UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

California State Water Resources Control Board
Submitted via Email: Bay-Delta@waterboards.ca.gov

Re: Comment Letter – Draft Scientific Basis Report Supplement

Dear State Water Resources Control Board:

The U.S. Environmental Protection Agency (EPA) appreciates the opportunity to review the *Draft Scientific Basis Report Supplement in Support of Proposed Voluntary Agreements for the Sacramento River, Delta, and Tributaries Update to the Bay-Delta Water Quality Control Plan* (Draft Supplement), released by the State Water Resources Control Board (SWRCB) on January 10, 2023. EPA also participated in the SWRCB's public workshop on the matter held on January 19, 2023.

EPA has reviewed the Memorandum of Understanding Advancing a Term Sheet for the Voluntary Agreements to Update and Implement the Bay-Delta Water Quality Control Plan (WQCP), and Other Related Actions (November 9, 2022) submitted to the SWRCB by its signatories (Term Sheet). EPA understands the Term Sheet was submitted as a proposed supplementary alternative for revising the Bay-Delta WQCP with a "voluntary pathway to achieve reasonable protection of fish and wildlife beneficial uses." It proposes a new narrative water quality objective (aka criteria) and a combination of flow and non-flow habitat restoration actions to achieve not only the new narrative, but also the existing narrative "doubling goal" objective, which was approved by EPA in 1995.[1] It is our understanding that the SWRCB's evaluation of the Term Sheet is independent of and supplemental to the Board's proposed action on WQCP amendments.

EPA's technical comments on the Draft Supplement's scientific evaluation of the Term Sheet are attached to this letter. While EPA appreciates that the SWRCB process will require peer review of its Final Supplement, EPA notes that critical elements of the scientific basis for the Term Sheet are not available at this time, particularly the expert opinion process used to evaluate habitat benefits. Further, EPA notes the Draft Supplement analysis itself concludes that the benefits of the Term Sheet are not clear, and that based on its modeling, in some major watersheds the Term Sheet provisions are not likely to improve conditions at all.

In addition to technical comments on the Draft Supplement, EPA notes the Term Sheet's reliance on only narrative objectives (criteria) for aquatic resource protection. While narrative water quality standards can be appropriate in some cases, in general, narrative criteria are usually established where numeric criteria cannot be established or as supplements to numeric criteria. 40 C.F.R. 131.11(a)(2). Numeric criteria serve as consistent and transparent targets to drive implementation. The SWRCB has already conducted significant scientific work to develop numeric objectives and has demonstrated that

[1] Doubling Goal: Water quality conditions shall be maintained, together with other measures in the watershed, sufficient to achieve a doubling of natural production of chinook salmon from the average production of 1967-1991, consistent with provisions of State and federal law.

scientifically defensible numeric flow criteria can be established. EPA urges the SWRCB to continue developing the basis for such numeric flow objectives for the Sacramento and Delta.

Finally, EPA is concerned about the ongoing delays in completing revisions to the Sacramento and Delta portion of the Bay-Delta WQCP.[2] Based on information shared at the January 19 public workshop, EPA understands that a draft staff report for updates to the Bay-Delta WQCP will be available for comment in Spring 2023. EPA believes that the Board has a basis in the 2017 Scientific Basis Report and 2018 Framework to make decisions expeditiously now. Should more specific Voluntary Agreements be developed in the future, the SWRCB has the authority to amend its Bay-Delta WQCP at that time.

As EPA has indicated before, pursuant to Clean Water Act requirements, the SWRCB should expeditiously revise the Bay-Delta WQCP water quality objectives for the Sacramento River and Delta, including both numeric and narrative criteria. EPA will review and approve or disapprove any new or revised water quality standards in the Bay-Delta WQCP once received. As part of that review, EPA will consult with federal fisheries agencies pursuant Section 7 of the Endangered Species Act and will also consult with affected tribes. EPA anticipates acting on the SWRCB's amendments to the WQCP for the San Joaquin tributaries by late Spring 2023.

EPA appreciates the opportunity to inform the SWRCB's water quality standards development process and remains committed to our partnership to protect and restore water quality in the Bay-Delta watershed. Please contact me if you would like to discuss our comments.

Sincerely,

/s/

February 8, 2023

Tomás Torres
Director, Water Division

Enclosure

[2] As the SWRCB is aware, Delta aquatic resource advocates petitioned EPA to initiate a federal promulgation of new WQCP provisions in 2016, and both EPA and the SWRCB received formal petitions in 2022. EPA also received a Title VI civil rights complaint about, among other issues, the delayed WQCP revisions. Those federal petitions are pending.

Enclosure

EPA Technical Comments on the January 2023 Draft Scientific Basis Report Supplement (Draft Supplement) in Support of Proposed Voluntary Agreements (VAs) for the Sacramento River, Delta, and Tributaries Update to the San Francisco Bay/Sacramento-San Joaquin Delta Water Quality Control Plan (Bay-Delta WQCP)

EPA offers the following comments related to habitat, flow, the doubling goal, the model and temperature. EPA was not able to conduct an exhaustive review of the Draft Supplement during the comment period but provides general comments in each of these important technical areas below. We appreciate the effort by the State Board to translate the Term Sheet into the Draft Supplement to help facilitate an understanding of the Term Sheet.

Habitat

The Draft Supplement's assessment of the VAs assumes that salmon habitat Assets are highly productive; however, this is not realistic in dynamic and heavily altered ecosystems like the Bay-Delta watershed. For instance, the Draft Supplement assumes all available redd and rearing habitat will be consistently occupied as a function of flow (p. 5-5); however, there is scientific evidence that many spawning and rearing areas typically remain unoccupied by at-risk salmonid populations (Achord et al., 2003). Data collected between 1999 and 2016 suggest that a significant proportion of suitable habitat between the Sacramento River and San Francisco Bay remains unoccupied by salmon fry, and within this region fry presence and abundance is correlated with adequate flow conditions (Munsch et al., 2020). Thus, merely creating new habitat is no guarantee of occupancy of various life stages at full capacity, especially in struggling populations.

The Draft Supplement also assumes that all habitat within "specified depth and velocity ranges" in the tributaries is suitable spawning habitat (pp. 5-5 - 5-6). However, the determination of spawning habitat based only on flow, depth and velocity may substantially over-estimate suitable habitat and subsequently abundance because numerous important factors required for spawning are ignored, including geomorphology, substrate size and water quality (temperature and dissolved oxygen) (Kondolf et al., 1996).

The Draft Supplement assumes that the VA Assets identified for Delta tidal wetlands habitat will be significant generators of food to the open waters of the Delta. The literature, however, indicates that while tidal wetlands generate food to the nearshore zone for specific fish and life stages that forage there, they generate very little food to the open waters of the Delta, where Delta pelagic fish mostly reside and forage. The primary generator of food for the open waters of the Delta is the upstream riverine floodplains, where high tributary flows flush food generated there downstream to the open waters of the Delta (Hammock et al., 2019; Herbold et al., 2014; Hartman et al., 2022; Yelton et al., 2022).

Flow

The Draft Supplement's conclusion that marginal increases in flow are sufficient to protect salmon is not consistent with statements in previous SWRCB documents or the literature which state that substantial increases in flow are necessary to protect Delta fish, including salmon. The 2017 Scientific Basis Report in Support of possible New and Modified Requirements for Inflows from the Sacramento River and its Tributaries and Eastside Tributaries to the Delta, Delta Outflows, Cold Water Habitat, and Interior Delta Flows (2017 SBR) (p. 3-2) identifies flow as the "master variable" governing Delta ecosystem processes; the 2010 Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem (2010 Flows Report) (pp. 4-5) identifies flow as the limiting factor on Delta fish survival. In its 2018 Master Response 5.2 to the Phase 1 Bay-Delta Plan update, the State Board observed that "…flow is a key driver of hydrologic health for fish and wildlife. There is no evidence that non-flow measures, in lieu of, or as a partial substitution for, providing the requisite flows would protect fish and wildlife beneficial uses in the LSJR [Lower San Joaquin River]." EPA expects that this would also hold true for the Sacramento River and its tributaries.

Also, in its 2012 comments on potential changes to the Bay-Delta Plan, the California Department of Fish and Wildlife acknowledges that "without significant improvements to instream flows, implementation of nonflow measures will not meet the salmon doubling objective or protect fish and wildlife beneficial uses."[1] Additionally, peer reviewed science documents the critical importance of flow on salmon survival. Notch et al. (2020) observes that "In the Sacramento River, flow was found to be the top covariate in predicting outmigration survival of hatchery late-fall Chinook salmon, with years of high flow resulting in a three-fold increase in outmigration survival through the river (Friedman et al., 2019; Henderson et al., 2019)."

The Draft Supplement's heavy reliance on habitat increase with only marginal flow increase will be most disproportionate during dry periods when aquatic life need flow the most. The Draft Supplement concludes that the VA Assets will provide zero acre-feet of new environmental water during critical years in the Feather, Yuba, San Joaquin (Friant), and Mokelumne Rivers (p. 4-2). In-stream temperature usually induces the most severe impacts to salmon populations during critically dry years. During exceptionally low and warm flows in 2021 on the Sacramento River, egg-to-fry survival rates of endangered winter-run Chinook dropped to the historical low of 2.6% (Shimabuku & Kammeyer, 2022). As a result of climate change, in-stream water temperatures are expected to rise in Sierra Nevada streams 1.9 degrees by the 2050s (Ficklin et al., 2013).

The Draft Supplement does not evaluate the impacts of the VA Assets on the frequency and severity of Harmful Algal Blooms (HABs) in the Delta and lower tributaries. HABs are an emerging environmental problem in the Delta that have not been given enough attention and that are inextricably connected to flow. HABs in the Delta are a serious threat to aquatic life and human health in and around Delta waterways. The literature has observed a clear link between increased abundance of HABs (in the Delta and lower tributaries) and lower flows in both the Sacramento and San Joaquin Rivers (Berg & Sutula, 2015; Lehman et al., 2013). The Final Supplement should include a robust assessment of the impacts of VA Assets on the frequency and severity of HABs against an accurate flow baseline.

[1] Comments regarding the Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the San Francisco Bay – Sacramento / San Joaquin Delta Estuary: San Joaquin River Flows and Southern Delta Water Quality [Phase 1], p.3.

Further, the Draft Supplement Assets do not appear to be sufficient to address several other important flow-related concerns in the Delta. For instance, studies indicate that Delta temperatures have warmed over the past 50 years (Vroom et al. 2017; Nobriga et al. 2021; Bashevkin and Mahardja 2022); however, the Draft Supplement does not consider the effect of flow on tributary temperatures and resulting downstream impacts on Delta fish species. The proposed-listed species, Longfin smelt, for example, is highly dependent on freshwater inflow and resulting temperature of the San Francisco Bay estuary (87 FR 60957 (October 7, 2022)). Also, although the Draft Supplement considers the impact of the VA flow Assets on Delta pelagic fish, any increases in abundance appear small, which is concerning given that baseline abundance of these species is currently seriously low. EPA recognizes that other stressors may be contributing to the pelagic fish decline in the Delta, but flow is generally recognized as a key limiting factor on Delta pelagic fish abundance (2017 SBR, 2010 Flows Report), and hence the Draft Supplement should consider evaluating the impact of significantly higher VA flow Assets on the abundance of pelagic fish.

Doubling Goal

The Draft Supplement does not provide assurances that salmon populations can withstand extension of the doubling goal narrative objective[2] compliance date to 2050. Similarly, the Draft Supplement does not explain why reaching 25% of the doubling goal in 8 years is protective. Central Valley salmon are in immediate peril, as observed in the SWRCB's July 6, 2018, press release requesting comment on the proposed 2018 update: "The two Bay-Delta Plan updates are aimed at addressing an ecological crisis in the Delta and preventing further collapse of Bay-Delta fisheries. A dramatic decline in the populations of native fish species that migrate through and inhabit the Delta has brought some species to the brink of extinction."[3] Peer-reviewed literature indicates that: 1) if present population trends of southern Pacific Coast salmon and trout continue, a majority of them (25 of the 32 taxa native to California) will likely be extinct or extirpated within the next century, and; 2) adequate flows to support salmonid life stages are needed now, before population decline to the point that recovery is improbable (Katz et al., 2013; Munsch et al., 2020).

Even assuming that 25% of the doubling goal abundance would be met in 8 years, the Draft Supplement meets the goal in only two of the five tributaries (Yuba and Mokelumne Rivers) (Figure ES-1).[4] As a result, presumed gains in salmon population abundances may not be supported or may be lost. Long-term resilience of Central Valley salmonids requires protecting all tributaries to avoid decimation by a catastrophic event, such as drought or climate change (Carlson & Satterthwaite, 2011). Therefore, it is critical that sufficient flow and rearing habitat are restored in all five tributaries.

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[2] Water Quality Objective known as the "Doubling Goal": Water quality conditions shall be maintained, together with other measures in the watershed, sufficient to achieve a doubling of natural production of chinook salmon from the average production of 1967-1991, consistent with provisions of State and federal law.
[3] https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/Bay-Delta_Plan_Update_Press_Release.pdf
[4] Under an alternative evaluation in the Draft Supplement, that is, the Meaningful Floodplain Events (MFE, p. ES-5), the Feather River would also meet 25% of the doubling goal. Regardless of approach, the VA flow contribution does not provide even the minimal amount (25% of doubling goal) of rearing habitat in at least two of the five tributaries.

Model

The Draft Supplement to a large extent relies on expert opinion and simplistic modeling. Specifically: 1) estimation of salmon abundance (as derived from habitat area) was based on interpretation of qualitative information from the literature rather than empirical data, and; 2) determination of available habitat area was based on simplistic modeling of habitat viability. The Draft Supplement acknowledges that "the modeling and qualitative analyses…indicate expected benefits from the VAs, but the actual outcomes of the VAs are not certain at this time. As with all modeling analyses, the results have uncertainty arising from assumptions and simplifications" (p. 7-2). Given the complexity of the Bay-Delta ecosystem, the scientific basis of the VAs should rely on more empirically derived data and a more complex model that includes key parameters influencing abundance predictions, including geomorphology, substrate size, and water quality. Additionally, the Draft Supplement explains that expert opinion, watershed representatives and technical leads were relied on to provide the best available science but does not cite specific verifiable sources (p. 5-5). As the SWRCB finalizes this document, it is important to document and share all sources upon which the evaluation is based.

The Draft Supplement does not adequately evaluate the impact of VA flow Assets cumulatively with other ecological stressors (e.g., invasive species, predation, food, competition, disease, water quality) that also affect salmon health and survival. Not addressing cumulative impacts of all relevant factors may result in higher estimates of salmon survival (Zillig et al., 2021), and consequently abundance. Also, the Draft Supplement should consider the impact of climate change, which will continue to contribute to increased stream water temperatures (Ficklin et al. 2013), thereby inducing further stress on Central Valley and Delta aquatic organisms.

Temperature

The Draft Supplement does not evaluate whether the resulting temperatures from the VA Assets will adversely affect salmon in the Sacramento River and tributaries. Both the SWRCB's 2017 SBR and its Final Substitute Environmental Document (SED) to the 2018 San Joaquin River Bay-Delta Plan updates identify temperature as a critical flow-related variable impacting all life stages of salmon populations. In particular, the SED assessed whether the proposed numeric flow objectives would result in temperatures that exceeded adverse effect levels.

Temperature assessment is important because in-stream temperatures in Central Valley streams are frequently close to salmonid thermal tolerances (Zillig et al., 2021). Increases in instream flow generally decrease stream temperatures. Diversions and cold-water releases from reservoirs have direct control on river water temperatures. Native California salmonids and other aquatic species are reliant on suitable water temperatures to support their physiology (FitzGerald et al., 2021), to cue their natural history strategies (Spence & Dick, 2014), and reduce adverse impacts of ecological stressors (Zillig et al., 2021). The SWRCB rightly included temperature assessment to derive the numeric flow objectives in the 2018 San Joaquin River Bay-Delta WQCP updates and should do so again here.

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