



REGION 9

SAN FRANCISCO, CA 94105

January 19, 2024

State Water Resources Control Board
Division of Water Rights
Attn: Bay-Delta & Hearings Branch
Submitted via Email: SacDeltaComments@waterboards.ca.gov

Re: Comment Letter – Sacramento/Delta Draft Staff Report

The U.S. Environmental Protection Agency (EPA) appreciates the opportunity to comment on the State Water Resources Control Board's (State Water Board) September 28, 2023 *Draft Staff Report in support of updates to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan) for the Sacramento River and Delta watersheds* (Staff Report). The State Water Board identified the need to comprehensively review and, if necessary, amend flow objectives in response to growing concern over deteriorating aquatic life conditions, climate change, and pelagic organism decline.¹ This Staff Report is a critical step to provide the State Water Board with the information necessary to make appropriate updates to the Bay-Delta Plan and EPA applauds the State Water Board for its efforts in reaching this milestone. Once the State Water Board concludes this process, EPA will review and act upon any new or revised water quality standards pursuant to Clean Water Act section 303(c), including government-to-government consultation in accordance with [EPA Policy on Consultation with Indian Tribes](#) and compliance with Section 7 of the Endangered Species Act, as appropriate.

The San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta) is the water hub of California, draining over 40% of California's land area, providing flow, flow-related habitat, and water quality benefits to support millions of acres of farmland as well as drinking water for millions of people, and vital recreational, commercial, and subsistence fisheries. As recognized in the Staff Report, many Native American Tribes are deeply connected to the aquatic life of the Bay-Delta. These Native American Tribes have historical and current reliance on the Bay-Delta ecosystem to provide food and to support cultural and spiritual practices, a profound connection with the watershed that must be taken into account. The Bay-Delta Plan establishes protections for this large, diverse, and singularly

¹ See, State Water Resources Control Board. August 4, 2009. Staff Report on the Periodic Review of the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. Adopted by Resolution 2009-0065. EPA notes that water quality standards for the waterbodies covered in this Staff Report were last updated in 1995, despite a Clean Water Act requirement that States consider and as appropriate, make such updates at least once every three years. CWA § 303(c)(1).

important ecosystem. While EPA's attached comments focus primarily on potential updates to the Bay-Delta Plan related to flow objectives to support fish and wildlife designated uses, EPA acknowledges the importance of improving water quality throughout the Bay-Delta watershed to protect all uses, including Tribal Beneficial Uses (TBUs). EPA continues to urge the State Water Board to expeditiously adopt and implement long-delayed updates to the Bay Delta Plan to ensure that this important ecosystem can continue to support these uses for future generations.²

The Staff Report includes alternatives for both numeric and narrative flow objectives to protect aquatic life uses. While narrative water quality criteria 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 and EPA strongly recommends that the State Water Board include numeric flow objectives in its amendments to the Bay-Delta Plan. Importantly, EPA notes that the State Water Board has completed a significant amount of work to develop the scientific rationale for numeric flow objectives.³ EPA supports the regulatory framework outlined in the proposed Plan amendment alternative that would pair numeric flow objectives with a flexible program of implementation.

The Staff Report also assesses a Proposed Voluntary Agreement (VA) Alternative that includes a new narrative objective and a framework to provide a combination of flow and non-flow habitat measures (VA assets). EPA is concerned that the Staff Report does not provide sufficient evidence to demonstrate that the proposed VA assets will protect beneficial uses in the Sacramento River and Delta watersheds. Enclosed, EPA provides recommendations regarding the information necessary to demonstrate that the VA Alternative will protect beneficial uses.

EPA strongly supports the State Water Board's proposal to incorporate TBU definitions into the Bay-Delta Plan, as expressed in our June 1, 2023 letter. Adopting TBUs into the Bay-Delta Plan will place these important Tribal cultural and subsistence uses on the same footing as other beneficial uses addressed by the Bay-Delta Plan. Although Native American Tribes have asked the State Water Board to apply TBUs throughout the watershed rather than utilizing the Regional Board-specific designation process, the State Water Board has not identified or discussed a timeline to designate TBUs for specific Bay-Delta waterways. EPA encourages the State Water Board to consult with affected Tribes to take into consideration tribal cultural practices within the Bay-Delta and expeditiously designate beneficial uses and protective criteria for such waters.

EPA supports the State Water Board in its efforts to amend the Bay-Delta Plan, however, the ongoing delays in completing revisions to the Bay-Delta Plan remain a significant concern given the consequences of these delays on Bay-Delta communities.⁴ EPA will continue to provide technical

² See U.S. EPA webpage, "EPA Comments on the SF Bay Delta Water Quality Control Plan" <https://www.epa.gov/sfbay-delta/epa-comments-sf-bay-delta-water-quality-control-plan>.

³ The Staff Report discussion of the Plan Amendment alternative builds on the State Water Board's 2017 Scientific Basis Report and July 2018 Framework for the Sacramento/Delta Update to the Bay-Delta Plan.

⁴ In 2016, Delta aquatic resource advocates petitioned EPA to initiate a federal promulgation of new Bay-Delta Plan provisions. In 2022, both EPA and the State Water Board received formal petitions for rulemaking to develop water quality standards that are protective of aquatic life and tribal beneficial uses. EPA also received a Title VI civil rights complaint about, among other issues, the delayed Bay-Delta Plan revisions. The federal complaint and petition are pending.


assistance and guidance to the State Water Board, as appropriate to ensure that CWA requirements are fulfilled.

EPA appreciates the opportunity to inform the State Water Board's rulemaking process and remains committed to our partnership to protect and restore water quality in the Bay-Delta watershed. Please don't hesitate to contact me or my team if you would like to discuss further.

Sincerely,

**TOMAS
TORRES**

Tomás Torres
Director, Water Division

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ENCLOSURE

1. EPA Comments on the September 28, 2023 *Draft Staff Report in support of updates to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary for the Sacramento River and Delta watersheds*

Enclosure

EPA Comments on the September 28, 2023 *Draft Staff Report in support of updates to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary for the Sacramento River and Delta watersheds*

Introduction

EPA's comments are focused on two alternatives described in the Staff Report: the proposed Plan amendment and the proposed Voluntary Agreement (VA) alternatives. EPA will continue to engage as the State Water Board refines amendments to the Bay-Delta Plan. Once the State Water Board concludes this process, EPA will review and act upon any new or revised water quality standards pursuant to Clean Water Act section 303(c). The CWA and its implementing regulations (40 C.F.R § 131.11(a)(1)) require States to develop criteria based on sound scientific rationale and that contain sufficient parameters or constituents to protect all designated uses. Because the Staff Report does not include proposed amendment language, EPA's comments do not address whether the alternatives presented would be consistent with the CWA and its implementing regulations. EPA's comments are intended to assist the State Water Board with developing Bay-Delta Plan amendments that are based on a sound scientific rationale.

To comprehensively assess whether any potential Bay-Delta Plan amendment protects all designated uses, comparability is key. EPA encourages the State Water Board to provide a side-by-side comparison of environmental outcomes across the proposed Plan amendment and the proposed VA alternative that relies on a consistent definition of the baseline flows (including minimum required Delta outflow, or MRDO). This will enhance public understanding of the potential plan amendments and their outcomes and improve public participation in the plan amendment process.

The Staff Report¹ along with previous State Water Board reports in which the State Water Board compiled and analyzed a significant amount of comprehensive scientific information, recognize that substantially more flow is needed in the Delta and Sacramento-San Joaquin watersheds to support aquatic life.² Currently, six fish species (Delta smelt, longfin smelt, green sturgeon, Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead) are listed or proposed as threatened or endangered under the Endangered Species Act. Scientific consensus indicates that native fish population abundance is positively associated with flow volumes (e.g., Jassby et al. 1995, Sommer et al. 1997, Mac Nally et al. 2010, Tamburello et al. 2019) and that largescale increases in both flow and habitat restoration are needed to recover and protect these and other native species. The Bay-Delta and its watersheds have also experienced increased frequency of harmful algal blooms (HABs) affecting aquatic life and human health. Restoration of higher flow volumes may

¹ "Flow is commonly regarded as a key driver or master variable governing the environmental processes in riverine and estuarine systems such as the Bay-Delta and its watershed (cites omitted)." Staff Report p. 3-2.

² "The State Water Board further cautions that flow and physical habitat interact in many ways, but they are not interchangeable. The best available science suggests that current flows are insufficient to protect public trust resources." State Water Resources Control Board. August 3, 2010. Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem, p. 1-2.

address key drivers of HABs, including increased stream temperature and water residence time (Kudela *et al.* 2023; Berg & Sutula 2015, Lehman *et al.* 2013). EPA reiterates that swift action is needed to address the imperiled state of the Delta and the species, communities, and economies that depend on this ecosystem for survival.³

As explained by the State Water Board, the September 28, 2023 *Draft Staff Report in support of updates to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan) for the Sacramento River and Delta watersheds* (Staff Report):

assesses a range of alternatives that may be considered for adoption by the State Water Board. Alternatives include several stand-alone alternatives that are based on flow scenarios evaluated in the State Water Board’s 2017 Scientific Basis Report for potential Sacramento/Delta updates to the Bay-Delta Plan (*Scientific Basis Report in Support of 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*), as well as a proposed stand-alone voluntary agreements alternative, and several modular alternatives that would add to or modify the stand-alone alternatives. The draft Staff Report includes an alternative that is referred to as the proposed Plan amendments that is based on the State Water Board’s 2018 Framework for a possible Sacramento/Delta Update to the Bay-Delta Plan (2018 Framework) that was identified prior to the VAs proposal.

Staff Report at p. 1.2.

The Proposed Plan Amendment Alternative

The proposed Plan amendment alternative includes “new inflow and cold water habitat objectives for the Sacramento/Delta tributaries, new and modified Delta outflow objectives, modified Suisun Marsh objectives, and new and modified interior Delta flow objectives” and a revised program of implementation (Staff Report p. 5-3). Overall, EPA supports a regulatory framework such as that outlined in the proposed Plan amendment alternative that would pair numeric flow objectives with a flexible program of implementation to restore a more natural flow regime in the Bay-Delta watershed to support fish and wildlife designated uses.

EPA is encouraged by the scientific approach that the State Water Board uses to justify the need for amended flow objectives and to assess the potential impacts of the proposed Plan amendment on fish and wildlife designated uses. The Staff Report leverages empirical evidence to illustrate how the proposed Plan amendment may result in substantial improvements to aquatic life in the Delta and its watersheds. For example, the Staff Report uses empirically derived biological indicators of fish population health to demonstrate that an inflow and inflow-based outflow objective at or above 55% unimpaired flow (UF), in particular, increases the frequency of providing many key flow-related benefits to estuarine and anadromous fish,

³ See U.S. EPA webpage, “EPA Comments on the SF Bay Delta Water Quality Control Plan” <https://www.epa.gov/sfbay-delta/epa-comments-sf-bay-delta-water-quality-control-plan>.

including improved estuarine habitat conditions (Table 3.14-6) and improved Chinook fall-run and winter-run outmigration (Tables 3.14-4 to 3.14-5). While any improvements in aquatic conditions to benefit imperiled fish and habitat in the Delta are valuable, the State Water Board should include in its impact analyses an indication of conditions (i.e., unimpaired flow percentages and resulting water temperatures) required to protect designated uses, including restoration and full protection for viable native fish populations, and not just indicate improvements from baseline.

EPA agrees with the State Water Board's ecosystem-wide approach, using new and revised objectives to augment and link tributary inflow, cold water habitat, Delta outflow, and interior Delta flows. Utilizing an ecosystem-wide approach to protect designated uses appropriately recognizes the critical connections that natural, unimpaired flows provide across the watershed and estuary, including habitat for diverse fish and wildlife species, migration corridors for anadromous and migratory fish, and critical food exports and subsidies from productive floodplains to downstream habitats (Jeffres *et al.* 2020).

EPA strongly supports the use of year-round numeric objectives for unimpaired flows, Delta inflow, and inflow-based-outflows to protect and augment existing flows and water quality characteristics that are impacted by flow, and to provide habitat conditions necessary to support native anadromous and estuarine fish species.⁴ Year-round flow objectives based on sound scientific rationale would provide clear water quality goals and transparent regulatory requirements.⁵

EPA recommends the State Water Board consider scientific studies published since the State Water Board's 2017 Final Scientific Basis Report was released in the final Staff Report to support draft plan amendments. Studies published after 2017 may refine the State Water

⁴ "This Report describes how year-round inflow requirements are needed to provide for ecological processes including continuity of flows and specifically to protect anadromous and other fish and wildlife species that inhabit the Bay-Delta and its tributaries throughout the year as juveniles or adults. Those inflows are needed to provide appropriate habitat conditions for migration and rearing of anadromous fish species (primarily Chinook salmon and steelhead) that have runs that inhabit the Delta and its tributaries all year. Those flows are also needed to contribute to Delta outflows to protect estuarine species. The Report specifically finds that flows are needed that more closely mimic the conditions to which native fish species have adapted, including the frequency, timing, magnitude, and duration of flows, as well as the proportionality of flows from tributaries. These flow attributes are important to protecting native species populations by supporting key functions including floodplain inundation, temperature control, migratory cues, reduced stranding and straying and other functions. Providing appropriate flow conditions throughout the watershed and throughout the year is critical to genetic and life history diversity that allows native species to distribute the risks that disturbances from droughts, fires, disease, food availability, and other natural and humanmade stressors present to populations." State Water Resources Control Board. 2017. Scientific Basis Report in Support of 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, p. 1-18.

⁵ "Existing regulatory minimum Delta outflows would not be protective of the ecosystem, and without additional instream flow protections, existing flows may be reduced in the future, particularly with climate change and additional water development absent additional minimum instream flow requirements that ensure flows are preserved in stream when needed for the reasonable protection of fish and wildlife." Staff Report p. 1-9.

Board’s identification of critical flow thresholds that benefit native fish species and estuarine habitat. For example, recent studies on flow-survival relationships for Chinook salmon in the Sacramento River and Delta provide scientific support for the positive relationship between flow and outmigration survival and recruitment of Chinook salmon, including for late-fall, fall, and winter-run salmon (Michel, 2019), late-fall run and spring-run smolts (Cordoleani et al., 2018; Henderson et al., 2019; Michel et al., 2021; Perry et al., 2018), wild origin salmon fry (Munsch et al., 2020), and winter-run juveniles (Hassrick et al., 2022). Furthermore, since the 2016 draft Scientific Basis Report and the 2017 Final Scientific Basis Report identified a flow range of 11,400-29,200 cfs as protective of fish and wildlife uses for the February-June period, recent research has demonstrated that even greater flow magnitudes over a period longer than February-June are needed to be protective of zooplankton populations (Hassrick *et al.* 2023), which are a foundational group in the food web to support species at higher trophic levels, including listed salmonids.

EPA also supports the concept of provisions to allow for flexibility in implementation of unimpaired flow objectives to enable adjustment to real-time and watershed-specific conditions within a specified range. Such provisions primarily involve adjusting the magnitude and/or timing of dedicated flows within a defined range of variation. EPA notes that flexible implementation should be utilized to provide protection for the season-specific needs of fish and wildlife designated uses. Unimpaired flows should not be reduced as part of flexible implementation if it would result in adverse impacts on native aquatic life. The State Water Board has noted in the Staff Report and in related actions^{6,7} that it may choose to adaptively manage unimpaired flows under a “block of water” approach (Staff Report p. 5-20) with flexibility to apply that block of water pursuant to real time management. If this approach is incorporated into the Bay-Delta Plan amendment, the State Water Board should provide estimates of how large that “block of water” would be on each covered tributary under the expected range of hydrological circumstances. This will provide the public with a better understanding of how flows could be distributed across space and time, and of the potential benefits of real-time management using this tool.

EPA recommends the State Water Board demonstrate how fall flows anticipated under the proposed Plan amendment will be protective of all designated uses, even if implemented under an unimpaired “natural flow regime.” EPA understands the implication that natural flows are generally lower in the Delta and its tributary watersheds during late summer and fall, and thus summer and fall seasonal conditions have the potential to stress aquatic life, particularly during dry conditions. However, within the balance of water resources that the State Water Board is evaluating in the proposed Plan amendment (i.e., unimpaired flow, cold water storage, and water diversion) there may be conditions that could mitigate seasonal impacts on aquatic life during the late summer and fall that are not currently provided in the Staff Report. Therefore,

⁶ State Water Resources Control Board. 2017. Scientific Basis Report in Support of 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, p. 1-18.

⁷ State Water Resources Control Board. July 2018 Framework for the Sacramento/Delta Update to the Bay-Delta Plan, p. 25.

EPA recommends the State Water Board provide a more comprehensive analysis that evaluates sufficient combinations of unimpaired flow and diversion rates with the corresponding effects on year-round reservoir storage and downstream temperatures to enable a complete assessment of potential benefits and impacts of the proposed Plan amendment on designated uses.

The Proposed Voluntary Agreement Alternative

The State Water Board is considering a proposed Voluntary Agreement alternative as a possible path forward for updating the Bay-Delta Plan:

The VAs include a combination of proposed flow and non-flow habitat restoration measures on a portion of the Sacramento/Delta tributaries over 8 years (with the intent to extend the term), including varying amounts of increased flows, depending on water year type, and non-flow habitat restoration actions targeted at improving spawning and rearing capacity for juvenile salmonids, estuarine species, and other native fish and wildlife. The proposed VA flows are intended to be additive to the Delta outflows required by State Water Board Decision 1641 (D-1641) and resulting from the 2019 Biological Opinions (collectively “2019 BiOps condition”) though the VAs acknowledge that the BiOps may change. The flow and non-flow habitat actions are proposed as implementation measures for an existing and proposed new water quality objective in the Bay-Delta Plan. Specifically, the VAs propose: 1) a new narrative objective to achieve the viability of native fish populations; and 2) to provide the participating parties’ share, during implementation of the VAs, to contribute to achieving the existing Narrative Salmon Protection Objective, and propose doing so by 2050. The VAs also include proposed governance and science programs to direct flows and habitat restoration, conduct assessments, and develop strategic plans and annual reports.

Staff Report at p. 9-1.

The proposed VA described in the Staff Report applies to the largest salmon-producing tributaries in the Sacramento River and Delta watershed, including the mainstem Sacramento River, the Feather River, the American River, and the Mokelumne River, which collectively support the largest run of Chinook salmon in California and a significant proportion of recreational and commercial salmon fisheries. Improving flow conditions and habitat in these watersheds is crucial to restore and protect salmon, estuarine species, and other native fish.

The proposed VA alternative includes a new narrative objective and a framework to provide a combination of flow and non-flow habitat measures (VA assets) for the major Sacramento River and Delta tributaries to achieve both the new narrative objective and the existing narrative Salmon Protection Objective (salmon doubling goal). The new narrative objective requires the State Water Board to maintain flow conditions in the Delta and its tributaries to “support and maintain the natural production of viable native fish populations” (Staff Report p. 9-7). EPA notes that under the CWA implementing regulations, States can establish narrative criteria

where numeric criteria cannot be established or to supplement numeric criteria (40 C.F.R. § 131.11(b)). Recognizing the difficulties in implementing narrative criteria, EPA recommends the Water Board provides clear definitions of critical terms, including “viable,” that reflect biologically relevant goals (i.e., quantitative metrics) to protect aquatic life to avoid inconsistent interpretation and assessment of the narrative objective.

As demonstrated in the comments below, EPA is concerned that the Staff Report does not yet include a sound scientific rationale that demonstrates how the proposed VA alternative will provide protections for all designated uses in the Sacramento River and Delta watersheds. EPA notes its previous comments on scientific limitations related to analytical approaches used to support the proposed VA remain applicable to this Staff Report.⁸ Below EPA provides additional comments related to the scientific approach described in the Staff Report regarding the proposed VA alternative. In addition, EPA provides comments related to the implementation structure outlined in the proposed VA alternative.

Proposed Flow Assets

As cautioned by the State Water Board: “flow and physical habitat interact in many ways, but they are not interchangeable. The best available science suggests that current flows are insufficient to protect public trust resources.”⁹ Further, scientific consensus indicates that native fish population abundance is positively associated with increasing flow volumes (e.g., Jassby et al. 1995, Sommer et al. 1997, Mac Nally et al. 2010, Tamburello et al. 2019) and that largescale increases in both flow and habitat restoration are needed to recover and protect these and other native species. Clearly, flow is a critically important driver of the health of the Bay-Delta watershed. However, the VA alternatives, as currently proposed, do not provide flow to ensure year-round protection or protection in critical dry years. Rather, flow assets provided by the proposed VAs are concentrated January through June, with priority in April and May, during Dry, Below Normal, and Above Normal water years (Staff Report p. 9-5). As noted in the Staff Report, one or more life stages of native estuarine and anadromous fish, including threatened and endangered Chinook salmon and steelhead, require access to habitats across the entire watershed at all times of the year (Staff Report Table 3.4-1 and footnote 4). For this reason, it is important that the State Water Board include provisions to ensure adequate flow is available for year-round protection of designated uses in its Bay-Delta Plan amendments. Native salmonids are particularly at-risk during drought conditions.¹⁰ However, potential VA flow assets are not required for critical dry years on most tributaries, the Sacramento River, and

⁸ February 8, 2023 EPA Comment Letter to the State Water Board, Re: Comment Letter – Draft Scientific Basis Report Supplement.

⁹ State Water Resources Control Board, August 3, 2010, Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem, p. 1-2.

¹⁰ “Drought and low flows cause water temperatures in river systems to rise, reducing spawning and increasing disease risk for fish and reducing survival for eggs, youth, and adult fish.” NOAA Fisheries West Coast Regional Office. 02/03/2023. Available at: <https://www.fisheries.noaa.gov/west-coast/climate/drought-west-coast-region#:~:text=Drought%20Impacts,-Drought%20poses%20significant&text=Drought%20and%20low%20flows%20cause,%2C%20youth%2C%20and%20adult%20fish.>

the Delta (Staff Report Table 9.3-1). Further, the Staff Report indicates that during critical dry years the proposed VA alternative will result in a decrease of flows from baseline (Tables 9.5-2 to 9.5-5). When stream flow protections were inadequate during the 2012-2016 drought, Chinook, coho Salmon, and steelhead experienced widespread negative population-level consequences (Willmes *et al.* 2018; Williams *et al.* 2016). In a landscape increasingly defined by climate change impacts, including increased frequency and intensity of drought conditions (Cook *et al.* 2015, Williams *et al.* 2015), flow protections in critical years are essential to support fish and wildlife designated uses. For this reason, it is important that the State Water Board include provisions to provide flow to protect designated uses in the Bay-Delta Plan amendments in critical dry years.

Currently, key analyses used in the Staff Report to demonstrate aquatic life benefits of the proposed VA alternative suggests that VA flow assets provide only minimal benefits relative to both current baseline conditions and compared to the modeled benefits of the proposed Plan amendment.¹¹ For example, the Staff Report summarizes potential benefits of both alternatives on achieving critical flow thresholds identified in the Staff Report as beneficial to specific estuarine species and to fall-run and winter-run Chinook salmon outmigration.¹² Across all comparable metrics, Delta outflow provided under the proposed Plan amendment is modeled to achieve those critical flow thresholds at a higher frequency than the VA alternative across all UF scenarios 35% and greater, with substantial differences (and perceived benefits) observed at higher UF scenarios (Tables 9.6-4, 3.14-4, and 3.14-6). Delta inflow and outflow anticipated under the VA alternative versus the proposed Plan amendment also results in substantial differences in modeled changes to the median X2 position¹³ for January through June relative to baseline conditions, where a westward change indicates a perceived benefit to estuarine habitat and species. Under the VA alternative, the median of average January through June X2 position is anticipated to move one km westward of the Baseline (Figure 9.7-1), while that under the proposed Plan amendment is anticipated to move four km westward overall and five km westward during critically dry water-year types at 55% UF (Figure 7.6.2-2).

Although the flow assets identified in the proposed VA may provide some benefit to aquatic life, EPA is concerned that the total volume and timing of Delta inflow and outflow provided under the proposed VA alternative relative to baseline is not large enough to adequately restore and protect aquatic ecosystems, as described by the State Water Board in analyzing the proposed Plan amendment alternative. Under the proposed VA SacWAM modeling, mean total

¹¹ EPA finds it useful to compare benefits of the VA alternative to the baseline and the proposed Plan amendment alternative, given the robust scientific analysis underlying the proposed Plan amendment alternative.

¹² Chapter 3 and Chapter 9 of the Staff Report identify ecological flow thresholds for specific native fish and estuarine habitat that, if achieved or exceeded, indicate protection. Therefore, the higher frequency at which flows provided meet or exceed critical flow thresholds, the greater the perceived protective benefit is to a given species or estuarine habitat indicator.

¹³ X2 is a physical attribute of the estuary used as a habitat indicator for the location of the low salinity zone. X2 is the location in kilometers from the Golden Gate Bridge where water salinity is 2 ppt (parts per thousand) of isohaline salt. Historically, the low salinity zone was associated with high primary productivity, zooplankton population, and abundance of native species. See <https://viewperformance.deltacouncil.ca.gov/pm/salinity>

Delta inflow for all water year types (including Tuolumne River contributions) would provide an additional 119 TAF of Delta inflow over baseline (Tables 9.5-29 and 9.5-31). Notably, this is less than that provided under the proposed Plan amendment at 35% UF (provides an addition of 193 TAF) and five times smaller than that provided at 55% UF (provides an addition of 543 TAF). See Table A1-100. Similarly, mean total Delta outflow for all water year types under the VA alternative (excluding San Joaquin River contributions) is modeled to provide an additional 109 TAF Delta outflow over baseline (Tables 9.5-40 and 9.5-42), which is less than half of the expected Delta outflow at 35% UF and more than 13 times smaller than that provided at 55% UF (1,466 TAF; Table A1-102). This magnitude difference is anticipated to be greatest in Below Normal water year types, when the VA alternative is modeled to provide nearly 40 times less Delta outflow than the proposed Plan amendment at 55% UF.

The State Water Board explains that flows provided under the proposed VA alternative are intended to be additive to minimum Delta outflows required by State Water Board Decision 1641 (D-1641) and resulting from the 2019 Biological Opinions (Staff Report p. 9-1). The Staff Report also notes that current average minimum Delta outflows are not protective of the Bay-Delta ecosystem and that further protections are necessary to protect instream flows for fish and wildlife (e.g., Staff Report p. 1-9 and p. 9-199). Additional depletions, pursuant to either existing but unexercised rights or under newly granted rights,¹⁴ could reduce flows during some times of the year to levels substantially below existing baseline conditions, even if the flow assets provided under the proposed VA are protected. The State Water Board should consider how any such additional potential depletions will impact the range of potential benefits of the proposed VA alternative. Further, the proposed VA alternative indicates that the flow assets would be implemented in three out of eight years on the American River (Staff Report p. 9-4, footnote to Table 9.3-1) but does not describe how that asset allocation frequency is protective of aquatic life, or what outcomes (i.e., species-specific flow threshold attainment frequency or temperature exceedance probabilities for sensitive salmonid life stages) are expected.

The analysis of the proposed VA alternative indicates that peak flows “would generally be similar to baseline” (Staff Report p. 9-109) conditions, which would limit the benefits of higher peak flows above baseline conditions that “maintain channel size, shape, and bed texture” (p. 9-108) and “provide beneficial disturbance to both the channel and its adjacent floodplain and riparian corridor” (Staff Report p. 9-108). It is important to note that high flows can lead to riverbed scour of salmon eggs in redds (Staff Report p. 9-109) and potentially exacerbate habitat degradation in heavily altered rivers with substrate deficits and no consistent sediment supply (Merz and Setka 2004). However, as stated in the literature cited in the proposed Plan amendment (Staff Report Chapter 7.6.2), flood flows are needed to create the geomorphic conditions and water quality in interstitial space within spawning gravels that salmon eggs and

¹⁴ For example, the State Water Board currently has several large pending applications for diversions out of the watershed, including but not limited to the Sites Project Authority Application A025517X01 for 1.5 MAF; the Turlock I.D./Modesto I.D. Application A033277 for 2.7 MAF, and the Merced Irrigation District Application A033098 for 400kaf. The State Board will evaluate each of these applications on their own merits.

embryos need. For example, the Geomorphic Flows section (Staff Report 7.6.2-53) cites peer-reviewed research that supports the need for peak flows that are unhindered by unnaturally low-flow baseline conditions.

Proposed Non-Flow Habitat Assets

As discussed in EPA's recent technical comments on the draft Scientific Basis Report supplement regarding the proposed VA,¹⁵ the State Water Board has not yet provided scientific support for the proposal that that minimal increases in flow and non-flow habitat restoration will provide the benefits needed to protect designated fish and wildlife designated uses. This Staff Report does not demonstrate that suitable habitat area in the Sacramento and Delta watersheds is a limiting factor on estuarine and anadromous fish population growth, nor does the Staff Report provide an adequate scientific rationale to demonstrate that habitat restoration assets will increase fish abundance without meaningful increases in tributary flows protected as Delta outflows. Any improvements in habitat will likely be achieved only if pursued alongside substantial increases in flow rates, because flow is strongly and positively correlated with many indicators of native fish survival, including for salmon survival out-migrating from natal tributaries (Michel, 2019, Henderson et al. 2019), salmon survival in and through the Delta (Perry et al. 2018), and Delta Smelt post-larval survival (Polansky et al. 2021). Targeted habitat restoration with insufficient flow, on the other hand, is associated with low salmonid inhabitation (Munsch et al. 2020). Therefore, the State Water Board will need to provide additional analyses that demonstrate how allocation of non-flow assets, in combination with the flow assets identified in the VA proposal, will be sufficient to protect designated uses.

EPA recommends the State Water Board apply a quantitative analysis to the proposed VA alternative that links changes in flow and non-flow assets to changes in species abundance like the statistical models used in the Plan Amendment based on empirical correlations between changes in flow and changes in species abundance. EPA recognizes that the effects of VA non-flow assets on species abundance are likely complicated due to numerous factors like habitat-flow relationships, temperature dynamics, and predation rates that may affect fishes throughout their life cycle. In addition, the effects of VA non-flow assets will partly depend on assumptions about how asset types or functions limit species recruitment (Hayes et al. 1996). More detail and scientific references on the assumption in the proposed VA analysis that habitat is a primary limiting factor on salmon recruitment in the Sacramento and Delta watersheds, as well as on the assumption that habitat assets will produce and export substantial prey resources to Delta fish, can be found in the Enclosure to EPA's February 8, 2023 Comment Letter to the State Water Board (Re: Comment Letter – Draft Scientific Basis Report Supplement).

¹⁵ February 8, 2023 EPA Comment Letter to the State Water Board, Re: Comment Letter – Draft Scientific Basis Report Supplement.¹⁶ California can, within limits of relevant federal law, revise its governance structures for implementing a federal program, as it did in 2015 when the California Legislature transferred federal Safe Drinking Water Act functions from the California Department of Public Health to the State Water Board.

To provide necessary analytical support for the proposed VA alternative, EPA recommends that the State Water Board use life cycle modeling (e.g., Hendrix et al. 2019, Peterson and Duarte 2020, Smith et al. 2023). Life cycle models may provide similar analytical support for assumed habitat benefits compared to published correlations of flow and abundance of Delta fishes (e.g., Tamburello et al. 2019) and salmonids (e.g., Munsch et al. 2020). More specifically, life-cycle modeling will help demonstrate whether a reliance on habitat restoration in the Delta and Sacramento-San Joaquin watersheds will be equally protective compared to reliance on ecosystem-wide flow augmentation proposed in the Plan amendment alternative.

Temperature

Staff Report analyses of the proposed VA indicate that “changes in temperature associated with the proposed VA alternative on the Sacramento, Feather, and American Rivers are small as shown in Appendix G3e (most monthly 10th, 50th, and 90th percentiles of daily average VA temperatures are within 1°F of baseline temperatures)” (p. 9-142). This finding suggests that the proposed VA flow assets will have an insignificant impact on improving temperature conditions. Given that salmon in these rivers are adversely impacted by temperatures that often exceed thermal tolerance thresholds under existing baseline conditions, the proposed VA alternative does not appear to provide protection. The Staff Report analysis of the proposed VA alternative suggests that mitigation measures (reservoir management and habitat restoration) will avoid or reduce temperature impacts on native species in the Sacramento River and Delta. However, any such assertions about reduction in impacts of high temperature should be supported by empirical evidence and analyses.

Incomplete Description of VA Alternatives

EPA appreciates the State Water Board efforts to model and evaluate a “best guess” as to what a final VA alternative may contain. Nevertheless, the public cannot effectively comment on major elements of the proposal because the proposal is, at this time, uncertain. For example, tables describing the suggested flow assets in the VA Term Sheet (MOU Advancing a Term Sheet for the VAs Staff Report Appendix 1), the Staff Report (p. 9-4 to 9-5), and the Draft Strategic Plan (Staff Report Appendix G1, p. 8) include different descriptions of the asset caveats. Each, however, clarifies that the flow asset tables were still being negotiated at the time of submission or evaluation. Given the critical role these flow assets will play in resource protection, it is important for the State Water Board to provide a consistent and complete description of the VA proposal being offered as an alternative.

Complex Governance Proposals

The draft Governance Proposal (Voluntary Agreement Draft Strategic Plan Appendix B, pp. 146 *et seq.*) is complex, and includes a broad Systemwide Governance Committee consisting of representation from State and Federal Agencies, tribes, water agencies, and environmental groups, as well as individual tributary governance structures, a Program Office, an Executive Director, a Flow Operations Team, and a Science Committee, as well as additional committees established as needed. While it is difficult to understand how this complex system will work at this stage, EPA is concerned that the draft governance proposal may lead to confusion about accountability. EPA notes that the State Water Board is the “federal water pollution control

agency” for purposes of the federal CWA, and as such is responsible for all CWA program responsibilities (including requirements for conducting triennial reviews under CWA section 303(c) and complying with financial assistance and accountability provisions).¹⁶ EPA urges the State Water Board to explicitly articulate the anticipated relationship between the State Water Board and any new governance structure to enable both transparency and accountability. Relatedly, the State Water Board frequently requires regulated entities to conduct monitoring and evaluate data and such requirements generate valuable data that can inform assessment of designated use attainment and, where relevant, adaptive management. EPA notes that the California State Legislature considered the issue of coordinating objective scientific monitoring in the Bay-Delta when it established the Independent Science Board in the 2009 Delta Reform Act. We note further that the highly successful Interagency Ecological Program (IEP) has been coordinating monitoring and evaluation activities in the Delta for more than 50 years. The VA alternative proposes that, rather than utilizing the well-established IEP, the VA alternative set up yet another separate and extensive monitoring and science effort. While EPA supports robust data collection, it is important that there is significant coordination around monitoring objectives and science communication.

Tribal Beneficial Uses

As explained in the Staff Report, California Native American Tribes have a deep and abiding connection to the Bay-Delta watershed and rely on sufficient flow and water quality to support subsistence fishing and other important tribal uses of water (Staff Report Chapter 11). A healthy Bay-Delta watershed is one that provides the water and water-dependent vegetation (e.g. willow and tule) and animals (e.g. native fisheries) to support Tribal spiritual and cultural practices. The Staff Report further asserts that the State Water Board, as the only entity with direct authority to regulate diversions of water, adopted the Bay-Delta Plan because “water diversions from the Bay-Delta watershed’s rivers and streams, including large export diversions from the Delta by the [State and Federal Water Projects] have [...] degraded the ecosystem, contributing to the decline of native fish populations” (Staff Report p. 11-12). EPA appreciates that the State Water Board has clearly identified the importance of meaningful engagement with tribes and the importance of flow for tribal uses of water (Staff Report p, 11-11).

EPA strongly supports incorporation of Tribal Beneficial Uses (TBUs) into the Bay-Delta Plan. The Staff Report explains that the State Water Board “is expected to make a decision on the pathway for incorporating, designating, and protecting TBUs [Tribal Beneficial Uses] when Plan amendments are for adoption at a Board Meeting in 2024” (Staff Report p. 11-10). However, the Staff Report also states that “[i]ncorporation of the TBU definitions into the Bay-Delta Plan is not proposed as a formal ‘designation’ of the uses as applying to specific waterbodies or waterbody segments within the Bay-Delta” (Staff Report p. 11-11). While the Staff Report clearly identifies the need for TBUs in the Bay-Delta Plan, the Staff Report stops short of

¹⁶ California can, within limits of relevant federal law, revise its governance structures for implementing a federal program, as it did in 2015 when the California Legislature transferred federal Safe Drinking Water Act functions from the California Department of Public Health to the State Water Board.

proposing how the State Water Board will address this need in the Bay-Delta Plan. EPA encourages the State Water Board to expeditiously designate appropriate beneficial uses and protective criteria for such waters in the Bay-Delta Plan, based on available data and information including information provided by the Tribes.

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