



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

75 Hawthorne Street
San Francisco, CA 94105-3901

FEB 23 2017

Via email (commentletters@waterboards.ca.gov)

Jeanine Townsend, Clerk
State Water Resources Control Board
PO Box 100
Sacramento, CA 98512-2000

Subject: Bay-Delta Water Quality Control Plan; Phase 2

Dear Ms. Townsend,

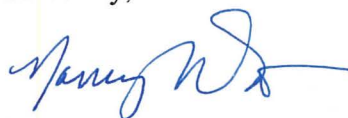
The U.S. Environmental Protection Agency (EPA) appreciates the opportunity to review and comment on the State Water Resources Control Board's (State Water Board's) *Working Draft Scientific Basis Report for New and Revised Flow Requirements on the Sacramento River and Tributaries, Eastside Tributaries to the Delta, Delta Outflow, and Interior Delta Operations* (Scientific Basis Report). The Scientific Basis Report is the foundational document supporting modifications to water quality standards in the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta WQCP) to improve conditions for aquatic life and wildlife designated uses.¹ EPA's review of the Scientific Basis Report reflects our role as the State Water Board's partner and the federal agency accountable for protecting all designated uses of water in the San Francisco Estuary watershed (San Francisco Bay, Sacramento-San Joaquin Delta, and tributaries) pursuant to the Clean Water Act.

The State Water Board is updating water quality standards, including flow criteria, to reverse population declines of commercial, recreational, and forage fisheries and broadly improve conditions for aquatic resources. In 2010, the State Water Board determined that water quality criteria in the Bay-Delta WQCP were not sufficiently protecting fish and wildlife designated uses. This conclusion was based on best available science that identified flow modification as one of the primary stressors contributing to sharply declining fish populations.² Flow modification continues to impair fish population recovery as the abundance of resident and migratory fishes has remained at historically low levels for more than 15 years.³ A significant amount of scientific information and monitoring data suggest that aquatic life designated uses are not protected by existing water quality standards in the Bay-Delta WQCP.⁴ New and modified flow criteria are part of a comprehensive effort to address multiple stressors that contribute to poor aquatic ecosystem conditions and fish population declines.⁵ State and federal partner agencies and non-governmental organizations are considering non-flow actions that decrease the loading of contaminants into waterways and restore floodplains, wetland, and riparian habitat.⁶ It is appropriate and

necessary for the State Water Board to use its unique authorities to adopt flow criteria and fulfill its role in the broader effort to improve conditions for aquatic resources.

EPA commends the State Water Board for developing and releasing the Working Draft Scientific Basis Report. We submit the attached comments and recommendations for your consideration as the draft report is updated, strengthened, and prepared for external peer review. Completing the Final Scientific Basis Report with the best available scientific knowledge will provide a robust foundation to support modifications to the Bay-Delta WQCP.⁷ If you have any questions, please contact me at 415-972-3409 or have staff refer to Erin Foresman at 916-930-3722.

Sincerely,



2-23-2017

Nancy Woo
Assistant Director, Water Division

References

- ¹ The Federal Clean Water Act uses the terms “[designated uses](#)” and “criteria” as the component parts of a “water quality standard” whereas California’s Porter-Cologne Water Quality Control Act uses the terms “[beneficial uses](#)” and “objectives” for the same purposes. This letter and comment table will generally use the federal nomenclature.
- ² State Water Resources Control Board. 2010. Development of flow criteria for the Sacramento-San Joaquin Delta Ecosystem. Resolution No. 2010-0039. “The best available science suggests that current flows are insufficient to protect public trust resources.” Page 2; “The public trust resources that are the subject of this proceeding include those resources affected by flow, namely, native and valued resident and migratory aquatic species, habitats, and ecosystem processes.” Page 10.
http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf;
- ³ [Interagency Ecological Program Newsletter \(2015\) Volume 28, Number 2](#).
- ⁴ National Academy of Sciences Natural Resource Council Committee on Sustainable Water Management in California’s Bay-Delta (2012) Report: Sustainable Water and Environmental Management in California’s Bay-Delta “...sufficient reductions in outflow due to diversions would tend to reduce the abundance of these organisms [“these organisms” = 8 Bay Delta aquatic species at various trophic levels].” Page 60 and “Thus, it appears that if the goal is to sustain an ecosystem that resembles the one that appeared to be functional up to the 1986-93 drought, exports of all types will necessarily need to be limited in dry years, to some fraction of unimpaired flows that remains to be determined.” Page 105
USFWS April 25, 2012 Comment Letter to State Water Board for Phase 2 Workshop. “Fish populations will not be viable if inflow to the Delta and outflow to the Bay are not sufficient to support successful spawning, larval and juvenile transport, rearing, and adult migration.” http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/comments_042512/amy_aufdemberge.pdf;
NMFS April 25, 2012 Comment Letter to State Water Board for Phase 2 Workshop. “Changes in Delta flows have caused changes in the physical habitat components of the system, which has contributed to the decline of the Delta ecosystem
www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/comments_042512/maria_rea.pdf; California Department of Fish and Wildlife (2010) Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta. Available at <http://deltacouncil.ca.gov/docs/delta-isb/final-quantifiable-biological-objectives-and-flow-criteria-aquatic-and-terrestrial>. See quote in Executive Summary “...current Delta water flows for environmental resources are not adequate to maintain, recover, or restore the functions and processes that support native Delta fish.”
- ⁵ For example, the Delta Stewardship Council outlined a multidimensional approach to protecting and restoring a vibrant and healthy Delta ecosystem that includes adoption of flow criteria, large-scale aquatic habitat restoration, improvements to water quality, hatchery operations, and invasive species controls, see The Delta Plan (2013), Executive Summary, available at http://deltacouncil.ca.gov/sites/default/files/documents/files/Delta_Plan_Executive_Summary_2013.pdf
- ⁶ Some examples include: US Fish and Wildlife Service Anadromous Fish Restoration Program https://www.fws.gov/lodi/anadromous_fish_restoration/afrp_index.htm; California EcoRestore <http://resources.ca.gov/ecorestore/>; EPA TMDL Progress Reports <https://www.epa.gov/sfbay-delta/accelerate-water-quality-improvement>;
- ⁷ A substantial amount of scientific information and knowledge about the aquatic ecosystem and hydrology in the San Francisco Estuary watershed is available to support modifications to the Bay-Delta WQCP. See, Cloern, J.E., and A.D. Jassby. 2002. Drivers of Change in Estuarine-Coastal Ecosystems: Discoveries from Four Decades of Study in San Francisco Bay. Reviews of Geophysics, Vol. 50. RG4001 (October 24, 2012), at p.2. Available at <http://www.agu.org/pubs/crossref/2012/2012RG000397.shtml>.; EPA letter to State Water Board December 11, 2012, pages 4-5, and State Water Resources Control Board (2016) Working Draft Scientific Basis Report for New and Revised Flow Requirements on the Sacramento River and Tributaries, Eastside Tributaries to the Delta, Delta Outflow and Interior Delta Operations, page 1-7

Attached Comments on the Scientific Basis Report

Section	Page	Comment
General	General	EPA's previous comments on Phase 1, Phase 2, and the 2009 Periodic Review are incorporated by reference to the extent that they remain applicable. ¹
3.11	General	Expand scientific information about flow and the lower foodweb. The relationship between flow and the food web should be more comprehensively summarized in the report. Section 3.11 addresses only zooplankton. Expand the summary of available science describing the relationship between freshwater flow and the size, composition, and distribution of the lower foodweb (i.e., zooplankton and phytoplankton communities) in the marine, estuarine, and freshwater portions of the system. Scientific knowledge about the relationship between primary and secondary production are relevant to flow criteria. The San Francisco Estuary Institute recently completed a report titled: <i>Primary Production in the Sacramento-San Joaquin Delta</i> which includes information on primary producer groups, transport, and use of primary production by consumers. It is available here: http://www.sfei.org/sites/default/files/biblio_files/Primary%20Production%20in%20the%20Sacramento-San%20Joaquin%20Delta%206-1-2016.pdf
4.6 & 5	4-16 to 4-17 General	Incorporate predicted changes in precipitation, snowpack, and salinity gradient into analysis of potential objectives in Chapter 5. The anticipated temperature and hydrology changes described in section 4.6 amplify the challenge of restoring and maintaining commercial, recreational, and forage fisheries in the San Francisco Estuary watershed. Incorporate the changes summarized in 4.6 into potential flow criteria and adaptive management options in Chapter 5. This is likely to require adaptation strategies for managing the predicted decrease in controllable water supply for ecosystem and consumptive uses. Adjusting to anticipated temperature and hydrology changes is an important element of adaptive management strategies and underscores the need for robust triennial reviews that assess criteria efficacy.
5	General	Apply the “Framework for Quantifying Flow Targets to Protect Aquatic Life” (section 6 of the Final EPA-USGS Technical Report: Protecting Aquatic life from Effects of Hydrologic Alteration) ² to transparently derive modifications to water quality criteria in the Bay-Delta WQCP. A substantial amount of the work required by the Framework has already been accomplished in the Working Draft Scientific Basis Report. Applying this framework will assist in explicitly connecting the chosen flow criteria indicator (percent of unimpaired flow) with measurable aquatic conditions and explicitly stating the scientific and management reasons for choosing a specific flow value or range.
5.1.1	5-3	Provide scientific and/or policy support for using percent of unimpaired flow as the unit of measure for flow criteria. This can be achieved by describing the relationship between unimpaired flow to

Section	Page	Comment
		measurable habitat elements such as salinity, temperature, nutrient loads, food web and/or estuarine hydrodynamics. A description of the management and policy reasons for choosing percent unimpaired flow will help validate this specific metric for the flow objective.
5.1.1	5-4	Expand the inflow and outflow range evaluated to include values greater than 75% of unimpaired flow. It is important to have estimates of the benefits and costs of flows greater than the <u>minimum</u> recommended outflow value for halting declines and rebuilding resident and migratory fish populations identified in the State Water Board's 2010 Flow Criteria Report. ³
5.3.3.1	5-15	Include increased flows from the Phase 1 update on the San Joaquin River into evaluations of potential new flow objectives in Phase 2 to determine if the flows can provide a contiguous migratory corridor from the lower San Joaquin River to the western estuary and Pacific Ocean.
5.3		Include a discussion of the precision of the Net Delta Outflow Index (NDOI) as a compliance tool as well as the potential for improvements in the process of updating the Delta outflow objective. It is widely understood that NDOI is not a reliable predictor of outflow when fresh water flows are low. ⁴
5.3.4	5-28	Provide year-round aquatic life protection in updates to the Delta outflow objective. Flow targets that increase protection for aquatic life should be established for all months of the year. We concur with the conclusion that greater quantities of Delta outflow are needed during the winter and spring to support estuarine processes. However, it does not appear that a year-round narrative or numeric standard is being proposed for Delta outflow. The seasonal approach started in 1995 does not appear to have protected the aquatic life beneficial use, specifically, resident and migratory fish. Fall and summer months have a substantially weaker commitment in the report. The seasonal approach has resulted in unanticipated adverse consequences for populations of resident and migratory fish in the estuary and surrounding watershed. ⁵
5.3.4	5-28	Provide more clarity regarding how the existing Delta Outflow objective may be modified or integrated with percent of unimpaired flow. It is not clear how these different metrics overlap or intersect.
5.3.4.4	5-30	Consider changes to the monitoring network as the State Water Board considers updating and implementing the Delta outflow objective and other standards. Technological advances in monitoring equipment have occurred since the Delta outflow objective was first implemented in the 1990s; however, the monitoring network has not changed substantially in more than twenty years. Modern instruments and higher spatial resolution can greatly increase the precision and utility of monitoring data for determining compliance with standards, advancing forecasting tools, and evaluating the effectiveness of water quality standards in protecting aquatic life and water deliveries. Please consider information in the report,

Section	Page	Comment
		<i>Advancement of Salinity and Flow Monitoring in the San Francisco Bay Delta</i> , ⁶ which evaluates improvements to the monitoring network (and enclosed).
5.2, 5.3, 5.4, 5.5,	General	Any new or modified narrative and numeric objectives should apply year-round.
5.2, 5.3, 5.4, 5.5,	General	Any new or modified numeric objective should define how percent of unimpaired flow (UF) will be measured and calculated. The objective should identify an equation (or equations) and assumed coefficients used to calculate percent UF, measured flow data needed as inputs for the UF equation, and locations of measurements.
5.2, 5.3, 5.4, 5.5,	General	Include biological goals in the objective as decision rules for shifting within the flow range. Flow criteria or objectives should be linked to biological goals and assessment endpoints to clearly identify the desired condition of biological resources relevant to the established flows.
5.2, 5.3, 5.4, 5.5,	General	Identify management strategies, including optimization evaluations, for shaping flows to mimic storm and snow melt events that correspond to unimpaired hydrograph patterns. These strategies identify functional flows that can be achieved with the block of water identified by the percent of unimpaired flow indicator.
5.2, 5.3, 5.4, 5.5,	General	Initiate a Monitoring, Assessment, and Science Program. Include a section describing a strategy for transforming the existing San Francisco Estuary monitoring structure and disaggregated network of requirements to an Integrated Monitoring, Assessment, and Science Program. The proposal for new and modified flow criteria depends heavily on real-time monitoring and assessment of water quality, hydrology and aquatic biology data. As part of its update to the Bay-Delta WQCP, the State Water Board should work with agency partners such as Interagency Ecological Program, the Delta Regional Monitoring Program and others, to implement a monitoring and assessment framework that integrates aquatic resource monitoring requirements in federal and state natural resource laws, incorporates necessary monitoring improvements, and identifies assessment targets and a long-term funding structure. These actions are critical to successful adaptive management and effectiveness of new and modified flow criteria.
5.4	General	Identify reservoir storage targets for cold water to achieve predicted benefits.
5.5.3 5.5.4	5-39 to 5-40	Distinguish between avoiding jeopardizing the continued existence of an endangered and/or threatened species and fully protecting aquatic life beneficial use. The Delta Cross Channel gate closure requirements and Old and Middle River Flow limitations rely on science summarized in Biological Opinions that regulate the operation of the Central Valley Project and State Water Project (OCAP BOs). The Clean Water Act goal is an ecosystem goal that integrates multiple species management and includes

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		the concept of self-sustaining, viable, populations that are maintained at levels higher than those that minimally avoid jeopardizing the continued existence of a species.
5.2, 5.3, and 5.4	General	Establish a migration corridor for salmonids downstream of inflow points using Interior Delta flow, inflow, and outflow requirements. The ability of salmonids to migrate through the Delta to the ocean and then return to spawn is essential to achieving sustainable populations. This is perhaps most amplified in the southern Delta. Most of the freshwater from the San Joaquin River is diverted in upstream tributaries or as it enters the Delta, which creates a condition whereby almost 40 kilometers of San Joaquin River channels contain water primarily from the Sacramento River; this disrupts salmon navigation signals and interrupts a continuous migratory corridor connecting the San Joaquin River to the Pacific Ocean. This discontinuity between Vernalis on the San Joaquin River and the Pacific Ocean adversely affects migratory success for salmon and steelhead due to the mixing of physical and chemical cues. Interior Delta flows need to ensure a migratory corridor downstream of the lower San Joaquin River, the eastside tributaries, and the Sacramento River connecting the Delta to the San Francisco Bay and Pacific Ocean.

¹ EPA comments on the WQCP update can be found here: <https://www.epa.gov/sfbay-delta/strengthen-estuarine-water-quality-standards>

² Final EPA-USGS Technical Report: Protecting Aquatic life from Effects of Hydrologic Alteration, <https://www.epa.gov/wqc/final-epausgs-technical-report-protecting-aquatic-life-effects-hydrologic-alteration-documents>

³ California State Water Resources Control Board (2010) Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem available at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/final_rpt.shtml

⁴ Department of Water Resources (DWR). 2016. On estimating Net Delta outflow (NDO). March.

http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/ndo_report_march2016.pdf; Reed D. et al. 2014. Panel Summary Report on the State Water Resources Control Board's Workshop on Delta outflows and Related Stressors, on the Internet at: <http://deltacouncil.ca.gov/sites/default/files/documents/files/Delta-Outflows-Report-Final-2014-05-05.pdf>.

⁵ United States Environmental Protection Agency (2012) Water Quality Challenges in the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary: EPA's Action Plan available at <https://www.epa.gov/sfbay-delta/bay-delta-action-plan>. Page 11 "In about 2000, however, many critical pelagic species suffered an unexpected and dramatic decline (the "pelagic organism decline" or "POD"). This time period coincided with increases in fall pumping in the south Delta. Since then, during fall (except 2011), the low salinity zone has been consistently in the western Delta where poor quality estuarine habitat is compressed into modified, inhospitable river channels. Consequently, no matter how favorable conditions might be for pelagic fishes during the winter and spring, they have been forced into unfavorable habitat during the fall. The POD prompted wide-ranging scientific investigations;" and Baxter, R., R. Breuer, L. Brown, L. Conrad, F. Feyrer, S. Fong, K. Gehrts, L. Grimaldo, B. Herbold, P. Hrodey, A. Mueller-Solger, T. Sommer, and K. Souza. Interagency Ecological Program 2010 Pelagic Organism Decline Work Plan and Synthesis of Results, available at <http://www.water.ca.gov/iep/docs/FinalPOD2010Workplan12610.pdf>

⁶ <https://www.epa.gov/sfbay-delta/technical-support-and-regulatory-assistance>