the collection of particulate selenium concentrations and other data to improve mass balance calculations that will be useful for the Luoma and Presser selenium model.

4. Are there additional selenium control methods or programs that should be considered for reducing selenium inputs and impacts?

The Service provided comments on the San Joaquin River Selenium Basin Plan Amendment focused on reducing selenium impacts. These can be found on the State Water Resource Control Board (SWRCB) website. (http://www.swrcb.ca.gov/water_issues/programs/tmdl/docs/sjr_selenium/comments092210/susan_moore.pdf). Key recommendations are:

- Complete an assessment of the effects of continued selenium inputs into the San Joaquin River on existing and future runs of anadromous fish, and develop remedies for any impairments in order to achieve water quality objectives which protect beneficial uses in the San Joaquin River including the reach upstream of the Merced River. Consideration should be given to ensuring adequate water quality to protect reintroduced salmon runs starting at the end of 2012;

- Include lands north of the Grassland Bypass Project's Drainage Area into the Project that continue to discharge directly into the south Grasslands wetland supply channels;

- Eliminate discharges into the Delta Mendota Canal from the drainage sumps in the Firebaugh Canal Water District owned by the U.S. Bureau of Reclamation;

- Evaluate alternative routes of disposal and/or storage of excess drainage flows that occur during heavy rainfall events and that have historically been discharged into the Grassland wetland water supply channels.

Pesticides

1. What, if any, additional scientific information is available on (a) the effects of pesticides in stormwater discharges, or (b) the potential interactive effects of combinations of pesticides on aquatic resources in the Bay Delta Estuary?

The recent biological opinions from NMFS on pesticides provide the most detailed, high quality, and up-to-date assessment of pesticide risks to salmonids.
(See http://www.nmfs.noaa.gov/pr/consultation/pesticides.htm)

2. What, if any, actions should EPA take under its authority to improve the effectiveness of regulating pesticide contamination of the Bay Delta Estuary watershed?

We recommend that EPA implement and enforce the NMFS biological opinions on pesticides, work with others to provide incentives for pesticide users to reduce pesticide use, control drift and runoff, and encourage safer pesticide alternatives.

3. How can the process for establishing numeric water quality criteria be streamlined while maintaining technical integrity?

It would be better not to focus on criteria but rather implement and provide incentives for reducing pesticide use, runoff and drift. Keeping pollutants from entering the environment/water in the first place may be more cost-efficient and effective than treating or removing them afterwards. See response to general contaminants question #2 above.

4. What are the benefits and constraints of using fish tissue in place of, or in addition to, water column concentrations when establishing water quality criteria for pesticides?

This question is less relevant for modern pesticides which do not tend to accumulate in fish tissues. See response to pesticides question #3 above.

5. Are there testing protocols that would effectively and efficiently identify synergistic toxic effects in the Bay Delta Estuary?

See response to pesticides question #3 above.

6. What, if any, specific combinations of contaminants are of particular concern in the Bay Delta Estuary?

See response to pesticides question #3 above.

7. Should EPA and our state partners move away from evaluating isolated aquatic species for one or two pollutants, and towards evaluations of water conditions more representative of the actual aquatic conditions in the Bay Delta Estuary? How might this be done?

See response to pesticides question #3 above.

8. What new or revised effluent limitations, monitoring requirements or other permit requirements could be included in NPDES permits for discharges of pesticides from MS4s in the Bay Delta Estuary in order to better meet the regulatory standard of reducing discharges to the maximum extent practicable? What information is necessary to determine permit requirements, such as identifying effluent limits that can effectively reduce ambient contaminant concentrations and restore designated uses? Please provide any available information on water quality benefits that may result from such requirements.

See response to pesticides question #3 above.

9. What new or revised effluent limitations, monitoring requirements or other permit requirements could be included in NPDES permits for stormwater discharges associated with construction activity and/or stormwater discharges associated with industrial activity to address pesticides? What information is necessary to determine permit requirements, such as identifying effluent limits that can effectively reduce ambient contaminant concentrations and restore designated uses? Please provide any available information on water quality benefits that may result from such requirements.

See response to pesticides question #3 above.

10. Should EPA use its residual designation authority at 40 C.F.R. 122.35 to designate currently unregulated small MS4s to ensure that municipalities have programs in place to control the discharge of pesticides in stormwater to the maximum extent practicable? What information is necessary to determine permit requirements, such as identifying effluent limits that can effectively reduce ambient contaminant concentrations and restore designated uses? Please provide any available information on water quality benefits that may result from such requirements.

The Bay Delta Fish and Wildlife Office has no information to provide on this question at this time.

11. Should EPA use its residual designation authority at 40 C.F.R. 122.26(a)(9)(i)(C)-(D) to designate currently unregulated stormwater discharges that contribute pesticides to surface waters? What information is necessary to determine permit requirements, such as identifying effluent limits that can effectively reduce ambient contaminant concentrations and restore designated uses? Please provide any available information on water quality benefits that may result from such requirements.

The Bay Delta Fish and Wildlife Office has no information to provide on this question at this time.

Contaminants of Emerging Concern

1. What, if any, additional information is available regarding the effects of CECs on aquatic resources in the Bay Delta Estuary?

The following resource offers information relevant to this question. See the workshop report "*Managing Contaminants of Emerging Concern in California: Developing Processes for Prioritizing, Monitoring, and Determining Thresholds of Concern*," September 2009 at the SFEI website. (http://www.sfei.org/sites/default/files/CA%20CEC%20Workshop%20Final%20Report%20Sept%202009.pdf). See also the SFEI web site on CECs at http://www.sfei.org/projects/3678.
Contact: Susan Klosterhaus at the San Francisco Estuary Institute (www.sfei.org).

2. What, if any, specific information exists to identify the sources and nature of discharges of CECs into the Bay Delta Estuary?

The Bay Delta Fish and Wildlife Office has no information to provide on this question at this time.

3. What, if any, monitoring mechanisms or methodologies are available to assist in identifying CECs?

The Bay Delta Fish and Wildlife Office has no information to provide on this question at this time.

4. What, if any, methods are most effective to minimize introduction of CECs into the Bay Delta Estuary?

The Bay Delta Fish and Wildlife Office has no information to provide on this question at this time.

Estuarine Habitat

1. What information is available on the effect of lower salinities in the western Delta on undesirable species such as Microcystis, overbite clams, or jellyfish? What, if any, information is available to determine if an increase in low salinity habitat would affect the fate, concentration and distribution of nutrients and toxics that are potentially negatively affecting the estuarine food web?

See literature by Lehman et al. for recent ecology of *Microcystis* in the Estuary. Low salinity habitat is related to Delta outflow, and higher outflows have at least a dilution effect on various pollutants. Food web effects are speculative, except for distribution. See Kimmerer's 2004 paper for an overview of freshwater influence on a wide array of Estuary ecological processes.

2. Could the frequency, area, and/or duration of low salinity habitat be changed so as to achieve ecosystem benefits for the suite of species that use the low salinity zone? If so, how? Is historical data on inter- or intra- annual frequency of variability the best basis for setting goals or are there other bases that could be used? How might climate change impacts, including sea level rise, affect the size, frequency, and duration of low salinity habitat?

Freshwater habitat can be increased in the Estuary by increasing outflows. Better understanding the benefits/causes of increased habitat quantity and quality is currently the focus of much research in the Estuary.

Climate change effects have been looked at conceptually by the CASCaDE Program (CALFED/USGS/ERP funded research). Most change scenarios imply the future will have less overall water (more water for shorter duration earlier in the year) and warmer water temperatures over time. Less water and warmer temperatures will probably result in a more lentic Delta ecology rather than one with more water and cooler temperatures which would result in a more lotic Delta ecology.

3. Are methods available for more systematically addressing ecological or biological connections between springtime X2 and subsequent fall X2 conditions? If so, what are they and what are their strengths and weaknesses?

Yes, but the connections don't appear to be direct, may not be constant, and may depend upon other factors. The U.S. Bureau of Reclamation is outlining an Adaptive Management Program to look at this and other mechanisms as required by an RPA (Component #3) contained within the Endangered Species

Act consultation on the *Proposed Coordinated Operations of the Central Valley Project (CVP) and State Water Project (SWP)* (USFWS 2008). This program is expected to be initiated in 2011. EPA's participation in this Program would be welcomed.

4. Would changes in water system operations to move X2 seaward in the fall adversely affect the reservoir storage needed to conserve salmonid fish spawning and other designated uses in the watershed? If so, under what conditions?

There is a likely cost when stored water reserves are used elsewhere in the system. The Department of Water Resources (DWR), and USBR have the required modeling tools to answer this question fairly accurately. A range of water year types can be examined using CALSIM II, and several available water temperature models can evaluate potential temperature effects to the Sacramento River.

5. What information is available on the effects of salinity management on terrestrial plant communities and/or tidal marsh endemic species? What indirect effect does this have on aquatic communities?

There is a substantial amount of literature on distributions of plant species versus soil or surface water salinity. Community movement and prediction of plant performance over time, while not definitive, is reasonably knowable (Culberson et al. 2004). Direct measures of what this does for/to aquatic communities will be hard to come by, but conceptual models are available. DRERIP models and CALFED ERP documents may provide useful information and clarify relationships.

6. Does the geographic location of low-salinity habitat have an effect on the quality of the habitat or its availability to species of concern? If so, what is the nature and extent of such effect? Is the distribution pattern of low salinity habitat important in determining its quality?

This is an important question and research is currently being conducted (e.g., IEP 2011 Work Plan) to determine the effect geographic location of the low-salinity zone has on habitat quality (for more information see Feyrer 2011). See responses to questions 2-4 above.

7. Are spring/neap differences in tidal water quality important for aquatic species? If so, how should these habitat characteristics be evaluated?

These differences may be discernable at the landscape level (Enright et al. in prep.), but showing what the links are to aquatic species performance will be unlikely for some time.

8. How can performance measures for species population and/or habitat condition be used to evaluate restoration of Bay Delta Estuary water quality?

To be properly evaluated, we recommend that such measures be contextualized given the large number of other environmental/anthropogenic factors affecting water quality.

Wetlands

1. What different approaches under the Clean Water Act Section 404 program should EPA consider, in consultation with the U.S. Army Corps of Engineers, to improve the protection of aquatic resource functions in the Bay Delta Estuary?

Preference should be given to establishment of lost ecological functions due to wetlands destruction and degradation, and priority should be given to approaches that re-establish these functions within the

Estuary, to the extent practicable. A systems/functional approach should be given preference to a strictly species-based approach.

2. What information exists that describes the relationship between the quantity and quality of wetlands and Bay Delta Estuary water quality and fish populations?

Very little information is available on the relation between these variables. It is known from other estuaries and in concept. There is information that suggests that the floodplain function of the Yolo Bypass is beneficial to out-migrating salmonid growth (DWR/IEP and other references). Areas with concentrations of wetlands within the Estuary (Suisun Marsh, for example) have consistently shown to have relatively higher populations of native fishes associated with them (University of California-Davis reports, Schroeter and Moyle 2002, Matern et al 2002).

3. In light of projected impacts of climate change (including sea level rise and its effects on levee stability), what specific activities can EPA undertake to improve long-term protection of existing and future wetlands, especially those resources on subsided islands?

Tidal wetlands with good internal integrity and adjacent upland areas should allow wetland adaptation and movement with sea level change. Protecting hydrobiogeomorphic integrity and processes are critical to the continuing evolution and existence of tidal marshes within the Estuary. Subsided lands will need restoration efforts to accumulate sediments or organic matter prior to full-return to tidal influence before they can provide tidal marsh functions. Protection of buffer lands is critical to the future of tidal marsh habitat.

Fish Migration Corridors

1. What role, if any, do gradients in physical and chemical constituents of water play in the suitability of the Bay Delta Estuary and San Joaquin River Basin migratory corridor for salmon?

These gradients are of foremost consideration and are likely what enable an individual fish to navigate successfully to and from the ocean and spawning grounds, and sense essential habitats. Disruption of these gradients or homogenization of their historical patterns is hypothesized to be a contributor to the imperilment of Central Valley salmonids.

2. What are the best measures of success for restoration of a migratory corridor? Could these measures be incorporated into new or revised biological criteria protecting the fish migration designated use?

The best measures of success for restoration of a migratory corridor are the reduction of mortality within and between reaches along the entire migratory length of Central Valley streams and rivers and the improvement of fish condition, on average, over time, of migrating salmonids. These measures could be used in the derivation of biological criteria to protect the fish migration designated use.

3. Should temporal characteristics be included in the definition of the physical and/or chemical properties of a migration corridor based on a reference condition? If so, how? What frequency and duration of such a corridor is required for salmonids? How might these characteristics change with the impacts of climate change?

The Bay Delta Fish and Wildlife Office has no information to provide on this question at this time.

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