Responses to Oral Comment

Received at the August 21-22, 2018 State Water Resources Control Board Meeting

Proposed Amendments to The Water Quality Control Plan

for The San Francisco Bay/Sacramento-San Joaquin Delta Estuary

---

On August 21-22, 2018, the State Water Resources Control Board (State Water Board) began considering adoption of proposed amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan) and the supporting proposed final Substitute Environmental Document (Final SED), and continued final action until November 7, 2018. The State Water Board heard two days of oral public comment; during this time, common issues were raised. In general, these common issues were already addressed in the Final SED, including in Volume 3: Response to Comments.[1] To help further inform the public about the proposed plan amendments, this document provides additional clarification of issues that were raised at the August meeting regarding: the scientific and technical analyses supporting the plan amendments and Final SED; alternative proposals, including the proposed Tuolumne River Management Plan; the role of the Stanislaus, Tuolumne and Merced Working Group; State Water Board authority for carryover storage targets and other requirements; and publicly owned treatment works.

1. Strength of Science and Recent Studies

a. Lower San Joaquin River Plan Amendments

Scientific information strongly supports the Lower San Joaquin River (LSJR) plan amendments. The LSJR plan amendments address the need for increased river flows with a more natural hydrographic pattern to improve aquatic habitat conditions and reasonably protect fish and wildlife. This need is documented in independent, scientific findings published in peer-reviewed academic journals, status and trends reports, technical reports, and other published and un-published information sources. An external peer review of the Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives (Scientific Basis Report) found that there was adequate evidence to support the conclusion that "flow of a more natural spatial and temporal pattern is needed from the three salmon bearing tributaries to the SJR during the February through June time frame to protect San Joaquin River fish and wildlife beneficial uses" (Final SED, Appendix C, Attachment 2, page 2). The plan amendments' approach to reasonably protecting fish and wildlife is based on fundamental scientific

[1] In addition, through its July 6, 2018, "Notice of Public Meeting and Consideration of Adoption of Proposed Amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary [Bay-Delta Plan] and Final Substitute Environmental Document [Final SED]," the State Water Board provided an opportunity to submit written comments on the revisions to the proposed plan amendments by July 27, 2018, at 12:00 p.m. No additional written comments were considered. State Water Board staff subsequently prepared a "Comment Summary and Responses" document that summarizes and responds to the significant written comments received in accordance with the July 6 notice requirements.

principles and the proposal is flexible enough to allow for the incorporation of advancements in scientific knowledge during implementation.

Some commenters criticized the scientific basis of the LSJR plan amendments as "outdated" and lacking recently published literature, status reports, or other published and unpublished sources. Such comments are addressed in the SED, including in Master Response 3.1, *Fish Protection*. Recent information does not invalidate the decades of research that laid the foundation for the scientific knowledge summarized in the Scientific Basis Report. Recent advancements in scientific knowledge often reinforce or complement the scientific basis of the plan amendments, provide additional precision, or identify additional management options.

The following briefly addresses studies raised at the August 21-22 meeting:

- **LSJR Salmonid Survival in the Delta (Buchanan et al. 2018).** This study evaluated survival of San Joaquin River salmon through the Delta to the San Francisco Bay and suggested that increased flows at Vernalis alone are not sufficient to improve juvenile salmonid survival in the Delta because juvenile survival in the high flow year of 2011 was very low. However, the article acknowledges that 2011 also had very high export rates, including during the fish survival study period (mid-May to mid-June).

  The article does not invalidate the scientific studies that identify the need for increased flows in the LSJR and three salmon-bearing tributaries to improve habitat for early life stages of salmonids. In fact, the article acknowledges the impacts of reduced tributary flows, stating, "the removal of up to 60% of the river water either upstream or in the Delta may limit any benefits of additional management actions on salmon survival" (page 676) and "a priority on habitat quality in the Delta, combined with efforts to improve survival through all portions of the salmon life history is likely to be required if this population is to persist" (ibid.). The article illustrates that there are many variables to consider when evaluating juvenile salmonid survival through the Delta.

- **The wild steelhead temperature study on the Lower Tuolumne River (Verhille et al. 2016).** This study was completed for the Federal Energy Regulatory Commission (FERC) relicensing process for New Don Pedro dam and funded by Turlock Irrigation District (TID) and Modesto Irrigation District (MID). This study extracted fish from the river and transported them to a field laboratory where fish metabolic rates were evaluated in swim tunnels at temperatures ranging from 13°C (55° Fahrenheit (F)) to 25°C (77°F) in 1°C increments. Aerobic scope, or metabolic performance, was maintained by wild steelhead up to 23-25°C (73-77°F). These temperature values are much higher than the Unites States Environmental Protection Agency (USEPA) recommended temperature criteria for rearing salmonids of 16°C (61°F). The authors concluded that the data are suggestive of local thermal adaptation in Central Valley fish but also acknowledged that the study does not provide a sole basis for selecting new thermal criterion. Master Response 3.1, pages 46-48, provides a complete response to local salmonid temperature studies using aerobic scope.

- **Floodplain Analysis Summary.** The Final SED's floodplain analysis recognizes that inundating terrestrial habitat can trigger ecological functions such as food production and refuge habitat that support the growth and survival of juvenile salmonids. A recent article by Hellmair et al. (2018) concludes that instream cover, either in the form of woody material or inundated terrestrial vegetation, was significantly associated with increased habitat use by juvenile Chinook Salmon as compared to locations where such cover was absent. This finding is consistent with information presented in the SED and highlights the importance of seasonal inundation of vegetated areas along rivers during time periods when juvenile salmonids are present. The Final SED's floodplain analysis estimates the area and duration of floodplain inundation, reported in acre-days, for each percent of unimpaired flow value (20, 30, 40, 50, and 60) and baseline. The estimates of floodplain inundation area and length are used to identify the potential ecological benefits triggered by activating floodplain processes and to compare the results among each of the flow scenarios and the baseline condition. This is a reasonable approach for a programmatic analysis and provides meaningful information to compare alternatives and support State Water Board decisions.

  The floodplain analysis was criticized for not considering weighted-usable-area (WUA) models to evaluate floodplain habitats along rivers in the project area. In the Final SED, wetted area, representing juvenile rearing habitat, was divided into two separate analyses. The in-river analysis used WUA to estimate the quantity and quality of available juvenile rearing habitat inside the main part of the river channel. The in-river analysis used models provided by the irrigation districts and by the Bureau of Reclamation. The floodplain analysis in the SED evaluates juvenile rearing habitat outside the river channel, during flow conditions that are high enough to exceed river banks. Please refer to Master Response 3.1 pages 56-60, Chapter 7, *Aquatic Biological Resources*, pages 65-66, and Chapter 19, *Analyses of Benefits to Native Fish Populations from Increased Flow between February 1 and June 30,* pages 52-61.

  The over-bank floodplain analysis does not consider WUA models because some elements are not appropriate and verifiable. First, WUA does not include additional food resources that are available from inundated riparian and floodplain areas, and it is likely that additional weighting should be applied for riparian and floodplain habitats to account for increased food availability. Second, modeling velocity microhabitats within riparian and floodplain vegetation can be problematic because of grid size and other modeling and surveying limitations. Third, it is difficult to safely observe juvenile fish in order to develop habitat suitability criteria in a river during high flow conditions that are inundating dense vegetation. WUA does not evaluate predator-prey dynamics of a river system that can be shifted from a warm and slow water system to a fast and cold-water system. Finally, WUA does not comprehensively assess habitat metrics that are widely accepted as primary drivers in salmonid success, especially for the seasonal time period of February through June when food availability, migratory corridors, predation vulnerability, disease vulnerability, smoltification, and many other factors may be more important than WUA. It should also be noted that during SED development, WUA curves

that extend above floodplain inundation levels on the Stanislaus and Tuoulumne Rivers were not available.

b. <u>Southern Delta Salinity Objective</u>

The southern Delta salinity objective is based on sound science and valid data. The report titled "Salt Tolerance of Crops in the Southern Sacramento-San Joaquin River and Southern Delta," known as the Hoffman Report (Final SED, Appendix E) estimates leaching fractions in the southern Delta and describes the relationship between applied water salinity, leaching fractions, and crop yields. The report relied on two methods to determine leaching fractions: 1) salinity data of tile drainage for many fields over a wide area over many years and 2) salinity of soil extracts for nine locations representing a variety of crops, soil types, and irrigation water.

A commenter criticized the data used in the Hoffman Report, asserting that the data measured "salty groundwater" instead of soil leachate. This issue was already addressed prior to finalization of the Hoffman Report. Dr. Hoffman specifically excluded areas with shallow groundwater so that shallow groundwater salinity would not interfere with the calculation of leaching fractions. In September 2009, during a State Water Board workshop on the draft Hoffman Report after it was released for public comment, commenters raised concerns with the data used in the report. This was followed by a solicitation for more data, and subsequent revision of the report to remove data that relied upon tile drainage that could have been influenced by irrigation tail water or shallow groundwater.

The Hoffman Report determined leaching fractions in areas that have the lowest permeabilities in the southern Delta—less than 0.2 inch per hour (Ksat, or permeability, as shown in table 2.1 on page 10 of Appendix E). These low permeability soils account for 40 percent of the soils in the southern Delta, as shown in slides 15-17 and 19, that were presented by the South Delta Water Agency at a June 6, 2011, State Water Board Workshop. The total range of calculated leaching fractions for applied irrigation water of 0.5 and 0.7 dS/m ranged from 0.08 to 0.43 electrical conductivity (EC) with averages of 0.18 and 0.23 deciSiemens per meter (dS/m), respectively (Final SED Appendix E, Table 3.10, page 52).

Another report, titled "Leaching Fractions Achieved in South Delta Soils under Alfalfa Culture," (referred to as the Leinfelder-Miles study) was commissioned by a commenter to analyze southern Delta leaching fractions. The Leinfelder-Miles study does not attempt to estimate leaching fractions for the entire southern Delta, but rather provides data for seven specific test sites. Reported leaching fractions ranged between 0.02 and 0.26 EC. There is no information on how the specific sites were selected, aside from selecting sites in alfalfa fields "for their soil textural and infiltration characteristics and differing irrigation source water." The location of the seven sites is not disclosed in the Leinfelder-Miles study. The Leinfelder-Miles study states, "Some of the study sites likely accumulated salts because shallow groundwater impeded salts from leaching out of the root zone…."

All of the sites evaluated in the Leinfelder-Miles study had relatively shallow groundwater—less than 1.6 meters (5.2 feet). The Leinfelder-Miles study also highlights two sites that are affected by shallow groundwater; however, shallow groundwater is evident for at least one of the seasonal readings at all sites that have soil salinity issues.[2] The shallowest groundwater recording at three sites (Sites 1, 2 and 7) is shallower than the root zone depth reported in the study—this means groundwater is elevated into the root zone. The sites with the highest soil salinities have the shallowest groundwater. Conversely, the sites that have the lowest soil salinities have the greatest depth to groundwater. In instances where shallow groundwater is so close to, or in, the root zone, high soil salinities are likely because: 1) there is nowhere for the leached soil salt to go and 2) salt will continue to be reintroduced into the soil column from salt in the groundwater. Given the above, the results of the Leinfelder-Miles study, therefore, do not provide useful information regarding the relationship between low permeability soils and leaching fraction for soils that are *not* affected by shallow groundwater.

The presence of shallow groundwater impairs the ability to draw conclusions about the relationship between leaching fractions, soil salinity, and applied water salinity, because, as explained above, salinity in the root zone will continue to be affected by salts in shallow water unless the groundwater is lowered below the root zone. Commenters also raised the issue of shallow groundwater during the development of the Hoffman Report. As Dr. Hoffman stated in a response, "If no leaching occurs the soil will become saline and no crops can be grown. If 'normal' irrigation practices will not result in leaching then other methods must be found or the land will have to be abandoned." (Final SED, Appendix E, page 128.) These other methods include lowering of groundwater so that leaching of salts can occur. Areas with shallow groundwater will continue to have problems leaching salts from the root zone regardless of applied water salinity. In these cases, salt will accrue in the soil profile unless salinity is managed through other methods. Further reducing salinity of the applied water (i.e., the salinity water quality objective) would not remedy salinity issues caused by shallow groundwater; that is why tile drains are a typical management practice in much of the western Delta.

The Hoffman Report builds on the foundational science of the relationship between applied water salinity, leaching fraction, and crop yields with which all researchers agree. Leinfelder-Miles refers to and uses the same equations Dr. Hoffman used for leaching fraction calculations. The issue raised by a commenter based on the Leinfelder-Miles study is that some soils in the southern Delta have leaching fractions far lower than assessed in the Hoffman Report, and this means either: 1) the applied water salinity (i.e., salinity water quality objective) must be lower than 1.0 dS/m or 2) the Hoffman Report conclusions about the relationship between leaching fractions and required applied water salinity must be discarded. Neither of these conclusions is

[2] It should also be noted that the soil types on test sites evaluated in the Leinfelder-Miles study sites are primarily located in the central, southeastern and northern regions of the Delta (see Appendix E, Figure 2.4, page 9), and the groundwater depth in those areas is generally shallow, between 3-5 feet (see Appendix E, Figure 3.17, page 49). By contrast, Dr. Hoffman's tile drain data come from the southwestern region of the Delta, near Tracy [see Appendix E, Figure 3.18, page 55] where the groundwater depth is generally greater than 5 ft feet.

correct. The methods and results in the Hoffman Report are not disproven by outlier data of extremely low leaching fractions at sites with generally shallow groundwater in the Leinfelder-Miles study.

The revised southern Delta salinity objective reasonably protects water quality for agricultural beneficial uses. Scientific information regarding crop salinity tolerance and the continued high agricultural yields in the southern Delta support the conclusion that the agricultural beneficial use will be reasonably protected by a salinity objective that is 1.0 dS/m year-round. Under current, baseline conditions, the interior Delta locations often are characterized by salinity that is approximately 1.0 dS/m. Agricultural yields in southern Delta counties suggest that current irrigation water quality is not impairing yield and agricultural beneficial uses of water are reasonably protected.

One commenter criticized SED comparisons to statewide agricultural yield averages as evidence that the agricultural beneficial uses were being reasonably protected by southern Delta water quality. This response provides yield comparisons at the county level to respond to this criticism.

Review of alfalfa yields in San Joaquin County and proximate counties supports the conclusion that irrigation water quality is not impairing yield. Alfalfa is a salt sensitive crop. Alfalfa yield in San Joaquin County is a good indicator of Delta alfalfa yield because approximately a quarter of the farmland in San Joaquin County is in the Delta. In 2011, alfalfa was one of the top 10 crops grown both in San Joaquin County and in the Delta portion of San Joaquin County, both in terms of acreage and total farm gate value. Per the 2011 Agricultural Commissioner's crop report, "the San Joaquin County Delta has over 215,000 acres of farmland that produces a farm gate value of nearly $560 million," and "over 1/3 of San Joaquin County's land mass is in the Delta and produces nearly 25% of the County's $2.2 billion total agricultural value" (San Joaquin County 1998–2017). Per the 2012 census (as reported in the 2015 crop report), there were 787,015 acres of farmland in San Joaquin County in 2012 (San Joaquin County 1998–2017). Delta farmland therefore accounts for approximately 27 percent of total San Joaquin County farmland, and 25 percent of the total county farm gate value. This means that for all crops, crop value per acre in the Delta portion of San Joaquin County is the same as the crop value per acre in San Joaquin County.

Average statewide alfalfa yield is 7 to 7.5 tons per acre, with higher yields, approaching 8 tons per acre in the San Joaquin Valley, and lower yields of 6 tons per acre in the Sacramento Valley (Putnam et al. 2007).

Alfalfa yield per acre in San Joaquin County is similar to average yields in adjacent counties, as shown below in Figure 1. Alfalfa yield per acre has fluctuated between 6.0 and 7.5 tons/acre since 1998 even though overall alfalfa acreage has declined in the Delta and proximate counties since 2014 with declining commodity prices (Merced County 1998–2017; San Joaquin County 1998–2018; Stanislaus County 1998–2017; Yolo County 1998–2017). Stanislaus County shows the highest yield per acre in most years while Yolo County shows the lowest yield per acre in

most years. San Joaquin and Merced County alfalfa yields/acre fluctuate in approximately the same range between Stanislaus and Yolo Counties. San Joaquin County alfalfa yield data suggest that baseline levels of water quality are sufficient to support this salt- sensitive crop in a county that has a quarter of its farmland in the Delta.

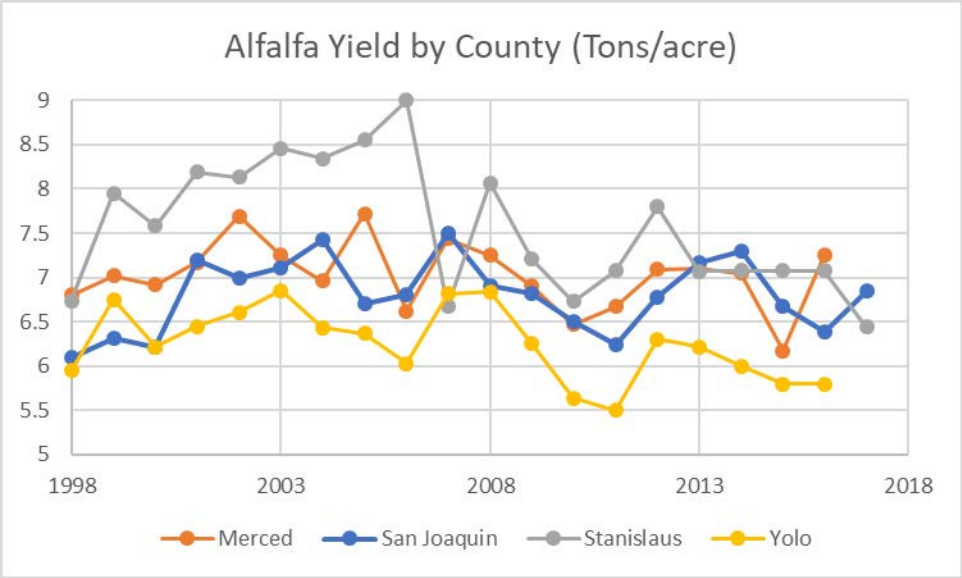

Figure 1: Alfalfa Yield for Merced, San Joaquin, Stanislaus, and Yolo Counties. Source: Merced County 1998–2017; San Joaquin County 1998–2018; Stanislaus County 1998–2017; Yolo County 1998–2017.

2. Project Alternatives

Some commenters suggested that non-flow approaches or other plans or proposals could achieve the Bay-Delta Plan's goals of reasonably protecting fish and wildlife beneficial uses. The Final SED addresses the purposes and goals of the plan amendments and the feasibility of non-flow approaches in its assessment of alternatives to the plan amendments including in Chapter 3, *Alternatives Description*, and Master Response 2.4, *Alternatives to the Water Quality Control Plan Amendments.* Flow is a necessary water quality parameter to protect fish and wildlife beneficial uses and, thus, an essential element of the LSJR flow objectives. Thus far, it has not been demonstrated that alternatives that include non-flow measures, but a limited or lesser amount of flows or flows for shorter time periods than evaluated under the LSJR alternatives, could achieve the purposes and goals of the plan amendments.

Commenters described the proposed Tuolumne River Management Plan (TRMP) and compared it to the LSJR plan amendments. The proposed TRMP is an application to the Federal Energy Regulatory Commission (FERC) for the relicensing of New Don Pedro dam. The FERC applicants, Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (the Districts), worked with the City and County of San Francisco (CCSF) to develop what is called the Districts' Proposed Plan (DPP) and submitted it to

FERC on October 11, 2017 as part of the Amended Final License Application for a renewed license to operate New Don Pedro dam. Recently, the Districts and CCSF began to refer to the "DPP" as the proposed "Tuolumne River Management Plan."

The proposed TRMP is a combination of non-flow measures and slight flow increases that are similar to existing FERC-required flows and substantially lower than the flows required under the LSJR plan amendments. FERC will evaluate the DPP as it decides what to include in the project that FERC will ultimately analyze in its environmental impact statement.

The TRMP is very similar to the "San Francisco Public Utilities Commission (SFPUC) Alternative" to the LSJR plan amendments submitted to the State Water Board by CCSF in its March 17, 2017 comments on the draft recirculated SED. The TRMP does not address the Stanislaus or Merced Rivers, which are both addressed by the LSJR plan amendments in addition to the Tuolumne River. State Water Board staff responded to proposed alternatives, including the SFPUC Alternative, in Master Response 2.4 *Alternatives to the Water Quality Control Plan Amendments*; given the TRMP's similarities with the SFPUC Alternative, the relevant responses in Master Response 2.4 also apply to the TRMP.

Based on the information provided, the TRMP does not demonstrate that it will meet the purposes and goals of the LSJR plan amendments, including achieving the reasonable protection of fish and wildlife beneficial uses. Commenters described modeling results comparing the TRMP to the LSJR plan amendments at 40 percent of unimpaired flow. This document responds to the water and biological modeling information discussed on August 22, 2018 by TID.

The proposed TRMP flows are similar to existing FERC flow requirements and are therefore significantly lower than LSJR Alternatives 2 or 3 in the months February-June, as shown below in Figure 2. Accordingly, the proposed TRMP flows would provide only minor increases in flow-related habitat metrics such as favorable temperatures and floodplain inundation relative to baseline. In contrast, LSJR Alternative 3 provides substantial improvements in temperature conditions and potential for floodplain inundation (see SED Chapters 7 and 19 and Master Response 3.1). In addition, the proposed TRMP flow increases would not convey temperature and floodplain benefits downstream in the LSJR. As the largest contributor to the lower San Joaquin, Tuolumne River flows have the highest potential to provide flow-related benefits to the LSJR system. The plan amendments provide these flow-related benefits; the TRMP does not.

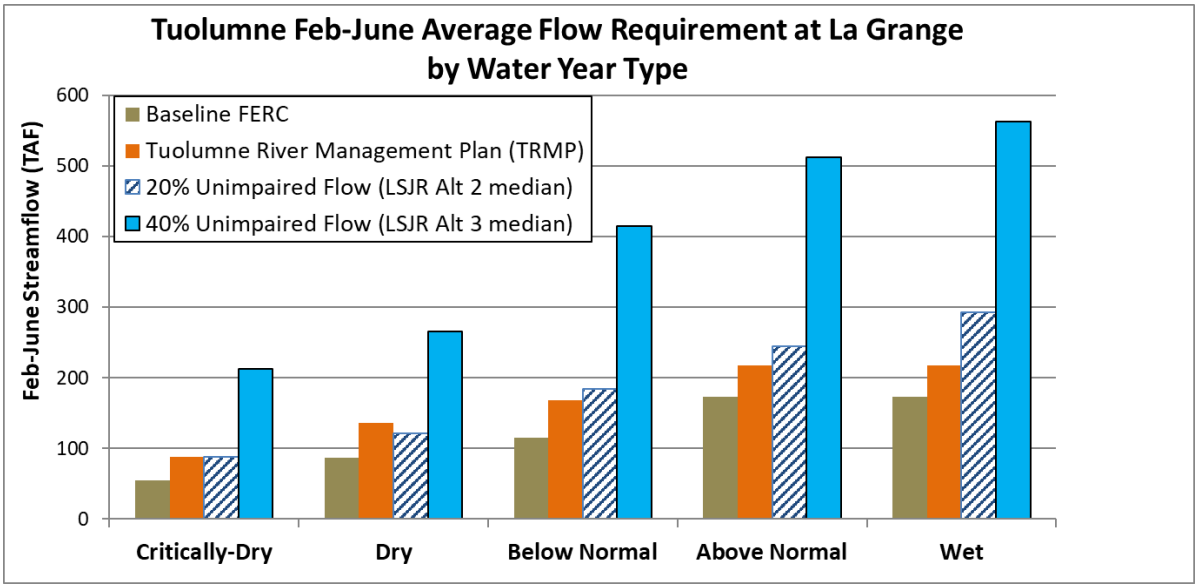

Figure 2. Comparison of Existing FERC Requirements in Baseline, TRMP, and 40% of Unimpaired Flow (LSJR Alternative 3) flow requirements. LSJR Alt 3 values are median values.

The proposed TRMP required flows and resulting fish production benefits described by TID are not appropriate for a direct comparison to the LSJR plan amendments. First, comparing required flows and resulting fish benefits masks the function that baseline levels of existing flow are providing in the Districts' analysis. The LSJR plan amendments create a "minimum" instream flow requirement that must be maintained February through June; however, since it is a minimum, expressing the requirement as a bar does not acknowledge that part of the requirement is already being met by baseline flows. Conversely, the proposed TRMP does not substantially increase "required flows," but expressing the required flows as a bar and then relying on the existing flows that are available under baseline conditions in the determination of fishery benefits does not acknowledge that baseline flows are being included in the TRMP fishery benefit calculation. Second, TID modeled the LSJR plan amendments without the non-flow actions that were evaluated in the proposed TRMP, which limits the direct comparison value. The Districts' analysis included flows and non-flow actions in the assessment of its proposal but did not conduct a comparable assessment of the LSJR plan amendments with non-flow actions. While the LSJR plan amendments do not require non-flow actions, they do recommend such actions. It would have been reasonable to include them in any comparison because the Districts are proposing the non-flow actions.

The proposed TRMP represents the Districts' assessment of their proposed action using their own models. However, the validity of the Districts' biological models is highly uncertain and remains challenged by outstanding agency comments that were not resolved in the final study reports for the juvenile fish production models (CDFW 2014a; NMFS 2014a; USFWS 2014; TID and MID 2013b, 2017a, 2017b, 2017c). California Department of Fish and Wildlife (CDFW), U.S. Fish and Wildlife Service (USFWS), and State Water Board documented disagreements with underlying model assumptions in multiple letters and comments in meetings regarding juvenile fish production models and the Districts'

predation study and report (CDFW 2013a, 2013b, 2014b; NMFS 2014b; USFWS 2013a, 2013b; State Water Board 2013a, 2013b; Stillwater Sciences 2013; TID and MID 2013a, 2013b, 2016). Agency criticisms of the Districts' biological models include, but are not limited to, concerns that models do not recognize existing rearing and spawning habitat limitations or accurately represent temperature sensitivity, predation, and the effect of flow in establishing rearing and floodplain habitat benefits.

Finally, the Districts' use of WUA in isolation from other flow-related benefits does not include important habitat metrics such as food availability, propagation of downstream temperature benefits, migratory corridors, and the value of riparian channel margin and floodplain habitat activation. The TRMP analysis does not recognize the ability of the LSJR plan amendments to shape flows for targeted optimization of in-channel WUA at certain times and overbank floodplain habitats at other times. The LSJR plan amendments provide a sufficient water budget to shape flows for more frequent floodplain activation while the proposed TRMP doesn't propose enough flow to trigger such ecological functions as often as the LSJR plan amendments. For these reasons described above, the Districts' juvenile fish production models are not appropriate for comparative analysis to the FERC base case or the LSJR plan amendments.

3. <u>Stanislaus, Tuolumne, and Merced Working Group</u>

Some commenters sought clarity regarding the role of the Stanislaus, Tuolumne, and Merced Working Group (STM Working Group) or suggested adding additional detail regarding the composition and governance. The STM Working Group is discussed in the SED, including in Appendix K, *Revised Water Quality Control Plan*, Master Response 2.1, *Amendments to the Water Quality Control Plan*, and Master Response 2.2, *Adaptive Implementation*. Some commenters expressed concern regarding the role of the STM Working Group in establishing minimum reservoir carryover storage targets or other requirements to help ensure that providing flows to meet the flow objectives will not have significant adverse temperature or other impacts on fish and wildlife or, if feasible, on other beneficial uses. As explained in the SED, the STM Working Group's role is advisory.

To address certain of these concerns, additional amendments to the LSJR program of implementation have been proposed. The changes expressly include non-governmental organizations in the STM Working Group composition and provide for a balance of interests so that, to the extent practicable, no one interest constitutes a majority of the group. The revisions further clarify that the group's role is to make recommendations and that the group has no control over water diversions or project operations. It is the State Water Board's responsibility to require that the diverters and reservoir operators who are assigned responsibility to implement the plan amendments incorporate minimum reservoir carryover storage targets or other requirements in their water management in order to help ensure that significant adverse impacts (such as loss of sufficient cold water pool) are avoided. Collaborating with the STM Working Group would offer these diverters and operators access to a wide range of expertise and the potential to achieve a common understanding and support for adaptive management proposals and the use of adaptive methods such as flow-shifting. Finally, the changes specify procedures associated with the submittal and approval of annual adaptive operations plans, namely, that the State Water Board will assign responsibility for submitting and implementing the plans when it implements

the LSJR flow objectives in water right or water quality actions. The State Water Board will consider the recommendations of the STM Working Group when acting on the plans.

Changes have not been made to establish a more rigid governance structure for the STM Working Group in the Plan amendments. The program of implementation provides structure for governing adaptive implementation decisions in the absence of consensus while allowing for the development of a detailed governance structure and decision-making processes by the State Water Board in consultation with the STM Working Group.

4. Minimum Reservoir Carryover Storage Targets or Other Requirements

The proposed plan amendments require the February through June LSJR flows to be managed in a way that avoids causing significant adverse impacts to fish and wildlife beneficial uses at other times of year. (SED Appendix K, Table 3, p. 18.) For example, dams block the ability of salmonids to reach cold water pools in the upper watersheds. So, currently, dam operators mitigate in part for this impact by releasing cold water below the dam in the fall. The flow objectives could result in more water being bypassed in February through June and less water being diverted to storage during this time, which in turn could limit the ability of reservoir operators to make cold water releases later in the year. The program of implementation allows water diverters and users, in collaboration with the STM Working Group, to adaptively avoid such unintended adverse effects by releasing a portion of the February through June flows after June. (SED Appendix K, p. 31.) The program of implementation also commits the State Water Board, when implementing the LSJR flow objectives, "to include minimum reservoir carryover storage targets or other requirements to help ensure that providing flows to meet the flow objectives will not have significant adverse temperature or other impacts on fish and wildlife or, if feasible, on other beneficial uses." (SED Appendix K, p. 28.) By requiring the February through June flows to be managed to avoid adverse impacts to fish and wildlife beneficial uses at other times of year, the State Water Board will help ensure that the LSJR flow objectives are achieved.

Some commenters questioned whether the State Water Board has authority to impose minimum reservoir carryover storage targets or other requirements to avoid adverse impacts. The Final SED describes the State Water Board's authority, including in Chapter 1, *Introduction*, Master Response 1.1, *General Comments*, and Master Response 1.2, *Water Quality Control Planning Process*. The State Water Board has broad authority to implement the plan amendments, including through water right actions involving riparian users and senior appropriators. (Cal. Const. art. X, § 2; *Nat. Audubon Society v. Superior Ct.* (1983) 33 Cal.3d 419; *Light v. State Water Res. Control Bd.* (2014) 226 Cal.App.4th 1463; *United States v. State Water Resources Control Bd*. (1986) 182 Cal.App.3d 82.) Water rights in California are subject to, and qualified by, the inherent limitations of the reasonable and beneficial use doctrine and public trust doctrines, both of which restrict a water right holder's ability to divert, store and use any specific quantity of water for its own purposes on an ongoing basis. The State may require public trust needs to be met before allowing the diversion or use of water if the State subsequently deems it necessary and feasible to protect public trust resources.

More specifically, with respect to carryover storage targets, or other reservoir requirements, the State Water Board's continuing authority to prevent unreasonable method of diversion and to protect public trust resources include authority to set conditions to avoid or mitigate adverse effects on fish that might otherwise result from reservoir operations. The State Water Board previously has imposed requirements on the diversion and use of water that may affect a water project's operations. For example, in Order WR 90-18, the State Water Board amended a water right license to set instream flow requirements that included a minimum pool requirement to protect fish. (See also Order WR 2009-0039 [requiring reservoir elevations in 401 certification for a project on the Stanislaus River] and Order WR 90-5 [enforcing water quality objectives in Shasta Dam operations].) The State Water Board has also considered whether there is a "physical solution" available by which competing needs be best served. In those cases, which include the Mono Lake decision, the State Water Board concluded that the physical solution doctrine can be applied to require releases from storage to establish a flow regime for the protection of fish (see e.g., State Water Board Decision 1631 and Order WR 90-16).

While the specifics will be determined during implementation, the State Water Board may implement such requirements, for example, by requiring the reservoir owner or operator to develop and implement a plan to avoid adverse impacts. The reservoir owner or operator also may adopt adaptive implementation measures that include flow shifting to later in the year. In this case, the STM Working Group would provide recommendations to the State Water Board on adaptive implementation, but would not control operational decisions by water diverters or users. Again, this is a possible example of how any requirement would be developed and implemented. State and federal agencies routinely impose requirements on water supply projects that affect operations, including for example, requirements to comply with the existing Bay-Delta Plan, biological opinions, or flood control measures. Facility operators incorporate these requirements into their facility management; the regulatory agency is not managing the project facility.

The LSJR narrative objective and related elements in the program of implementation (such as carryover storage targets and flow shifting) are discussed throughout the Final SED, including in Master Response 2.1, Amendments to the Water Quality Control Plan; Master Response 2.2, *Adaptive Implementation*; Master Response 3.2, *Surface Water Analyses and Modeling*; and Appendix F.1, *Hydrologic and Water Quality Modeling*.

5. <u>Publicly Owned Treatment Works (POTWs)</u>

Commenters expressed concerns that compliance schedules under the State Water Board Compliance Schedule Policy, Resolution No. 2008-0025, to meet the salinity water quality objective may not be available to the POTWs when they need it. They are concerned that the duration of a compliance schedule under the policy is ten years from the adoption of a water quality objective and POTWs may not be subject to numeric water quality based effluent limitations necessitating a compliance schedule until after that time. The plan amendments provide that it may be infeasible for POTWs discharging to the southern Delta to comply with numeric water-quality based effluent limitations for salinity. If it becomes feasible for a POTW to comply, then the POTW would have to comply with the more stringent numeric limits for salinity, which may entail the POTW having to construct new infrastructure. This

feasibility determination, however, could be made after ten years from the adoption of the salinity water quality objective.

To address the commenters' concerns, additional revisions to the plan amendments' program of implementation have been proposed. The Compliance Schedule Policy allows a ten-year compliance schedule from not only the adoption of new water quality objectives, but also from new interpretations of water quality objectives that result in more stringent limits. The above-mentioned feasibility determination is consistent with the intent of the Compliance Schedule Policy to allow for compliance schedules for newly interpreted water quality objectives resulting in more stringent limits. Accordingly, the revised language states:

> If the Central Valley Regional Water Board determines it is feasible for a POTW to comply with numeric water quality based effluent limitations for salts, it may grant compliance schedules for new compliance actions to comply with the numeric limitations consistent with the State Water Board's Compliance Schedule Policy, Resolution No. 2008-0025. A feasibility determination would result in the first instance of a legally binding numeric permit limitation for the POTW to implement the salinity water quality objective for the southern Delta set forth in Table 2, and shall be regarded as a "newly interpreted water quality objective" under the State Water Board Compliance Schedule Policy, Resolution No. 2008-0025 at the time of the NPDES permitting action implementing the feasibility determination.

A commenter also expressed a concern that the Compliance Schedule Policy may not apply to relaxed water quality objectives and that the proposed salinity water quality objective arguably is. The Compliance Schedule Policy states that a compliance schedule is not authorized when an objective has been relaxed *and* the new permit limits are less stringent than the limits based on the prior, more stringent objective. That would not be the case with the POTWs in the southern Delta with respect to the salinity water quality objective. As explained in the proposed plan amendments language above, the feasibility determination would result in the first instance of a legally binding numeric limit for a POTW to implement the salinity water quality objective in the Bay-Delta Plan.

Finally, a commenter stated that the state of emergency provision in the proposed plan amendments should be expanded to encompass the southern Delta salinity water quality objective because flow and salinity are interconnected. No change has been made. The state of emergency provision states the State Water Board may authorize a temporary change in the implementation of the LSJR flow objectives in a water right proceeding if there is an emergency (as defined under the California Environmental Quality Act) or the Governor has declared an emergency and the LSJR flow requirements affect or are affected by the conditions of such emergency. This provision could, for example, allow a temporary change to water right implementation requirements related to the LSJR flow objectives in order to provide water for public health and safety needs in a Governor-declared state of emergency. Implementation of the salinity water quality objective does not implicate similar concerns. To the extent that the commenter is concerned with droughts affecting compliance with the salinity objective, as explained in Master Response 2.1, *Amendments to the Water Quality Control Plan*, the state of

emergency provision is not intended to address routine droughts. Furthermore, the plan amendments have already been revised to provide regulatory relief to POTWs by recognizing that compliance with traditional numeric water quality effluent limitations for salinity may not be feasible in the southern Delta and allowing alternative effluent limitations, including a performance limitation that considers drought.

6. References Cited

Buchanan, R. A., P. L. Brandes, J. R. Skalski. 2018. *Survival of Juvenile Fall-Run Chinook Salmon through the San Joaquin River Delta, California, 2010–2015*. *North American Journal of Fisheries Management.* DOI: 10.1002/nafm.10063.

California Department of Fish and Wildlife (CDFW). 2013a. *California Department of Fish and Wildlife Comments on Draft Meeting Notes and W&AR-6 Workshop No.2, Don Pedro Hydroelectric Project (Project) No. 2299, Tuolumne River.* September 17.

California Department of Fish and Wildlife (CDFW). 2013b. *California Department of Fish and Wildlife Comments on Draft 2014 Predation Study Plan, Don Pedro Hydroelectric Project Nol. 2299, Tuolumne River*. September 3.

California Department of Fish and Wildlife (CDFW). 2014a. *Comments in Response to Draft License Application Don Pedro Hydroelectric Project (Project) Federal Energy Regulatory Commission (Commission) No. 2299-075 Tuolumne River*. February 26.

California Department of Fish and Wildlife (CDFW). 2014b. *Comments on Request for Extension of Time to Conduct FERC-Approved Predation Study for Don Pedro Hydroelectric Project (Project) Federal Energy Regulatory Commission (Commission) No. 2299/075 Tuolumne River*. April 25.

Hellmair, M., M. Peterson, B. Mulvey, K. Young, J. Montgomery, A. Fuller. 2018. Physical Characteristics Influencing Nearshore Habitat Use by Juvenile Chinook Salmon in the Sacramento River, California. *North American Journal of Fisheries Management.* DOI: 10.1002/nafm.10201.

Merced County. 1998–2017. *Agricultural Commissioner's Reports: Alfalfa Yield (tons/acre)*. Available: http://www.co.merced.ca.us/Archive.aspx?AMID=36. Accessed: September 9, 2018.

National Marin Fisheries Service (NMFS). 2014a. *Comments on the Draft License Application for the Don Pedro Hydroelectric Project, P-2299*. March 3.

National Marine Fisheries Service (NMFS). 2014b. *Comments on the Updated Study Report and Proposed Modifications to the Commission's Study Plan for the Don Pedro Hydroelectric Project, P-2299*.

Putnam, D. H., C. G. Summers, S. B. Orloff. *Alfalfa Production Systems in Californina*. Irrigated Alfalfa Management for Mediterranean and Desert Zones. University of California, Division of Agriculture and Natural Resources. Publication 8287. December. Available: https://alfalfa.ucdavis.edu/irrigatedalfalfa/pdfs/UCAlfalfa8287ProdSystems_free.pdf. Accessed: October 17, 2018.

San Joaquin County. 1998–2017. *Agricultural Commissioner's Reports: Alfalfa Yield (tons/acre)*. Available: https://www.sjgov.org/department/agcomm/crop_reports. Accessed: September 9, 2018.

Stanislaus County. 1998–2017. *Agricultural Commissioner's Reports: Alfalfa Yield (tons/acre)*. Available: http://www.stanag.org/crop-reports.shtm. Accessed: September 9, 2018.

State Water Resources Control Board (State Water Board). 2013a. *Don Pedro Hydroelectric Project, Federal Energy Regulatory Commission Project No. 2299, W&AR-6 Chinook Salmon Population Model Study Report and Workshop No.2 Draft Meeting Notes*. September 23.

State Water Resources Control Board (State Water Board). 2013b. *Comments on Initial Study Report for Don Pedro Hydroelectric Project, Federal Energy Regulatory Commission Project No. 2299*.

Stillwater Sciences. 2013. *Turlock Irrigation District and Modesto Irrigation District Don Pedro Project, FERC Project No. 2299, Final Meeting Notes and Responses to Relicensing Participant Comments on the W&AR-6 Modeling Workshop No. 2 held on August 6, 2013*. October 31.

Turlock Irrigation District (TID) and Modesto Irrigation District (MID). 2013a. Salmonid Population Information Integration and Synthesis Study Report Don Pedro Project FERC NO. 2299. January. Prepared by Stillwater Sciences.

Turlock Irrigation District (TID) and Modesto Irrigation District (MID). 2013b. *Don Pedro Project Relicensing Combined W&AR-06—Chinook Population Model—and W&AR-10—*O. mykiss *Population Model—Consultation Workshop Logs*. November 15, 16, 2012; August 8, 2013; November 5, 2013.

Turlock Irrigation District (TID) and Modesto Irrigation District (MID). 2016. *Don Pedro Hydroelectric Project, Project No. 2299-075-CA Predation Study*.

Turlock Irrigation District (TID) and Modesto Irrigation District (MID). 2017a. *Chinook Salmon Population Model Amended Study Report, Don Pedro Project, FERC NO. 2299*. September. Prepared by Stillwater Sciences.

Turlock Irrigation District (TID) and Modesto Irrigation District (MID). 2017b. *Don Pedro Hydroelectric Project, FERC NO. 2299, Amendment of Application, Exhibit E—Environmental Report*. September.

Turlock Irrigation District (TID) and Modesto Irrigation District (MID). 2017c. Oncorhynchus Mykiss *Population Model Amended Study Report, Don Pedro Project, FERC NO. 2299*. September. Prepared by Stillwater Sciences.

U.S. Fish and Wildlife Service (USFWS). 2013a. *U.S. Fish and Wildlife Service Comments on W &AR- 6, Chinook Salmon Population Model Study Draft Report and Workshop No.2 Draft Meeting Notes for the Don Pedro Hydroelectric Project, Federal Energy Regulatory Commission Project No. P-2299 on the Tuolumne River; Tuolumne and Stanislaus Counties, California*. September 20.

U.S. Fish and Wildlife Service (USFWS). 2013b. *U.S. Fish and Wildlife Service Comments on the W&AR-7 Draft 2014 Predation Study Plan for the Don Pedro Hydroelectric Project, Federal Energy Regulatory Commission Project No. P-2299 on the Tuolumne River.* Tuolumne and Stanislaus Counties, California.

U.S. Fish and Wildlife Service (USFWS). 2014. *U.S. Fish and Wildlife Service Comments o~ Updated Study Report and Draft License Application, Don Pedro Hydroelectric Project, FERC Project #P-2299 on the Tuolumne River; Tuolumne and Stanislaus Counties, California*. February 26.

Verhille, C. E., K. K. English, Cocherell, D. E., Farrell, A. P., and Fangue, N. A. 2016. High Thermal Tolerance of a Rainbow Trout Population near its Southern Range Limit Suggests Local Thermal Adjustment. *Conservation Physiology* 4(1):cow057; doi:10.1093/conphys/cow057.

Yolo County. 1998–2017. *Agricultural Commissioner's Reports: Alfalfa Yield (tons/acre)*. Available: https://www.yolocounty.org/general-government/general-government-departments/agriculture-cooperative-extension/agriculture-and-weights-measures/crop-statistics. Accessed: September 9, 2018.