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

MAR 28 2013

Ms. Jeanine Townsend
Clerk to the Board
State Water Resources Control Board
P.O. Box 100
Sacramento, California 95814-0100

RE: EPA's comments on the Bay-Delta Water Quality Control Plan; Phase 1; SED

Dear Ms. Townsend,

The U.S. Environmental Protection Agency (EPA) appreciates the opportunity to review the State Water Resources Control Board's (State Board's) *Public Draft Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary: San Joaquin River Flows and Southern Delta Water Quality,* (SED), released on December 31, 2012. Once the State Board concludes this process, EPA will review and approve or disapprove any new or revised water quality standards pursuant to Clean Water Act §303(c).

We urge the State Board to expeditiously adopt and implement updates to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta WQCP).[1] The benefits of increasing freshwater flows can be realized quickly and help struggling fish populations recover. EPA respectfully submits the following observations and recommendations regarding the SED:

1. EPA supports the State Board's efforts to enhance freshwater flows for aquatic life protection as part of a multi-phase, interagency effort to address resource degradation in the San Joaquin River basin.

Multiple stressors are impacting aquatic life and degrading water quality across the Bay-Delta ecosystem.[2] These stressors include insufficient freshwater flow, conversion and fragmentation of floodplains and wetlands, discharge of contaminants into surface waters, introduction and spread of invasive species and the resulting alteration of food webs, and degradation of aquatic habitat through high instream water temperatures and low levels of dissolved oxygen.

The State Board, in its Strategic Plan, has articulated a valid process for considering flows and other stressors affecting the Bay-Delta ecosystem,[3] and has recognized that increasing freshwater flows is

[1] State Water Resources Control Board, 13 December 2006, Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, (Bay-Delta WQCP).
[2] See EPA's December 11, 2012 letter to the State Board Re: The Comprehensive Review of the Bay-Delta Water Quality Control Plan. Available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/comments121212/karen_schwinn.pdf
[3] State Water Resources Control Board; Strategic Plan 2008-2012 http://www.waterboards.ca.gov/water_issues/hot_topics/strategic_plan/2007update.shtml

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essential for protecting resident and migratory fish populations.[4] The State Board correctly concluded that "*[a]lthough flow modification is an action that can be implemented in a relatively short time in order to improve the survival of desirable species and protect public trust resources, public trust resource protection cannot be achieved solely through flows – habitat restoration also is needed…One cannot substitute for the other; both flow improvements and habitat restoration are essential to protecting public trust resources.*"[5] The Regional Water Boards, other agencies, and non-governmental organizations are already pursuing actions to decrease the loading of contaminants into waterways, and to restore floodplains and riparian habitat. To comprehensively address all stressors, the State Board should use its authorities to address the flow regime.

2. EPA recommends strengthening the proposed narrative fish and wildlife objective with greater definition and extending year-round protection to aquatic life.

In the SED, the State Board proposed the following narrative fish and wildlife objective to apply from February to June:

> "*Maintain flow conditions from the San Joaquin River Watershed to the Delta at Vernalis, together with other reasonably controllable measures in the San Joaquin River Watershed, sufficient to support and maintain the natural production of viable native San Joaquin River watershed fish populations migrating through the Delta. Flow conditions that reasonably contribute toward maintaining viable native migratory San Joaquin River fish populations include, but may not be limited to, flows that mimic the natural hydrographic conditions to which native fish species are adapted, including the relative magnitude, duration, timing, and spatial extent of flows as they would naturally occur. Indicators of viability include abundance, spatial extent or distribution, genetic and life history diversity, migratory pathways, and productivity.*"[6]

The draft narrative objective should be strengthened by replacing vague language with measurable performance targets and by having it apply during all months of the year. Clear definitions and performance targets are critical for establishing an effective objective and allow for evaluation of the attainment of the objective in the future. A water quality standard "*express(es) or establish(es) the desired condition…or instream level of protection for waters of the United States….*"[7] The term "viable," for example, is subject to wide variation of interpretation, which minimizes the clarity and effectiveness of the objective. Measurable performance targets should be established for "*viable,*" and the "*abundance, spatial extent or distribution, genetic and life history diversity, migratory pathways and productivity*,"[8] Similarly, we recommend removing the phrase "*other reasonably controllable measures in the San Joaquin River watershed*" from the objective and relocating it to prefatory material that establishes the context for multiple stressors in the lower San Joaquin River watershed. Including this phrase in the objective defers decisions to future discussions about what, if anything, should be done about freshwater flows and other stressors affecting the San Joaquin River.

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[4] "*The best available science suggests that current flows are insufficient to protect public trust resources.*" Page 2 and "*The public trust resources…include those resources affected by flow, namely, native and valued resident and migratory aquatic species, habitats, and ecosystem processes.*" Page 10 in State Water Resources Control Board, 3 August 2010, Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem Prepared Pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009, (2010 Flows Report), available at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf

[5] 2010 Flows Report, p. 7.

[6] State Water Resources Control Board, December 2012, Public Draft Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary: San Joaquin River flows and Southern Delta Water Quality (SED), Appendix K, Table 3, p. 1.

[7] Environmental Protection Agency, October 2012, What is a New or Revised Water Quality Standard Under CWA 303(c)(3)? – Frequently Asked Questions, EPA Publication 820F12017. 4pp. available at http://water.epa.gov/scitech/swguidance/standards/cwa303faq.cfm

[8] SED, Appendix K, Table 3, p. 1.

In addition, the proposed objective should be applied year round. Protecting the "viability" of fish populations involves protecting all of their life stages and native migratory fish are present in the San Joaquin River watershed in all months of the year. Although the proposed program of implementation currently focuses on flow-related actions in specific seasons, it seems clear the broad goal of the narrative objective, viable populations of native migratory fish, is a year-round goal. See #7 below for more detail.

The status of the existing *salmon doubling* objective[9] for the San Joaquin River and its relationship to the proposed objective is unclear in the SED. We recommend providing a redline/strike-out version of the Bay-Delta WQCP to show that the narrative salmon doubling objective will remain as an objective in the Bay-Delta WQCP after this update. The intended relationship between the proposed narrative objective and the salmon doubling objective should be explicitly described in the final SED.

3. The proposed flows do not appear to be substantially different from existing flows.

The preferred alternative identified in the SED includes requirements for 35% unimpaired flow (UF) at the mouths of the Stanislaus, Merced, and Tuolumne Rivers (February to June) and baseflows at Vernalis of 1,000 cubic feet per second (cfs) (February to June). The State Board's approach results in less than 35% UF at the downstream point of Vernalis because no flow requirements are proposed for the upper San Joaquin River, which contributes a significant amount of the unimpaired flow but less of the actual observed flow. The State Board proposed flows for the three major tributaries proportional to their historical and ecologically appropriate contributions but did not provide an adequate rationale for excluding the upper San Joaquin River itself.

Analyses summarized in the SED predict that, in an average year, proposed freshwater flows will <u>increase</u> in the Tuolumne and Merced Rivers by ~20% (February to June), <u>decrease</u> in the Stanislaus River by 7%, and <u>increase</u> at Vernalis by 8% relative to baseline.[10] EPA is concerned with the proposed decrease of flows in the Stanislaus River because the proposed flows would be less than those specified by the federal National Marine Fisheries Service (NMFS) under a "jeopardy" Biological Opinion (BO) issued to prevent the extirpation of salmon populations caused by the operation of the Central Valley Project and State Water Project.[11] The requirements in the NMFS BO would still be in effect and supercede the 35% UF requirement. However, the percentage UF selected by the State Board should strive for a higher goal of recovering sensitive species populations, rather than prescribing flow amounts lower than what is needed to merely avoid extirpation of salmon and steelhead.

In order to understand how the predicted increases <u>and</u> decreases in flows in the tributaries translate at the lowest point in the watershed, through which fish from all the tributaries must migrate, EPA calculated the median percentage UF that would reach Vernalis under the proposed flow scenario and compared it to observed flows.

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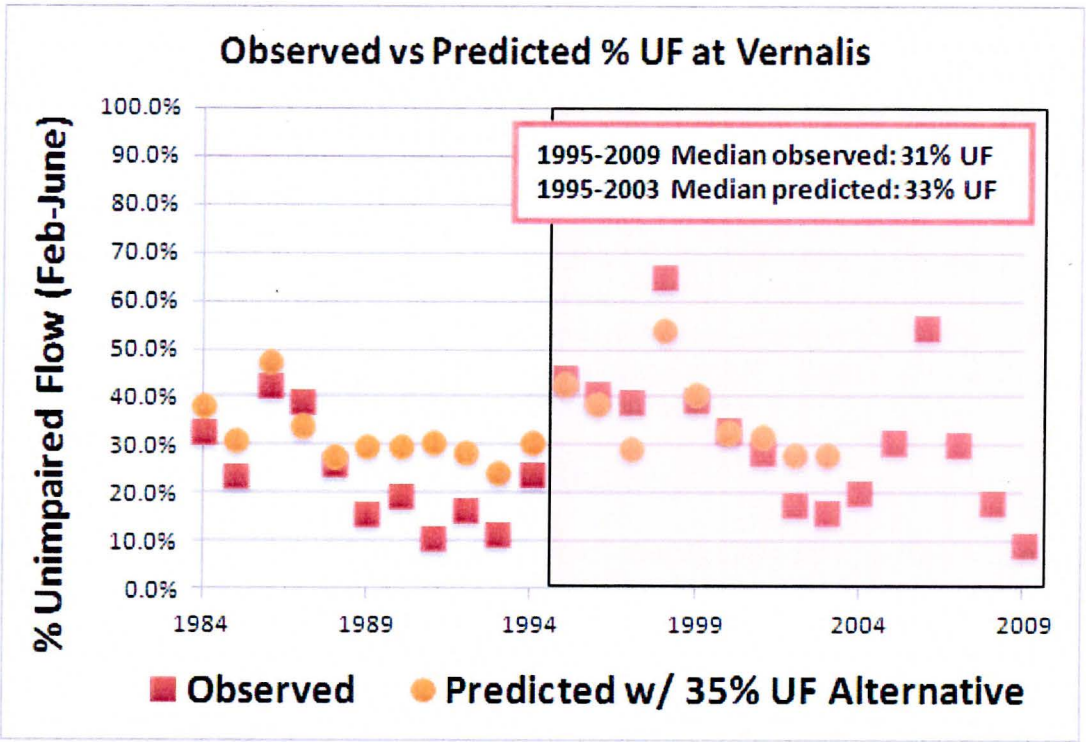
[9] Bay-Delta WQCP, Table 3, pp. 14

[10] SED, Table 20-2, pp. 20-5

[11] NMFS BO refers to NMFS, June 2009. Endangered Species Act Section 7 Consultation. Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project.
Appendix L: Sensitivity Analysis in the SED compares the NMFS Biological Opinion reasonable and prudent alternatives, including Action 3.1.3 flows required on the Stanislaus River against the flows predicted using the Water Supply Effects model under the 35% UF proposed alternative. "When the WSE model results are compared to baselines, the modeling shows some flow reductions in the Stanislaus River. However, because the LSJR alternatives would not directly result in any changes to the NMFS BO flow requirements on the Stanislaus River, actual reductions in flows below the NMFS BO flows would be unlikely." (SED, pp. 20-5)



EPA looked at the time frame since 1995, when the last major changes to flow requirements were made in the Bay-Delta WQCP. The median of observed and predicted flows under the 35% UF alternative were calculated from 1995 to the date of last available data in the SED, in 2009. The median of the observed flows is 31.0%, whereas the median of predicted flows under the 35% UF alternative is 32.8%.[12] EPA could not find a stated margin of error on the Water Supply Effects (WSE) model used in the SED, but the minor increase in flow predicted at Vernalis is likely to fall within the margin of error of the model. The flows proposed by the State Board do not appear to translate to increased protection for aquatic life compared to existing conditions.

According to the State Board,[13] U.S. Fish and Wildlife Service (FWS),[14] NMFS,[15] and the California Department of Fish and Wildlife (DFW),[16] existing conditions are not protecting aquatic life. All three fisheries agencies identified salmon and steelhead populations as declining under current flow conditions. Furthermore, in October of 2011, EPA found that existing temperature conditions, which are

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[12] EPA used observed flow and unimpaired flow at Vernalis from Tables 2.6 and 2.5 on pp. 2-17 and 2-16 in Appendix C of the SED. The values for the modeled flows at Vernalis under the proposed 35%UF scenario were obtained from column MG in the "Alt%WSEResults" tab in the spreadsheet titled "WSE_Model_12312012" which was provided along with the SED for public comment and is available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/2012_sed/docs/wse_model_econoutput_12312012.zip; last accessed 03/13/13.

[13] 2010 Flows Report, p.2.

[14] "Interior remains concerned that the San Joaquin Basin salmonid populations continue to decline and believes that flow increases are needed to improve salmonid survival and habitat." USFWS May 23, 2011 Phase I Scoping Comments, available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/cmmnts052311/amy_aufdemberge.pdf

[15] "Inadequate flow to support fish and their habitats is directly and indirectly linked to many stressors in the San Joaquin river basin and is a primary threat to steelhead and salmon." NMFS February 4, 2011 Phase I Scoping Comments, available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/cmmnts020811/010411dpowell.pdf

[16] "…current Delta water flows for environmental resources are not adequate to maintain, recover, or restore the functions and processes that support native Delta fish." Executive Summary in 2010 CDFG Flow Criteria.

heavily influenced by flow, are not adequate to support salmonids in several segments of the lower San Joaquin River and its lower tributaries.[17]

4. The proposed 35% UF may be too low to provide essential ecological functions.

EPA is concerned the proposed flows will not provide essential ecological functions such as adequate variability of flows, magnitude of flows, and tributary baseflows that a natural hydrograph can provide. Reproducing the natural variability in flow is a potential ecological benefit of using an approach based on a percentage of UF. However, a great deal of the variability is lost when one moves from a 3-day average to a 14-day average;[18] valuable peaks and troughs in flow are lost with the longer averaging period. In the past, DFW has recommended a 3-day average with a 3-day lag[19] and the feasibility of this or a similar alternative should be evaluated in the SED.

The caps on flow proposed in the SED limit the benefits of high water years to aquatic life including the flushing of gravels used for spawning, and the creation of nursery habitat for juveniles in floodplains. These caps, which are ostensibly intended to protect against flooding, are set at the median unimpaired flows in each of the tributaries, which is a metric unrelated to flooding and well below the flood control capacity.[20] The caps are the equivalent of 31% of flood control capacity on the Stanislaus River, 23% of capacity on the Tuolumne River and 33% of capacity on the Merced River.[21] The State Board should reevaluate the proposed caps because they allow for the delivery of less than 35% UF in the rivers at times when there is no risk of flooding.

The State Board should consider allowing the water from some representative selection of high flow events, to pass though the system as instream flows.[22] This will help restore some of the natural amplitude of flow events and hydrogeomorphic conditions on the river that are essential for healthy plant and animal populations. As currently proposed, the State Board's approach to adaptive management allows for the shifting of flows from one time period to another and would thereby allow for the Coordinated Operations Group (COG) to send a pulse flow or storm event flow down the system. However, such a small total volume of water is available for management during the February to June period that the COG would not be able to generate a pulse flow of the magnitude recommended by DFW for fall-run Chinook salmon while also reserving a sufficient flow amount to maintain reasonable baseflows in the system for the remainder of the flow window.[23]

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[17] See EPA's listing of several segments in the lower San Joaquin River and the Tuolumne, Merced and Stanislaus as impaired by temperature per CWA §303(d), Final Decision Letter on California's 2008-2010 §303(d) List of Impaired Waters issued October 11, 2011 and available at: http://www.epa.gov/region9/water/tmdl/california.html

[18] Grober, Les and Rich Satkowski, State Water Resources Control Board, presentation at a UC Davis Center for Aquatic Biology and Aquiculture (CABA) Seminar, January 18, 2013, slides 24-27 http://deltacouncil.ca.gov/sites/default/files/documents/files/CABA_Grober_and_Satkowski.pdf

[19] pp 23; http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/cmmnts020811/010711cdibble.pdf

[20] SED, Appendix C, pp. 5-4.

[21] SED, Appendix F, pp.F.1-32 indicates flows will be capped at 2,500 cfs on the Stanislaus, 3,500 cfs on the Tuolumne and 2,000 cfs on the Merced, yet SED, Figure 6-3 and Table 6-3 indicate that the California Department of Water Resources believes the flood capacity is 8,000 cfs on the Stanislaus, 15,000 cfs on the Tuolumne and 6,000 cfs on the Merced.

[22] Dahm, Cliff, University of New Mexico, presentation titled "Examples of Managed Flow Regimes - Possible Models for the Delta?" at a UC Davis Center for Aquatic Biology and Aquiculture (CABA) Seminar, January 18, 2013, states that it is better to "retain *certain floods at full magnitude and to eliminate others entirely than to preserve all or most floods at diminished levels.*" http://deltacouncil.ca.gov/sites/default/files/documents/files/CABA_Dahm.pdf

[23] See DFW testimony on 3/20/13.

The Independent Science Board for the Delta emphasized the importance of combining a percentage of UF approach with other measures such as tributary-specific, minimal flow criteria.[24] In their 2010 Flow Criteria Report, DFW recommended criteria for the recovery of fall-run Chinook salmon comprising 1,500 cfs at Vernalis (January to mid-June) in critical years, with increasing stepwise recommendations reaching 6,314 cfs in wet years.[25] These recommended baseflows from DFW are well above the baseflow proposed by the State Board in the SED (1,000 cfs at Vernalis). As summarized in Chapter 3 of the SED, in critical and dry years, the flows proposed by the State Board do not meet the criteria recommended by DFW[26] nor flows recommended by FWS.[27] The State Board should re-evaluate the proposed baseflow and ensure protection for aquatic life during critical and dry years.

5. The proposed percentage of UF is significantly lower than UF standards adopted elsewhere in the United States and internationally.

Established scientists recommend implementing freshwater flow prescriptions for rivers and estuaries that mimic the pattern of the natural hydrographs in order to protect aquatic species with life histories adapted to such flow patterns.[28] However, the flows proposed by the State Board under the UF approach described in the SED are significantly lower than flow standards resulting from the use of the UF approach elsewhere. Richter et. al.[29] studied rivers in Florida, Michigan, Maine, and the European Union and found that the cumulative allowable depletion of flows ranged from 6 - 20% year-round or in low-flow months (the equivalent of 80-94% UF); and 20-35% in higher flow months (the equivalent of 65-80% UF). These scientists recommended the equivalent of no less than 90% UF to achieve a high-level of ecological protection, and no less than 80% UF to achieve a moderate level of ecological protection. They concluded that alterations below an 80% UF threshold "*will likely result in moderate to major changes in natural structure and ecosystem functions.*"

6. The State Board's proposed flows fall short of recommended targets to protect fall-run Chinook salmon

In 2010, the State Board identified three flow criteria for the San Joaquin River at Vernalis for halting declines and rebuilding fish populations.[30] These recommendations included a 60% UF (14-day average; February through June), the existing Bay-Delta WQCP flow objective for October, and an October pulse flow of 3,600 cfs (10-day minimum) to "*provide adequate temperature and DO conditions for adult salmon upstream migration, to reduce straying, improve gamete viability, and*

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[24] "*Worldwide, research is indicating that the percent of impaired flow should be used together with other criteria. Variability in flow, tributary-specific minimal critical flows (i.e., thresholds) and flow targets need further consideration. In particular, the combined importance of higher and more variable flows in the spring, and variables such as the timing of flows and the rate of change in flow, which have been demonstrated to provide important cues to fish and other wildlife, should be further evaluated.*" Delta Independent Science Board May 22, 2012 letter to Les Grober, Re: Flow Criteria that use Precent of Unimpaired Flow http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/item8_att2_delta_isb_response.pdf

[25] California Department of Fish and Game, November 23, 2010, Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta (CDFG Flow Criteria), p. 105

[26] SED, pp. 3-12 – 3-13 and Figure 3-2

[27] SED, pp. 3-18 – 3-20 and Figure 3-6

[28] "*Major researchers involved in developing ecologically protective flow prescriptions concur that mimicking the unimpaired hydrographic conditions of a river is essential to protecting populations of native aquatic species and promoting natural ecological functions*". (Sparks 1995; Walker et al. 1995; Richter et al. 1996; Poff et al. 1997; Tharme and King 1998; Bunn and Arthington 2002; Richter et al. 2003; Tharme 2003; Poff et al. 2006; Poff et al. 2007; Brown and Bauer 2009). SED. Appendix C, p. 116

[29] Richter, B. D., Davis, M., Apse, C., and Konrad, C. P. 2011. A presumptive standard for environmental flow protection. River Research and Applications. DOI: 10.1002/rra.1511. http://eflownet.org/downloads/documents/Richter&al2011.pdf

[30] 2010 Flows Report, pp. 119-123

improve olfactory homing fidelity.[31] The first and last of these recommendations were identified as "Class A," meaning there was more robust scientific information to support specific numeric criteria than some other recommendations.

As noted in #3 above, since the 35% UF proposed in the SED would be achieved in the tributaries but not at Vernalis, the flow at Vernalis is expected to be lower.[32] The flows proposed in the SED almost halve the 60% UF that the State Board previously concluded was necessary to protect fall-run Chinook salmon, do not incorporate the recommendation for "Class A" pulse flows in the fall, and do not achieve DFW's flow recommendations to protect fall-run Chinook salmon.[33]

FWS identified flow targets[34] necessary to meet the doubling objective[35] for fall-run Chinook salmon in the Bay-Delta WQCP. The State Board did not analyze how frequently the 35% UF alternative in the SED meets these flow targets; however, the 40% UF alternative (which has 14% more flow than the proposed alternative) only meets these recommendations in 42% of modeled years.[36] In his external peer review, Dr. Olden, raised the concern that "*the rationale for examining 20-60% of unimpaired flow as the only scenarios is questionable, and it needlessly limits a full investigation of the flows required to achieve fish and wildlife beneficial use.*"[37] FWS recommended "*that a block of water should be allocated in each of the tributaries to manage flows on a daily basis so that water temperatures do not exceed 65F in the uppermost 5-mile reach between July 1 and mid October when the pulse flows begin.*"[38] The flows the State Board proposes also do not implement this latter recommendation as it falls outside the selected time frame for the objective.

7. The State Board's proposed flows do not protect all life stages of sensitive species.

The proposed narrative objective is written to protect "*native migratory San Joaquin River fish populations*" yet the proposed 35% UF is inconsistent with the protection of the existing migratory fish in the basin. The proposed flows are restricted to the February to June timeframe, and are currently based upon the biological needs and certain life stages of only a single species, fall-run Chinook salmon. The SED recognizes that other sensitive species, such as steelhead, and other life stages of fall-run Chinook salmon occupy the San Joaquin River watershed outside the proposed February to June window.[39] For example, the SED states that fall-run Chinook salmon in the San Joaquin River

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[31] 2010 Flows Report, pp 121

[32] SED, Appendix C and F

[33] Please refer to DFW's testimony to the State Board on March 20, 2013

[34] United States Fish and Wildlife Service, September 27, 2005, Recommended Streamflow Schedules To Meet the AFRP Doubling Goal in the San Joaquin River Basin (FWS 2005), pp. 27 available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/sjrf_sprtinfo/afrp_2005.pdf

[35] "*Water quality conditions shall be maintained, together with other measures in the watershed, sufficient to achieve a doubling of natural production of Chinook salmon from the average production of 1967-1991, consistent with the provisions of State and federal law.*" Bay-Delta WQCP, Table 3, pp. 14.

[36] SED, Figure 3-6, page 3-20, graph shows the flows are met in 33 out of 79 modeled years.

[37] "*Given the choice of scenarios to report (20-60% of unimpaired flow) is based on TBI/NRDC analysis suggesting 5,000 cfs threshold for salmon survival (p. 3-48) and that >50% is estimated to be needed to achieve doubling of salmon production, implies that the Technical Report is only considering potential flow schedules that may lead to salmon survival at current low levels and not salmon recovery into the future. Therefore, the rationale for examining 20-60% of unimpaired flow as the only scenarios is questionable, and it needlessly limits a full investigation of the flows required to achieve fish and wildlife beneficial use.*" p. 8 of Dr. Julian Olden's November 15, 2011 External Peer Review of "Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives." http://www.waterboards.ca.gov/water_issues/programs/peer_review/docs/sanjoaquin_river_flow/olden_pr.pdf

[38] FWS 2005, pp. 14-15

[39] SED pp. 7-14 - 7-18

watershed migrate October thru December, and spawn between November and January; and steelhead rear in the watershed for one to three years before migrating.[40]

The SED clearly identifies the deficiencies in the timeframe of the proposed flows for steelhead when it states that "although water temperatures for rearing steelhead would be improved in June, especially in the Tuolumne River, the benefits would likely be limited because the extent of suitable rearing habitat would continue to be limited by late summer water temperatures."[41] Although the SED analyzed the impact of proposed freshwater flows on maximum daily water temperatures, it did not analyze the impact of the proposed alternative (35% UF).[42] However, the analysis for the 40% UF alternative (which is 14% more flow than the proposed alternative), shows that the temperature would exceed suboptimal temperatures during six to nine months of an average year depending on location.[43] The SED also concludes that lethal temperatures would be reached for salmon in September on the Stanislaus, Tuolumne, and Merced Rivers; and in August, September, and October in the lower San Joaquin River (in an average year under the 40% UF alternative).[44] The restricted time frame of the State Board's proposed flows means important life stages of sensitive species are not protected.

Flows provided for salmon during the spring rearing cycle could go to waste if salmon populations are decimated by lethal temperatures in the fall as they migrate and spawn. By focusing on the spring months, EPA concurs with Dr. Olden's conclusion that the State Board is not fully accounting for the "range of ecologically-important flow events that occur over the entire year that are critical for salmon persistence and sustained productivity."[45] The WSE model assumes that water diverters and dam operators will not modify their behavior July through January to compensate for the new flow requirements, but experience indicates that this assumption is flawed. The State Board should analyze the indirect impacts of the proposed alternative to flow and aquatic life during the remainder of the year. Additionally, to safeguard against these indirect impacts, the State Board should provide adequate flows on a year round basis to protect aquatic life in all their life stages.

8. The State Board should ensure proposed flows are protective of downstream waters.

The State Board is addressing downstream aquatic life uses in Phase 2 of the updates to the Bay-Delta WQCP. Flow levels established during Phase 1 will influence the ability of the State to achieve Phase 2 goals. At this time, the State Board should consider the impact of proposed flows on downstream uses, or create a provision for reconsidering flow levels established during Phase 1 so adjustments can be made consistent with Phase 2 decisions.

The ability for salmonids to migrate past Vernalis, through the Delta to the ocean, and then return to spawn is essential to achieving sustainable populations, and is expressed as a goal of the proposed narrative objective.[46] Most of the freshwater from the San Joaquin River is diverted either upstream of

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[40] SED pp. 7-14 - 7-18
[41] SED, pp. 7-93
[42] SED, Chapter 20
[43] SED, pp. 7-95 - 7-96
[44] SED pp. 7-95 - 7-96
[45] *"In summary, although I agree that a fixed monthly prescription is not useful given spatial and temporal variation in runoff (p. 3-52), the Technical Report does not account for the range of ecologically- important flow events that occur over the entire year that are critical for salmon persistence and sustained productivity."* p. 7 of Dr. Julian Olden's November 15, 2011 External Peer Review of "Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives." http://www.waterboards.ca.gov/water_issues/programs/peer_review/docs/sanjoaquin_river_flow/olden_pr.pdf
[46] *"Maintain flow conditions from the San Joaquin River Watershed to the Delta at Vernalis, together with other reasonably controllable measure in the San Joaquin River Watershed, sufficient to support and maintain the* ***natural production of viable native San Joaquin River watershed fish populations migrating through the Delta.****"* Emphasis added, SED Appendix K, pp. 1

the study area for Phase 1, or as it enters the Delta, and this creates a condition whereby almost 40 kilometers of San Joaquin River channels contain water primarily from the Sacramento River in almost all months of almost all years.[47] This discontinuity between the San Joaquin River and the Pacific Ocean adversely affects the migratory ability of salmon and steelhead due to the absence of physical and chemical cues.[48] Increased flows are needed in the San Joaquin River basin to overcome this discontinuity, and if the problem cannot be adequately addressed now in Phase 1, then it should be revisited in Phase 2.

Similarly, the SED does not analyze the effects of the proposed flows and salinity objectives on achieving existing objectives in impaired downstream river segments, e.g., attaining the dissolved oxygen objective in Old and Middle Rivers and meeting the load allocations in the Lower San Joaquin River Dissolved Oxygen Total Maximum Daily Load (TMDL)[49] through which salmon must pass. Recent provisional data from the Stockton Deep Water Ship Channel, in the lower San Joaquin River, indicates that dissolved oxygen problems can arise in the fall at flows below 2,600 cfs.[50] The State Board should carefully analyze the recommendation for baseflows of 1,000 cfs at Vernalis and its impact on meeting the dissolved oxygen objective in downstream waters.

9. The State Board should analyze the potential impacts of relaxing the salinity objective on Delta hydrodynamics

The proposed seasonal salinity numerical objectives at four compliance locations in the southern Delta would change an existing objective of 0.7 and 1.0 deciSiemens per meter (dS/m) as a 30-day running average depending on the season, to 1.0 (dS/m) during all months of the year. The SED discounts, without significant analysis, the possibility that allowing salinity concentrations to rise in the southern Delta would have associated indirect impacts on instream temperatures and pollutant concentrations.[51] However, under current conditions waters are sometimes released by the U.S. Bureau of Reclamation to achieve the existing salinity objective and any change in this objective would therefore, ultimately impact flows, temperature, and pollutant concentrations in the south Delta. The SED should analyze these impacts; particularly the challenge of attaining the dissolved oxygen objective in Old and Middle Rivers and in the Stockton Deep Water Ship Channel; achieving adequate temperatures for salmonid migration; and managing the concentration and transport of selenium through the system.

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[47] Fleenor, William et al., February 15, 2010, On developing prescriptions for freshwater flows to sustain desirable fishes in the Sacramento-San Joaquin delta, available at: http://watershed.ucdavis.edu/pdf/Moyle_Fish_Flows_for_the_Delta_15feb2010.pdf

[48] Marston et al. December 2012. Delta Flow Factors Influencing Stray Rates of Escaping Adult San Joaquin River Fall-run Chinook Salmon (*Oncorhynchus tshawytscha*), San Francisco Estuary and Watershed Science, 10(4) Available at: http://escholarship.org/uc/item/6f88q6pf, see also 2010 Flows Report pp. 55-56

[49] Central Valley Regional Water Quality Control Board's San Joaquin River Dissolved Oxygen TMDL was approved by US EPA on February 27, 2007 and can be found at:
http://www.waterboards.ca.gov/rwqcb5/water_issues/tmdl/central_valley_projects/san_joaquin_oxygen/index.shtml

[50] EPA compared the daily minimum dissolved oxygen at the Department of Water Resource's Stockton Deep Water Ship Channel monitoring station 1 meter below the surface located at Rough and Ready Island available here: http://cdec.water.ca.gov/cgi-progs/queryF?s=sdo
with the net flow data at USGS' Garwood Bridge Station available at:
http://waterdata.usgs.gov/nwis/dv?cb_72137=on&format=gif_default&begin_date=2009-06-06&end_date=2009-06-22&site_no=11304810&referred_module=sw
Looking at data from 2007-2012; after the City of Stockton installed a nitrification system at their wastewater treatment plan, EPA concludes that excursions below the 6 mg/L criteria occur in September-November when flows are below 2,600 cfs.

[51] SED, Chapter 5

10. The State Board should clarify the adaptive management framework and broaden the range of unimpaired flows.

The 25-45% UF range for adaptive management is too restrictive to achieve protections for aquatic life in all water year types. In critical years, FWS recommended 76%, 86%, and 97% UF for the Tuolumne, Merced and Stanislaus Rivers, respectively, to achieve the existing Bay-Delta WQCP salmon doubling objective.[52] The range as currently proposed in the SED does not allow the flexibility to protect sensitive species during critical years

EPA supports adaptive management and believes it to be a promising concept. However, in practice, the methodology for effective adaptive management has often fallen short. In part this shortcoming can be traced to inadequate application and design.[53] To be effective, the State Board should provide more detail on the annual and long-term adaptive management described in Appendix K. This should include clearly defining the resource objectives, the roles of the Implementation Workgroup and COG, the structure and function of the decision-making process, and the specific criteria that will be used to trigger management actions. The flexibility of these groups should be constrained so as not to undermine the proposed objective, and the decision-making structure should clarify the State Board's authority to avoid any appearance of transferring authority to a third party. The State Board should coordinate and integrate the adaptive management program developed in this Bay-Delta WQCP update with ongoing monitoring efforts such as the long-established Interagency Ecological Program (IEP) and the emerging Delta Regional Monitoring Program.

Thank you for this opportunity to review and comment on the SED for San Joaquin River Flows and Southern Delta Water Quality. We look forward to working with the State Board as it completes its review and revises and implements the Bay-Delta WQCP.

Sincerely,

Timothy R. Vendlinski

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03/28/13

Cc:
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Larry Lindsay, State Water Resources Control Board

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[52] FWS 2005, pp. 27

[53] "*Despite examples of the potential of an adaptive approach, contemporary examples of successful implementation are meager. In many ways, this seems paradoxical. On the one hand, adaptive management offers a compelling framework; i.e., learn from what you do and change practices accordingly. Yet, the literature and experience reveal a consistent conclusion; while adaptive management might be full of promise, generally it has fallen short on delivery. This dilemma is widely recognized (Halbert 1993, McLain and Lee 1996, Roe 1996, Stankey and Shindler 1997, Walters 1997), leading Lee (1999: 1) to conclude "adaptive management has been more influential, so far, as an idea than as a practical means of gaining insight into the behavior of ecosystems utilized and inhabited by humans.*" p. 7 in Adaptive Management of Natural Resources: Theory, Concepts, and Management Institutions available at http://www.fs.fed.us/pnw/pubs/pnw_gtr654.pdf