Public Hearing (3/20/13)
Bay-Delta Plan SED
Deadline: 3/29/13 by 12 noon

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March 29, 2013

Via Email: *commentletters@waterboards.ca.gov*
Via Hand-Delivery

Members of the State Water Resources Control Board
Attn: Ms. Jeanine Townsend, Clerk to the Board
1001 "I" Street, 24th Floor
P.O. Box 100
Sacramento, CA 95814

Re: Comment Letter – Bay-Delta Plan SED

Dear Board Members:

The San Luis & Delta-Mendota Water Authority and State Water Contractors, Inc., on behalf of and in conjunction with each of their member agencies (herein "Public Water Agencies"),[1] appreciate this opportunity to provide comments on: (1) the 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" or "draft SED"), and (2) the draft Southern Delta Agricultural Water Quality Objectives and draft Lower San Joaquin River Fish and Wildlife Flow Objectives and the draft Program of Implementation for those objectives,[2] (together "draft amendments").

The draft amendments to the Water Quality Control Plan for the San Francisco Bay-Sacramento/San Joaquin Delta Estuary ("Bay-Delta Plan"), as identified in the SED, substantially improve upon the draft objectives and programs of implementation presented in the April 1, 2011, revised notice of preparation. The draft amendments also reflect important changes to the Bay-Delta Plan. Noteworthy improvements and changes are:

1. Updated analyses of the southern Delta salinity levels that will provide for the "reasonable" protection of agricultural beneficial uses;

2. Elimination from the program of implementation the intent to condition the water rights of the U.S. Bureau of Reclamation ("Reclamation") and the Department of

[1] See Attachment 1 for a description of the Public Water Agencies.
[2] This comment letter provides comments on the draft objectives and draft programs of implementation, as identified in Appendix K of the draft SED.

Water Resources ("DWR") on compliance with interior southern Delta salinity objectives, measured in the San Joaquin River at Brandt Bridge, Old River near Middle River, and Old River at Tracy Road Bridge; and

3. Elimination of water level and circulation narrative objectives.

Those three changes are required to ensure the objectives and programs of implementation are consistent with the best available science and the law, and the Public Water Agencies support them.

The process to develop potential changes to the Bay-Delta Plan and analyze potential changes in a draft SED presents an important opportunity for the State Water Resources Control Board ("State Water Board") to improve its understanding (and the collective understanding of interested parties) of the water quality impairments impacting beneficial uses of the waters of the Bay-Delta estuary. It also presents an opportunity to explicitly assess "all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible." (Water Code, § 13000.) Unfortunately, the draft amendments and the draft SED do not take full advantage of this opportunity and there are several legal, evidentiary and analytical defects with the draft amendments and draft SED. Attached hereto are detailed comments, which are incorporated herein by this reference. In this cover letter, the Public Water Agencies highlight a few critical defects with the draft amendments and draft SED.

1. The Draft Lower San Joaquin River Flow Objectives And Program Of Implementation Are Based On Two Underlying Premises Which Lack Evidentiary And Analytical Support

- *Unsupported Premise # 1*: Flows Can Be Managed To "Mimic the Natural Hydrographic Conditions" In A Highly Altered Ecosystem

- *Unsupported Premise # 2*: An "Unimpaired Flow" Regime Will Support And Maintain Viable Native Fish Populations

The staff has recommended that the State Water Board establish a narrative flow objective for the February-June period. The draft program of implementation contends that the beneficial uses will be better protected by establishing flows that "more closely mimic the natural hydrographic conditions." (Draft SED, App. K, at p. 3.) However, the scientific literature does not support the conclusion that more flow will necessarily provide environmental benefits and increase salmon viability. The results of the studies are mixed, particularly in highly altered systems. (Poff *et al.* 1997; Hart and Finelli 1999; Bunn and Arthington 2002; Poff and Zimmerman 2010.) As Poff, *et al.* 1997 explains:

> Most rivers are highly modified, of course, and so the greatest challenges lie in managing and restoring rivers that are also used to satisfy human needs. Can reestablishing the natural flow regime serve as a useful management and restoration goal? We believe that it can, although to varying degrees, depending on

> the present extent of human intervention and flow alteration affecting a particular river.

Accordingly, when Poff, *et al.* discusses restoration projects, it is in the context of providing targeted flows for the purpose of attaining specific ecological benefits. The general restoration literature review in Appendix C of the SED does not address the extent to which the flows being proposed here (as opposed to flows as a general concept) may provide fishery benefits through restored flow functions. Conversely, the analysis in Chapter 7 of the SED (which focuses on potentially significant negative effects) indicates that many of the benefits that sometimes occur in other systems are not expected to materialize here under any of the alternative implementation measures (e.g., no floodplain inundation, no increased turbidity, no sediment (gravel) transport, etc.). Without any analysis showing expected improvements in specific ecological functions, the draft amendments and SED lack the information to support a conclusion that the preferred Lower San Joaquin River flow alternative is necessary to obtain the narrative water quality objective.

2. The Draft Substitute Environmental Document Does Not Fully Or Sufficiently Analyze All Aspects Of The Southern Delta Salinity Objectives

The best available science supports a finding that some level of an increase in the southern Delta agricultural salinity objectives would reasonably protect agricultural beneficial uses. However, the Public Water Agencies are not expressing a position on what specific level of salinity concentration is reasonable because the draft SED is missing important information, information that is needed to allow the State Water Board to determine the amount of increase that is reasonably protective given "all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible." (Water Code, § 13000.)

For Southern Delta Agriculture, The Certainty Of Impacts Is Not Adequately Characterized: Chapter 11 of the draft SED show crops grown in the southern Delta will be fully protected with salinity objectives of 1.0 EC, during all months of the year. The draft SED projects that, even if the southern Delta salinity objectives were increased to 1.4 EC, farmers within the southern Delta would realize only a 5 percent reduction in dry bean yields (assuming 20 percent leaching fraction, and minimum precipitation) and a 3 percent reduction in almonds (assuming 15 percent leaching fraction, and minimum precipitation). (Draft SED, at p. 11-30.) Those impacts are based on analysis with highly conservative assumptions – for example, the analysis: (1) does not meaningfully account for the availability of low salinity water in the winter and spring; and (2) the analysis does not meaningfully account for changes in salt tolerance that occurs as plants mature. As a result, the impacts identified in the draft SED likely overstate the impacts that farmers in the southern Delta would realize if the southern Delta salinity objectives were increased to 1.4 EC.

No Monetization Of Potential Impacts To Southern Delta Agriculture: Crops grown in the southern Delta will be fully protected with an increase in the salinity objectives of to 1.0 EC, and therefore there is no need to monetize impacts under that alternative. However, as noted above, the draft SED identifies a 5 percent reduction in dry bean yields and 3 percent reduction in almond yields. Those impacts, assuming they would occur, are not monetized. The Public Water Agencies attempt to do that, based on information available to them.

In 2007, south Delta farmers cultivated 2,998 acres of dry-beans and 2,860 acres of almonds. (Draft SED, App. E, at p. 12 [citing San Joaquin County Ag Commissioner].) The per-acre value for dry-beans was approximately $1,140 and for almonds was $3,690. (San Joaquin County Ag Commissioner 2007 Report.) As a worst case scenario and based on information from the San Joaquin County Ag Commissions, the economic impact of a 5 percent reduction in dry beans and 3 percent reduction in almonds would be approximately $171,000 and $317,000, respectively (or collectively $488,000 annually). That calculation has not been performed by staff or presented for consideration by the State Water Board.

No Consideration Of The Comparative Costs Of Implementing The Southern Delta Salinity Objective: The draft SED does not compare the estimated $488,000 in costs to southern Delta agriculture associated with the proposed salinity objective of 1.4 EC to the burden placed on those under the draft program of implementation. If it did, the draft SED would demonstrate, for example, that the annual costs to Reclamation and DWR associated with installation of the temporary barrier program alone are more than an order of magnitude greater than the costs associated with reduced agricultural production. The annual cost of the temporary barrier program approximates $6,000,000. Additional costs are associated with other actions that would be required under the program of implementation, including monitoring and special studies. Again, those costs have not been previously presented. This point is made notwithstanding the information discussed below which demonstrates that the responsibility proposed for assignment to Reclamation and DWR is unreasonable and unlawful.

No Consideration Of Impacts Of The Southern Delta Salinity Objective On Water Service Providers: The draft SED does not analyze what, if any, water quality impacts would occur to water exported by the CVP and the SWP. Salinity in source water supplies can cause corrosion, unpleasant taste and odor, economic impacts to utilities and their customers, and constraints on water recycling and groundwater management programs. Bromide, one component of salinity, can produce harmful disinfection byproducts in drinking water such as bromate and trihalomethanes (THMs), which are known human carcinogens. Water service providers may experience increased costs to minimize or avoid those impacts by blending lower quality water or incorporating additional treatment facilities or processes. However, these options may not be available or technical or economically feasible for all water service providers. As the quality of a water source changes, the ability to blend and treat water changes. The draft amendments and draft SED fail to analyze whether such impacts will occur, or the associated costs to water suppliers to mitigate such impacts if they do occur.

3. The Draft Program Of Implementation For The Southern Delta Salinity Objectives Addresses Matters Outside Of The State Water Board's Water Quality Planning Authority That Will Impair Fundamental Rights Without Affording Due Process

The draft program of implementation for the southern Delta salinity objectives pre-determines water rights conditions and assigns to specific water right holders responsibility for implementation of the salinity objectives. However, what water right conditions, if any, are necessary to implement the salinity objectives must be considered and determined in an adjudicative water right proceeding, which affords water right holders due process. The draft program of implementation unlawfully conflates the State Water Board's quasi-legislative water

quality planning authority with its quasi-adjudicatory water rights authority. It would condition fundamental water rights without providing the procedural protections mandated by law. [3]

4. In Addition To Exceeding The State Water Board's Water Planning Authority, The Assignment Of Responsibility In The Draft Program Of Implementation For The Southern Delta Salinity Objectives Is Inequitable And Does Not Reflect Adequate Consideration Of The Factors Contributing To Southern Delta Salinity Concentrations

In several places, the draft SED acknowledges that multiple factors influence salinity concentrations in the southern Delta, including: San Joaquin River inflow; tidal action; diversions of water by the SWP, CVP, and local water users; municipal and agricultural return flows; and channel capacity. The draft SED correctly notes that operations of the CVP and SWP either have no impact or improve salinity concentrations in the southern Delta. Overall, however, the draft SED contains an incomplete and unbalanced analysis of the salinity issue, and the draft program of implementation unlawfully and inequitably assigns responsibility for addressing salinity in the southern Delta almost entirely to the CVP and SWP.

The SED Analyses Do Not Reflect Significant Reductions in Selenium And Salt Loads: The draft SED lacks any meaningful discussion of the substantial reductions in selenium and salt loads resulting from drainage management actions on the westside of the San Joaquin Valley. From Water Year 1995 to Water Year 2012, those actions reduced selenium loads by 94 percent (11,875 lbs to 750 lbs) and salt loads by 84 percent (237,530 tons to 38,400 tons). The draft SED should recognize that effort and progress and should look to others to address salt concentrations, before any new burdens are placed on the agricultural interests on the westside of the San Joaquin Valley, whether directly or through conditions on CVP water rights.

The Draft Program Of Implementation Assigns Responsibility To Reclamation And DWR When Neither Operations Of The CVP Nor SWP Facilities Contribute To Salinity Impairment In The Southern Delta: The assignment of responsibility in the draft program of implementation is not commensurate with the factors contributing to salinity concentrations in the southern Delta. The draft program of implementation assigns significant responsibility to Reclamation and DWR to install barriers, to conduct monitoring, and to prepare, fund, and conduct special studies, in spite of modeling results showing that pumping of water from the Delta by the CVP and SWP have a neutral or sometimes beneficial effect on salinity in the southern Delta, have uncertain but likely no more than limited impacts on water levels,[4] and have no adverse impact on circulation.

5. Conclusions

The Public Water Agencies welcome an opportunity to work with the State Water Board to address the comments raised in this letter and the attached detailed comment letter. The revisions needed to address the comments will result in an improved Bay-Delta Plan, a plan which is consistent with the best available science, addresses the multiple sources of impacts to water

[3] The same comment applies to the draft Lower San Joaquin River flow objectives and related draft program of implementation as well.

[4] Modeling suggests that in-Delta pumping operations of CVP and SWP has very limited impacts on water levels in the southern Delta. However, that modeling does not consider the impact of other factor, such as reductions in Delta inflow, local water users, or in-Delta land reclamation.

quality in the Lower San Joaquin River and southern Delta, and ultimately strikes a balance between competing demands for the water involved.

Sincerely Yours,

Daniel G. Nelson
Executive Director
San Luis & Delta-Mendota Water Authority

Terry L. Erlewine
General Manager
State Water Contractors

cc: Members of the State Water Resources Control Board

Attachment 1 - Description of the Public Water Agencies
Attachment 2 – Detailed Comments on Draft Amendments to the Bay-Delta Plan and Draft SED
Attachment 3 – List of References
Attachment 4 - Relevant Legal Standards and Rules
Attachment 5 – Discharges By Grasslands Bypass Project

Attachment 1
(Description of the Public Water Agencies)

The State Water Contractors, Inc. ('SWC") organization is a nonprofit mutual benefit corporation that represents and protects the common interests of its 27 member public agencies in the vital water supplies provided by California's State Water Project ("SWP"). Each of the member agencies of the State Water Contractors holds a contract with the California Department of Water Resources to receive water supplies from the SWP. Collectively, the SWC members deliver water to more than 25 million residents throughout the state and more than 750,000 acres of agricultural lands. SWP water is served from the San Francisco Bay Area, to the San Joaquin Valley and the Central Coast, to Southern California. The SWC's members are: Alameda County Flood Control and Water Conservation District Zone 7; Alameda County Water District; Antelope Valley-East Kern Water Agency; Casitas Municipal Water District; Castaic Lake Water Agency; Central Coastal Water Authority; City of Yuba City; Coachella Valley Water District; County of Kings; Crestline-Lake Arrowhead Water Agency; Desert Water Agency; Dudley Ridge Water District; Empire-West Side Irrigation District; Kern County Water Agency; Littlerock Creek Irrigation District; Metropolitan Water District of Southern California; Mojave Water Agency; Napa County Flood Control and Water Conservation District; Oak Flat Water District; Palmdale Water District; San Bernardino Valley Municipal Water District; San Gabriel Valley Municipal Water District; San Gorgonio Pass Water Agency; San Luis Obispo County Flood Control & Water Conservation District; Santa Clara Valley Water District; Solano County Water Agency; and Tulare Lake Basin Water Storage District.

The San Luis & Delta-Mendota Water Authority ("Authority") is a joint powers authority, established under California's Joint Exercise of Powers Act. (Gov. Code, § 6500 *et seq*.) The Authority is comprised of 29 member agencies, 27 of which hold contractual rights to water from the federal Central Valley Project ("CVP"). The Authority member agencies have historically received up to 3,100,000 acre-feet annually of CVP water for the irrigation of highly productive farm land primarily along the San Joaquin Valley's Westside, for municipal and industrial uses, including within California's Silicon Valley, and for publicly and privately managed wetlands situated in the Pacific Flyway. The areas served by the Authority's member agencies span portions of seven counties encompassing about 3,300 square miles, an area roughly the size of Rhode Island and Delaware combined. The Authority's members are: Banta-Carbona Irrigation District; Broadview Water District; Byron Bethany Irrigation District (CVPSA); Central California Irrigation District; City of Tracy; Columbia Canal Company (a Friend); Del Puerto Water District; Eagle Field Water District; Firebaugh Canal Water District; Fresno Slough Water District; Grassland Water District; Henry Miller Reclamation District #2131; James Irrigation District; Laguna Water District; Mercy Springs Water District; Oro Loma Water District; Pacheco Water District; Pajaro Valley Water Management Agency; Panoche Water District; Patterson Irrigation District; Pleasant Valley Water District; Reclamation District 1606; San Benito County Water District; San Luis Water District; Santa Clara Valley Water District; Tranquillity Irrigation District; Turner Island Water District; West Side Irrigation District; West Stanislaus Irrigation District; and Westlands Water District.

Attachment 2

(Detailed Comments on Draft Amendments to the Bay-Delta Plan and Draft SED)

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Attachment 2

(Detailed Comments on Draft Amendments to the Bay-Delta Plan and Draft SED)

I. SPECIFIC COMMENTS ON THE DRAFT SOUTHERN DELTA SALINITY OBJECTIVES, THE DRAFT LOWER SAN JOAQUIN RIVER FLOW OBJECTIVES AND THE RELATED PROGRAMS OF IMPLEMENTATION

The Public Water Agencies provide specific comments regarding: (1) the draft Southern Delta Agricultural Water Quality Objectives ("draft SDWQ objectives" or "draft salinity objectives") and related draft Program of Implementation ("draft salinity POI" or "draft POI"); and (2) the draft Lower San Joaquin River Fish and Wildlife Flow Objectives ("draft LSJR flow objective" or "draft flow objective") and related draft Program of Implementation ("draft flow POI" or "draft POI"), as identified in Appendix K of the 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" or "draft SED").

A. Legal And Evidentiary Defects Of The Draft Southern Delta Agricultural Salinity Objectives And Related Program Of Implementation

1. The Draft Salinity Objectives Fail To Adequately Consider The Section 13241 Factors

In establishing water quality objectives that provide "reasonable protection" of beneficial uses, Water Code section 13241 requires the State Water Resources Control Board ("State Water Board") consider the following factors, among others: (1) "[p]ast, present, and probable future beneficial uses of water;" (2) "[w]ater quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area;" and (3) "[e]conomic considerations." (Water Code, § 13241, subd. (a), (c), (d).) The draft SDWQ salinity objectives fail to reflect adequate consideration of these factors.

a. The Draft Salinity Objectives Do Not Consider The Extent Of Past, Present, And Probable Future Beneficial Uses Of Water

When considering what water quality objectives will provide a reasonable level of protection for agricultural uses in the southern Delta, the starting point must be defining the beneficial use. (Water Code, § 13241 subd. (a).) To do that, the State Water Board must consider the water rights asserted by southern Delta agricultural interests. That consideration is critical, as many assert riparian water rights, and, with regard to those asserted water rights, in Decision 1641, the State Water Board found:

1. On average, insufficient water is available to supply the southern Delta in Below Normal, Dry and Critical Dry years in August, September and October.

2. On average, sufficient water is available in September only in Wet Years.

3. Insufficient water is available in July during 16 percent of years, in August during 56 percent of years, in September during 78 percent of years, and in October during 70 percent of years.

> To the extent that other instream water users are making riparian use of water, and to the extent that all southern Delta lands are not riparian, water is available to southern Delta water users less often than assumed herein.
>
> Based on this analysis, riparian rights to the waters of the San Joaquin River are inadequate to meet the agricultural demands in the southern Delta in some months of many years. Because a riparian right holder's water right cannot exceed the natural flow, it follows that whenever there is inadequate natural flow to meet their demands, southern Delta riparian right holders cannot be injured if they are deprived of water that exceeds the natural flow.

(D-1641, at p. 33). Conversely, when there is inadequate natural flow to support riparian diversions, there is no riparian beneficial use of that water that requires protection. The draft amendments to the Water Quality Control Plan for the San Francisco Bay-Sacramento/San Joaquin Delta Estuary ("Bay-Delta Plan") do not reflect that circumstance, nor do the draft amendments consider the availability of water for southern Delta agricultural water users asserting other water rights.

b. <u>The Draft Salinity Objectives Do Not Consider The Water Quality Conditions That Could Reasonably Be Achieved Through The Coordinated Control Of All Factors Affecting Water Quality</u>

The draft salinity POI reveals that the draft salinity objectives were developed without adequate consideration of the water quality conditions that could reasonably be achieved through the coordinated control of *all factors* affecting water quality. (*See* Draft SED, App. K.) The draft SED states that "[s]alinity levels in the southern Delta are affected primarily by the salinity of water flowing into the southern Delta from the SJR near Vernalis and evapo-concentration of salt in water that is diverted from and discharged back into southern Delta channels for agricultural purposes [within the southern Delta]." (Draft SED, App. C, at p. 4-7; *see Id*. at pp. 13-7 – 13-10.) This statement acknowledges that multiple factors affect salinity concentrations in the southern Delta. Yet, the draft salinity POI reveals that the 1.0 EC objectives were developed with the assumption that the salinity objectives would be achieved by imposing significant responsibility on the U.S. Bureau of Reclamation ("Reclamation"). As proposed, Reclamation would be obligated to meet a salinity level of 0.7 EC at Vernalis, to provide "assimilative capacity" for downstream diversions and discharges. (*See* Draft SED, App. K.) Similarly, the draft POI states that "DWR and USBR's water rights will be conditioned to require the development and implementation of a Comprehensive Operations Plan to fully address the impacts of SWP and CVP export operations on water levels and flow conditions that *might affect* assimilative capacity for local sources and evapo-concentration of salinity in the southern Delta." (*Ibid*.)

The Department of Water Resources ("DWR") submitted the results of DSM2 modeling that specifically analyzes the effect of pumping by the CVP and SWP on water quality, water levels, and circulation with and without the temporary barriers.[5] The modeling results demonstrate that CVP and SWP operations usually have no effect on salinity in the southern Delta,

[5] The referenced DWR modeling results are contained on the "References" CD, which the Public Water Agencies provided by hand-delivery to the State Water Board.

and, at times, have a positive effect by lowering salinity concentrations. The models also demonstrate that null zones, which are commonly used as an indicator of poor circulation, occur with the same general frequency and duration with or without CVP and SWP pumping. In addition, spikes in salinity in the southern Delta may not be attributable to poor circulation because salinity sometimes spikes during high flow periods in the absence of null zones. The modeling also demonstrates that CVP and SWP pumping has a small and ephemeral impact on water levels in the southern Delta of approximately 6-8 inches for just a few hours per day. In contrast, the temporary barriers raise water levels well above levels that would occur without CVP and SWP pumping.[6]

Indeed, the draft SED acknowledges this effect of operations of the CVP and SWP. For instance, the SED states that "[h]igher CVP and SWP pumping . . . have a large effect on southern Delta salinity as higher pumping brings more Sacramento River water across the Delta to the export pumps and results in lower salinity." (Draft SED, at p. 2-37.) In addition, the draft SED itself clearly demonstrates that the salt loadings in the Lower San Joaquin River ("LSJR") and southern Delta are not attributable to the CVP or SWP pumping, but rather result from a host of other factors, including agricultural return flows in the southern Delta. (E.g., Draft SED, at 13-7 – 13-10.) Yet, by assuming assignment of responsibility to Reclamation and DWR, the draft amendments ignore the actions that could be taken by other entities that actually contribute to salt concentrations in the southern Delta. The State Water Board should not make the same mistakes it has made in the past, by taking too narrowly focusing and failing to consider all of the factors that affect water quality in developing water quality objectives.[7]

c. The Draft Salinity Objectives Do Not Adequately Consider The Economic Costs Associated With The Draft Objectives

(i) Economic Costs Associated With Agricultural Yield Reductions

The draft SED explains that the "State Water Board based the southern Delta EC objectives on the calculated maximum salinity of applied water which sustains 100% yields of two important salt sensitive crops grown in the southern Delta (beans and alfalfa) in conditions typical of the southern Delta." (Draft SED, App. C, at p. 4-2.) However, this approach to establishing the salinity objectives fails to consider and compare the economic costs and benefits of implementing specific salinity objectives. In other words, this approach fails to provide the State Water Board with the information necessary to consider whether it is "reasonable" to establish salinity

[6] Indeed, if the State Water Board is concerned about the impact of water levels on irrigation in the southern Delta, it would be far more cost effective and appropriate to study alternatives such as altering the timing of irrigation pumping in the southern Delta, or changing the location of pumps or siphons that experience issues with fluctuating water levels.

[7] *See U.S. v. SWRCB* (1986) ["Racanelli "] 182 Cal.App.3d 82. In *Racanelli*, the court concluded that "the Board made no effort to protect against water quality degradation by [] users [other than Reclamation and DWR] namely, upstream diverters or polluters. As a consequence, the Board erroneously based its water quality objectives upon the unjustified premise that upstream users retained unlimited access to upstream waters, while the projects and Delta parties were entitled only to share the remaining water flows." (*Id.* at p. 118.) The court stated that "the Board cannot ignore other actions which could be taken to achieve Delta water quality, such as remedial actions to curtail excess diversions and pollution by other water users." (*Id.* at p. 120.) The draft salinity objective and draft POI reflect the same mistakes found in *Racanelli*—the faulty and narrow presumption that the CVP and SWP will be held responsible for supporting the diversions and discharges of other entities.

objectives that provides 100% protection for agricultural beneficial uses of water in light of the economic costs associated with the responsibilities assigned in the draft POI. For example, the draft SED acknowledges that revising the salinity objectives could involve costs to dischargers complying with a NPDES discharge permit, waste discharge requirements, or complying with a TMDL that is established for protecting agricultural beneficial uses. (Draft SED, at p. 18-3.) Those are important considerations. However, the draft SED fails to account for other costs, such as the costs associated with mandating the installation and operation of the temporary barriers and conducting the studies and monitoring identified in the draft POI. These costs are necessary considerations.

In light of economic considerations, higher salinity objectives would provide "reasonable" levels of water quality protection for agricultural beneficial uses in the southern Delta. In fact, the evidence in the administrative record shows that even with the conservative assumptions that likely result in an overstatement of impacts, salinity objectives of 1.4 EC would result in only minor yield reductions in the most sensitive crops and would have a relatively minor economic impact on agriculture. The draft SED states:

> [T]here is a 5 percent yield reduction for Dry Bean irrigated with 1.4 dS/m water, with *minimum* amount of precipitation and a leaching fraction of 20 percent. When the median level of precipitation is used, the yield decline is less than 1 percent. For Almonds, the yield decline is 3 percent with a leaching fraction of 15 percent and *minimal precipitation*; with the median level of precipitation the yield decline is less than 1 percent. For Alfalfa there was no yield decline under the 15 percent leaching fraction with minimal precipitation.

(Draft SED, at p. 11-30, italics added.) Those conclusions alone could support changes in the salinity objectives. However, such a decision should be informed by the additional information discussed immediately below.

The 2007 Annual Crop Report ("2007 Crop Report"), prepared by the San Joaquin County Agricultural Commissioner's Office and cited in the draft SED (App. E) indicates that, as of 2007, there were 2,860 acres of almonds within the South Delta Water Agency's service area and 2,998 acres of dry beans. (Draft SED, App. E, at p. 12, Table 2.2.) The average value per acre of dry beans was approximately $1,141/acre. Assuming that the yield for dry bean would be reduced by 5 percent when irrigated with 1.4 EC water, (Draft SED, at p. 11-30), such a reduction would correspond to an approximate $57.00 reduction in the value of an acre of dry bean. Assuming the 5% yield reduction occurs on all of the 2,998 acres of dry bean, the yield reduction would correspond to a regional loss in value of approximately $171,000 annually. Similarly, the 2007 Crop Report indicates that the average value per acre of almonds was $3,690. Assuming that the yield for almonds would be reduced by 3 percent when irrigated with 1.4 EC water, (Draft SED, at p. 11-30), such a reduction would correspond to a $110.00 reduction in the value of an acre of almonds. Assuming the 3% yield reduction occurs on all of the 2,860 acres of almonds, the yield reduction would correspond to a regional loss in value of approximately $317,000 annually. Therefore, the combined estimated regional loss in value for yield reductions in almonds and dry beans from irrigating with 1.4 EC water would be approximately $488,000.00 annually.

While salinity objectives of 1.4 EC are estimated to result in less than a half a million dollars annually in economic impacts to southern Delta agricultural revenues, changes in the salinity

objectives could significantly affect the economic costs associated with actions contemplated in the draft program of implementation. For example, the estimated annual cost of operating the temporary barrier program, which is currently a condition of DWR and Reclamation's water rights to implement the existing salinity objectives and which is identified as a condition that will continue to be imposed to implement the draft 1.0 EC objective, is approximately *$6 million/year*. Yet, as demonstrated, it would be unlawful to require installation of the temporary barriers, to conduct additional studies, or to undertake other measures since those mandates cannot be imposed through water quality planning and neither CVP nor SWP pumping causes any introduction of salts into the waters of the southern Delta. But even if such mandates were lawful, the cost to implement the barriers (and conduct additional monitoring and studies) far outweighs any incremental benefit to agricultural crop yields resulting from lower salinity. The relative economic costs and benefits of implementing specific salinity objectives are precisely the type of "economic considerations" that the State Water Board must evaluate when considering the draft amendments.

(ii) Economic Costs Associated With Impacts To Municipal Water Service Providers

The SED fails to analyze all direct and indirect impacts to municipal water service providers that would result from implementing the southern Delta agricultural salinity objectives. Salinity in source water supplies can cause corrosion, unpleasant taste and odor, economic impacts to utilities and their customers, and constraints on water recycling and groundwater management programs. Bromide, one component of salinity, can produce harmful disinfection byproducts in drinking water such as bromate, which is a known human carcinogen. Water service providers may experience increased costs to minimize or avoid those impacts by blending lower quality water or incorporating additional treatment facilities or processes. However, these options may not be available or technical or economically feasible for all municipal service providers. As the quality of a water source changes, the ability to blend and treat that water changes. The draft amendments and draft SED fail to analyze these reasonably foreseeable impacts and associated costs to water suppliers to mitigate them.

2. The Draft Program Of Implementation Illegally Conflates The State Water Board's Legislative Water Planning Function And Its Adjudicative Water Right Function

The State Water Board performs dual functions—its legislative function of developing and amending water quality control plans and its adjudicatory function of allocating water rights. Consideration and determination of what, if any, water right conditions are necessary to implement *new* water quality objectives must be performed in an adjudicative proceeding. (*See Racanelli*, *supra*, 182 Cal.App.3d at p.113 ["in undertaking to allocate water rights, the Board performs an adjudicatory function."].) The draft SED acknowledge this rule and repeatedly asserts that the State Water Board will consider any necessary changes to water rights to implement the amendments to the water quality control plan in a later water right proceeding.[8] Unfortunately,

[8] See e.g. Draft SED at p. 1-1 ["Subsequent Phase III proceedings will consider and assign responsibility for implementing measures to achieve the water quality objectives established in Phase I and Phase II, including changes to water rights or other implementation actions."]; *Id.* at p. 1-2 ["This update of the 2006 Bay-Delta Plan, which describes the actions needed to protect the Bay-Delta ecosystem, does not affect the water rights of anyone either within or outside the Delta. Any changes to water rights that may be needed to implement the plan will be considered in future proceedings."]; *Id.* at p. 1-7 [the "State Water Board's Phase III would specifically identify the water rights that could be modified as a result of

the draft amendments pre-determine many water right conditions. For example, the draft POI pre-determines that DWR and Reclamation's water rights *will be* conditioned to: 1) develop and implement a Comprehensive Operations Plan to address how SWP and CVP operations "might affect the assimilative capacity for local sources of salinity in the southern Delta;" 2) develop and implement a special monitoring study to characterize water level, flow and salinity conditions in the southern Delta; 3) to require continued operations of the agricultural barriers program; and 4) develop a monitoring and reporting protocol to provide the data necessary to assess attainment of the salinity objectives. (Draft SED, App. K.) Such an approach illegally conflates the State Water Board's legislative water quality planning function with its adjudicative water rights function and fails to provide the targeted water right holders with the procedural protections and due process provided by an *adjudicative* water right proceeding.

a. <u>The State Water Board Cannot Decide To "Continue" To Condition The Water Rights Of Reclamation And DWR To Implement Water Quality Objectives During This Quasi-Legislative Water Quality Planning Process</u>

The "guiding principle" in any water right proceeding commenced to implement a water quality control plan is that the State Water Board's power to act in such a water rights proceeding "is constrained by the terms of the plan it is implementing." (*State Water Resources Control Bd. Cases* (2006) 136 Cal.App.4th 674, 729 at p. 729.) The draft SDWQ salinity objectives would amend the existing southern Delta salinity objectives in the Bay-Delta Plan (0.7 EC April-August and 1.0 September-March) to require 1.0 EC year-round. (Draft SED, App. K, at p. 1 of 5; Bay-Delta Plan at p. 13.) Therefore, the inquiry in any water right proceeding commenced to implement a new salinity objectives would be: "what water right conditions, if any, are necessary to implement the 1.0 dS/m salinity objective." Thus, because the State Water Board would be seeking to implement a new salinity objective, it must perform a new evaluation and determination of the water right conditions, if any, necessary to implement those salinity objectives, in a water right proceeding.

Although the draft salinity objectives would effectively eliminate the 0.7 EC salinity objectives that currently exist in the Bay-Delta Plan, the draft POI assumes that some of the existing water right conditions imposed to implement the 0.7 EC salinity objectives will continue. The draft POI states:

> In order to maintain current protective salinity levels in the southern Delta, *USBR's water rights will continue to be conditioned to require* compliance with a salinity level of 0.7 deciSiemens per meter (dS/m) from April through August and 1.0 dS/m from September through March in the San Joaquin River at the Airport Way Bridge near Vernalis.

(Draft SED, App. K, at p. 2 of 5, italics added.)[9] Also, the draft POI states:

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adopting and applying the program of implementation for the LSJR flow objectives analyzed in this SED as part of Phase 1."]; App. C at p. 1-1 ["Any changes to water rights consistent with the revised program of implementation will be considered in a subsequent adjudicative proceeding."].

[9] See e.g. Draft SED at p. 11-2, Table 11-1 [water quality within the southern Delta under SDWQ Alternatives 2 and 3 "is expected to remain unchanged as USBR would be responsible for complying with the same salinity requirements that currently exist at Vernalis."]; at p. 11-18 [the "program of implementation for the numeric salinity objectives contained in SDWQ Alternatives 2 and 3 includes continued U.S. Bureau of Reclamation (USBR) compliance with the Vernalis salinity requirement currently established in the 2006 Bay-Delta Plan and implemented through D-1641."]; at p. ES-15 [the

> *DWR and USBR's water rights will be conditioned to require* continued operations of the agricultural barriers at Grant Line Canal, Middle River, and Old River at Tracy, or other reasonable measures, to address the impacts of SWP and CVP export operations on water levels and flow conditions that might affect the assimilative capacity for local sources and evapo-concentration of salinity in the southern Delta.

(Draft SED, App. K, at p. 2 of 5, italics added.) However, the State Water Board cannot pre-determine the water right conditions necessary to implement the salinity objectives, and the draft POI's assumption that the State Water Board will continue to require the water right conditions imposed to implement the Bay-Delta Plan is contrary to law.

b. <u>An Adjudicative Water Right Proceeding Is Necessary To Provide Due Process To Water Right Holders</u>

A right to appropriate water is recognized as a private property right and "once rights to use water are acquired, they become vested property rights." (*Racanelli Decision*, *supra*, 182 Cal.App.3d at p. 101.) The Constitution prohibits a state from depriving any person of property "without due process of law." (Sec. 1, Amendment XIV, U.S. Constitution.) Thus, appropriative water rights "cannot be infringed by others or taken by governmental action without due process and just compensation." (*Racanelli Decision*, *supra*, 182 Cal.App.3d at p. 101.) Therefore, the procedural protections provided by law with respect to appropriative water rights are necessary to ensure that due process is provided by the State. The draft POI for the salinity objectives deprives Reclamation and DWR, their respective contractors, including members of the Public Water Agencies, and likely others of due process by attempting to impose water right conditions through this legislative water quality planning process.

An adjudicative water right proceeding provides additional procedural protections to water right holders that are not provided in the legislative water quality planning process. For example, in an adjudicative water right proceeding, each party has the right to call and examine witnesses, to cross-examine opposing witnesses, and to rebut evidence against him or her. (Gov. Code § 11513, subd. (b); Gov. Code, § 11425.10, subd. (a); 23 C.C.R. § 648, subd. (b) [listing applicable procedures in State Water Board adjudicative proceedings].) In addition, the decision issued in a water right proceeding must include "a statement of the factual and legal basis of the decision . . .." (Gov. Code, § 11425.10, subd. (a); 23 C.C.R. § 648, subd. (b).) These procedural rights, and others provided for in adjudicative proceedings, ensure that parties to such proceedings receive due process and an opportunity to contest the State Water Board's evidence. If adopted, the draft POI for the SDWQ salinity objectives would deprive Reclamation and DWR, their respective contractors, including members of the Public Water Agencies, and likely others of these procedural rights by pre-determining the conditions that will be placed on water rights, prior to providing the due process afforded in an adjudicative water right proceeding.

In addition, the State Water Board is held to a higher evidentiary standard in making water rights decisions than it is in developing water quality control plans. In reviewing the State Water Board's legislative actions, such as amendments to a water quality control plan, the courts apply a

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"program of implementation for SDWQ Alternatives 2 and 3 would require USBR to continue complying with the existing 2006 Bay-Delta Plan 0.7 dS/m EC objective at Vernalis April–August and 1.0 dS/m September–March as a 30-day average. This would help maintain assimilative capacity downstream of Vernalis into the interior southern Delta during the main growing season"].

deferential standard of review and a court will "'uphold the agency action unless the action is arbitrary, capricious or lacking in evidentiary support.' [Citation.]" (*Racanelli Decision*, *supra*, 182 Cal.App.3d at p. 113.) In contrast, in reviewing the validity of water right permit conditions imposed through an adjudicative proceeding, the courts must determine whether "the conditions are supported by 'precise and specific reasons founded on tangible record evidence.' [Citation.]" (*Id*. at p. 115.) Also, an administrative agency is required to make findings that bridge the analytic gap between the raw evidence and the ultimate decision when it issues an adjudicative decision, but not when it issues a legislative decision. (*Id*. at p. 114.) Thus, the nature of the proceeding determines the evidentiary standard the State Water Board must meet and adjudicatory actions provide more protection for the parties and rights affected by the agency action, by providing a more demanding evidentiary standard.

3. Assignment Of Responsibility For Implementing The Salinity Objectives Should Be Commensurate With A Party's Contribution To Salinity

The draft SED states that the "goal of the Preferred SDWQ Alternative is to protect agriculture through new numeric objectives and a program of implementation that places responsibility on the USBR, DWR, and others, *commensurate with their contributions to the southern Delta salinity impairments*." (Draft SED, at p. ES-3, italics added.) However, nowhere does it explain why it is appropriate to require Reclamation to provide "assimilative capacity" downstream of Vernalis. Nor does it explain why it is appropriate to require Reclamation and DWR to install, operate and maintain barriers, conduct the specified monitoring, and conduct the specified studies. There is also no valid basis for imposing permit conditions on the CVP and SWP, including those that require the Reclamation and DWR, and likely the Public Water Agencies, to fund monitoring and studies, install temporary barriers. (Draft SED, App. K.) It is beyond reasonable dispute that multiple factors affect the concentration of salinity in the waters of the San Joaquin River and southern Delta. Indeed, the draft SED acknowledges that salinity conditions in the southern Delta "are affected by various factors including low flows, salts imported to the SJR Basin in irrigation water, municipal discharges, groundwater percolation, poor circulation and water diversion and discharges from agricultural drainage." (*Id*.; Draft SED at p. ES-6 [listing additional factors]; *Id*. at p. 1-7 [same].) Thus, it is inconsistent with the goal of the Preferred SDWQ Alternative, unreasonable, and unlawful to require Reclamation to provide assimilative capacity or to require Reclamation and DWR to install, operate and maintain barriers, conduct the specified monitoring, and conduct the specified studies.

4. The Assignment Of Responsibility For Implementing The Salinity Objective Must Reflect The Substantial Reduction In Salt Discharge Upstream Of Vernalis

The SED extensively discusses the topic of salinity in the San Joaquin River, but the SED omits decades of successful efforts to reduce salinity loading in the San Joaquin River from lands irrigated with CVP water. The contribution of salinity to the San Joaquin River from lands irrigated with CVP water have changed considerably since the State Water Board last closely examined San Joaquin salinity standards in the 1995 Water Quality Control Plan amendments and in D-1641. At the time the State Water Board adopted D-1641, there was a concern that the Vernalis salinity objective would not be met. Indeed, Reclamation "acknowledged that on occasion salinity objectives at Vernalis will not be met under its plan." (D-1641, at p. 80.) The State Water Board found that "the actions of the CVP are the principal cause of the salinity concentrations exceeding the objectives *at Vernalis*." (*Id.* at p. 83, italics added.) The effect of CVP-

related irrigation and other activities is very different today, something the draft SED does not sufficiently acknowledge.

There have been no exceedances of the salinity objective at Vernalis since D-1641 was adopted. The Grasslands Bypass Project ("GBP") has achieved substantial reductions in salt discharges to the San Joaquin River. The GBP is regulated through waste discharge requirements issued by the Central Valley Regional Water Quality Control Board ("Central Valley Regional Board"), an important fact not mentioned in the description of the project. (Draft SED, at p. 1-13.) The GBP gathers subsurface drain water from some 90,000 acres of farmland located west of Firebaugh, California, lands that are irrigated with CVP water. As the draft SED explains, the GBP routes the drain water around wetlands and wildlife refuges. The GBP uses a portion of the San Luis Drain to convey the drain water to Mud Slough, which is tributary to the San Joaquin River. The SED acknowledges that the GBP "improves water quality in the wildlife refuges and wetlands, sustains the productivity of 97,000 acres of farmland, and fosters cooperation between area farmers and regulatory agencies in drainage management reduction of selenium and salt loading." (Draft SED, at p. 1-13.) The regulations and agreements governing the GBP require further dramatic drainage reductions that will continue to reduce discharges of salinity, while drainage management through the project will allow viable agriculture to be maintained. Appendix F to the SED, in a description of the baseline conditions for salinity modeling, says that "SWRCB recognizes that . . . the salinity upstream of the Merced is likely to be substantially reduced by the Grasslands drainage project (for selenium removal)." (Draft SED, App. F at p. 1-114.)

Absent from the draft SED, however, is any acknowledgement that the level of salinity that the GBP discharges to Mud Slough and hence to the San Joaquin River have already been substantially reduced. The reductions in salt discharge achieved by the GBP from water years 1995 through 2012 are presented in the table included with these comments as Attachment 5. As shown in Attachment 5, from 1995 to 2012 the GBP reduced the annual salt discharge to Mud Slough by 84%, from 237,530 tons to 38,400 tons. The GBP reduced the total volume of drain water discharged to Mud Slough by 82%, from 57, 574 acre-feet to 10,485 acre-feet. And the GBP reduced the annual discharge of selenium over this period by 94%, from 11,875 lbs. to 750 lbs. The GBP removed all discharges from the 97,000 acres into Salt Slough.

We have been unable to find any narrative in the draft SED describing these dramatic reductions in load from the GBP since 1995. Figure F.2-1b in the SED does depict combined salt load from Mud and Salt sloughs by month, from 1985 through 2010, but is on such a scale that the reductions in loading over time from the GBP are not readily apparent. The approximately 200,000 ton reduction in annual salt load reaching the San Joaquin River from the GBP from 1995 to the present amounts to a 19% reduction in the average salt load at Vernalis, which recently totals approximately 1 million tons per year. Figure F.2-1g in the SED depicts salt load at Vernalis. Like Figure F.2-1b, the scale in Figure F.2-1g does not reveal the reductions in salt loading at Vernalis by the GBP, nor does the narrative related to Figure F.2-1g mention these reductions. Any modeling or presentation of salinity in the San Joaquin River should reflect current conditions and trends–especially where they are supported by data indicating that the trends are likely to continue, in part in response to existing regulation. Failure to include such information in modeling will result in inaccurate information being considered by decision-makers. In particular, modeling current conditions is critical, given Westside farmers' already significant reductions in salt discharges.

Finally, other programs on the west side of the San Joaquin Valley are addressing salinity on lands not within the GBP. The Irrigated Lands Regulatory Program ("ILRP") includes measures addressing drainage discharges from irrigated agricultural lands that reach the San Joaquin River. The ILRP initially requires monitoring and data collection that will guide later management. In addition to program requirements for monitoring the discharge of salts, priority management practices, such as installation of drip irrigation and tailwater recirculation systems to avoid sediment discharges, are expected to have incidental but immediate benefits in reducing discharges of salts. The ILRP, along with the waste discharge requirements for the GBP, will be used to implement the TMDL for salinity in the lower San Joaquin River. Reclamation has entered into and is updating a Management Agency Agreement with the Central Valley Regional Board that is engaging stakeholders, including state and federal refuges, among others, in the development of a real time program for managing discharges to address salinity concerns.

In sum, much has changed since adoption of the 1995 WQCP and D-1641 regarding the CVP's contribution to salinity in the San Joaquin River upstream of Vernalis. There have been no exceedances of the standard at Vernalis since D-1641 was adopted. The GBP has achieved substantial reductions in salt discharges from agricultural lands irrigated with CVP water. These reductions in salinity discharges upstream of Vernalis, which are not described in the SED, should be made known to policymakers and the public. This information will help inform decisions about what salinity reduction measures are feasible, and the relative progress that has been made since adoption of the 1995 WQCP to address various sources of salinity in the south Delta. Such information is essential to developing sound amendments to the existing water quality control plan, including to the program of implementation.[10]

B. Legal And Evidentiary Defects Of The Draft Lower San Joaquin River Flow Objective & Related Program Of Implementation

1. Flow Is Not A Proper Parameter For A Water Quality Objective Under Porter-Cologne

The draft LSJR flow objective is unlawful because flow is a not a proper parameter for a water quality objective. "Water quality objectives" are defined in the Porter-Cologne Act as the

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[10] Two additional comments related to discharges of salt are.

Page 2-36, Paragraph 2.6.4 Water Quality and Water Quality Objectives: This paragraph describes contributions of salinity to the Lower San Joaquin River including boron, selenium and pesticides. The Lower San Joaquin River has been removed from the 303(d) list of impaired water bodies for selenium which is the main constituent of concern for the GBP. In 2010, 40.4 miles of the San Joaquin River from the Merced River to the Delta were removed from the 303(d) list because selenium objectives were being met. The EPA has identified the GBP as a "Success Story" because of these improvements. (water.epa.gov/polwaste/nps/success319/ ca_san.cfm).

Page 5-15 Salinity and Water Temperatures: The second paragraph on this page discusses the use of releases of water from New Melones to maintain water quality objectives of the San Joaquin River. The need for releases from New Melones for this purpose has been reduced significantly over time because of the reduced discharge of salinity from the GBP to the San Joaquin River, which results in lower salinity levels at Vernalis. An analysis in Chapter 6 of the GBP Annual Report 2008-2009 indicates that prior to water year 1997 273,440 acre-feet of fresh water would have been required to dilute the average annual volume of drainage water from the Grassland Drainage Area to meet the Vernalis standard. During the period of the project through 2009 the theoretical annual volume of water needed to dilute the drainage water from the Grassland Drainage Area was reduced to 60,580 acre-feet, or a reduction from the pre-project average of over 200,000 acre-feet. This represents a significant savings of water that now can be used for other purposes.

"limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." (Water Code, § 13050, subd. (h).) Temperature, pH, dissolved solids, pathogens, dissolved oxygen, and chemical constituents such as pesticides are all examples of "water quality constituents or characteristics." Flow, by contrast is the physical *movement* of water in a watercourse. While flow may affect water quality, flow is not a water *quality* constituent or characteristic of the water. Flow is therefore outside the scope of a water quality objective as defined in section 13050, subd. (h). The State Water Board's current task is to consider potential amendments to water quality objectives. Questions of flow may be properly addressed as part of implementation, in a water rights proceeding.

The Porter-Cologne Act defines "quality of the water" separately and differently from its definition of "water quality objectives." "Quality of the water" is defined as the "chemical, *physical*, biological, bacteriological, radiological, and other properties and characteristics of water which affect its use." (Cal. Wat. Code, § 13050, subd. (g), emphasis added.) Flow, and volume too, are physical properties of a water body. By contrast, the definition of "water quality objective" does not include the term "physical."

Notably, the defined term "quality of the water" is not used in the provisions of the Water Code that govern water quality control plans. Instead, it appears in a provision of the Water Code that prohibits the commingling of transferred water resulting in a diminution of the quality of the water (Water Code, § 1810), and in a provision that defines a "project" in the context of groundwater basin protection (Water Code, § 12921.3). The term also appears in provisions pertaining to specific projects and entities. For example, section 5901 addresses the deterioration of the quality of the waters of the Upper Klamath River Basin, sections 13951 and 13952 address waste disposal affecting the quality of waters in Lake Tahoe, and sections 50903 and 60230 enable small reclamation districts and water replenishment districts, respectively, to take certain actions to protect the quality of local waters. The Legislature's choice to use a term that includes physical properties in some contexts, but not in the water quality control plan provisions, is a strong indicator that it did not intend for plans to define objectives using physical properties of a water body such as flow.

There are sound policy and practical reasons for excluding properties such as flow and volume from water quality control plans. As discussed above, water quality control plans and water rights proceedings are subject to differing standards and requirements. The distinction between the two is breached when water quality objectives are expressed in terms of flow, because that can predetermine what water rights may be affected and by how much, without the benefit of due process.

The term "quality of the water" appears in only one reported California case. (*State Water Resources Control Board Cases*, *supra*, 136 Cal.App.4th at p. 699.). In that case, the court said that "[w]ater flow can be regulated as a water quality objective because, as the Board explained in the 1995 Bay-Delta Plan, 'the rate and quantity of flow . . . are physical properties or characteristics of the water' which 'have an impact on the beneficial uses of' water in the Bay-Delta." (Id. at p. 701 [citing Water Code, § 13050, subd. (g)].) This was *dictum*, however, because no party in that case challenged the State Water Board's authority to set flow-based objectives, which were adopted following the Delta Accord. Further, the court did not explain how the definition of "quality of the

water" it quoted could be substituted for the pertinent and materially different definition of "water quality objective" provided in Water Code section 13050(h).

The 1995 Bay-Delta Plan illustrates that for many years the State Water Board has taken the position that it may set flow objectives in a water quality control plan, despite the definition of "water quality objective" in section 13050(h). Assuming *arguendo* that the State Water Board's interpretation is not contrary to section 13050(h), it is still unlawful for failure to comply with the California Administrative Procedure Act, California Government Code §§ 11340 *et seq.* ("APA"). A "regulation" within the meaning of the APA includes "every rule, regulation, order, or standard of general application or the amendment, supplement, or revision of any rule, regulation, order, or standard adopted by any state agency to implement, interpret, or make specific the law enforced or administered by it, or to govern its procedure" (Gov. Code, § 11342.600). Under the APA, a promulgating agency "must comply with the procedures for formalizing such regulation, which include public notice and approval by the Office of Administrative Law. . ." (*County of Butte v. Cal. Emergency Medical Services Authority, Inc.* (2010) 187 Cal.App.4th 1175, 1200 [internal quotations and citations omitted].) In *Tidewater Marine Western, Inc. v. Bradshaw* (1996) 14 Cal.4th 557, 571, the California Supreme Court explained that a regulation is subject to the APA if it has two principal identifying characteristics: (1) "the agency must intend its rule to apply generally, rather than in a specific case;" (2) "the rule must 'implement, interpret, or make specific the law enforced or administered by [the agency], or . . . govern [the agency's] procedure.'" (Citing Gov. Code, § 11342, subd. (g).) The State Water Board's claim of authority to include flow as a water quality objective meets these criteria. Yet, the State Water Board has never formally adopted a regulation setting forth its expanded definition of water quality objectives. Accordingly, a water quality objective defined by flow would be based on an underground regulation, and hence invalid. (*Niles Freeman Equipment v. Joseph* (2008) 161 Cal.App.4th 765 [citing *Kings Rehabilitation Center, Inc. v. Premo* (1999) 69 Cal.App.4th 215, 217.].)

2. <u>The Draft Program Of Implementation Fails To Consider And Balance Competing Beneficial Uses Of Water</u>

In developing water quality objectives, the State Water Board is directed to consider *all* competing demands for water in determining what is a reasonable level of water quality protection .(Water Code, § 13000.) In the *State Water Resources Control Bd. Cases*, the court described the Board's duty to consider and balance competing beneficial uses of water as follows:

> In formulating the 1995 Bay–Delta Plan, the Board set out "to attain the highest water quality which is reasonable, considering *all* demands being made on the water of the [Bay–Delta]." (1995 Bay–Delta Plan, p. 14, italics added.) While the Board had a duty to adopt objectives to protect fish and wildlife uses and a program of implementation for achieving those objectives, in doing so *the Board also had a duty to consider and protect all of the other beneficial uses to be made of water in the Bay–Delta, including municipal, industrial, and agricultural uses.* It was for the Board in its discretion and judgment to balance all of these competing interests in adopting water quality objectives and formulating a program of implementation to achieve those objectives.

(*State Water Resources Control Bd. Cases*, *supra*, 136 Cal.App.4th at p. 778, second italics added.) Thus, the State Water Board has a duty to both protect fish and wildlife beneficial uses and other beneficial uses of water in developing flow objectives. Unfortunately, the draft SED fails to

identify the State Water Board's duty to balance competing beneficial uses as one of the stated goals in developing the flow objective.[11] The draft POI does not effectuate the State Water Board's duty to balance the competing beneficial uses of water because it provides for an "unimpaired" flow regime that would require significant reductions in water diversions for other beneficial uses.

It is unclear how the State Water Board can fulfill its statutory duty to consider and balance competing demands for water in developing water quality objectives if the draft SED fails to evaluate those competing beneficial uses of water. The draft SED asserts that "unimpaired flow" can be used as a "straightforward means to assist in balancing the competing uses of water" and that the "35 percent unimpaired flow requirement would strike a balance between providing water for the protection of fish and other competing uses of water, including agriculture and hydropower generation." (Draft SED, at pp. ES-2, ES-3.) Yet, the draft SED reveals that the draft POI's flow regime of 35 percent of unimpaired flow would have significant impacts on other beneficial uses of water. For example, the draft SED concludes that the preferred flow alternative will have significant and unavoidable impacts on agricultural supply and recreation. (*See* Draft SED, at pp. ES-48, ES-49; *see also* Water Code, § 13050, subd. (f) [identifying agricultural supply and recreation as beneficial uses of water].) The draft SED also fails to quantify any fishery benefits of these proposed additional flows under today's physical and biological conditions. Given the recent extremely low salmon survival in the southern Delta (regardless of there being high flows), any fishery benefits are at best highly speculative.

In light of the impacts to other beneficial uses of water, it is unclear how the draft POI's "unimpaired flow" regime satisfies the State Water Board's duty to consider and balance the competing beneficial uses of water in developing water quality objectives. The draft SED states that "[f]low needed for the protection of fish and wildlife beneficial uses will be balanced against flow needs for other beneficial uses of water including: agriculture and hydropower production." (Draft SED, App. C, at p. 3-62.) The draft POI does not reflect a balanced approach to the protection of all beneficial uses of water in the plan area.

3. <u>The Draft Narrative Flow Objective And Program Of Implementation Lack A Strong Technical Basis</u>

a. <u>Applying The Unimpaired Flow Metric Does Not "Mimic The Natural Conditions To Which Native Fish Were Adapted"</u>

The fundamental basis of the draft narrative flow objective is the presumption that an increased magnitude of instream flows that "mimic" actual seasonal hydrologic conditions during the later winter and spring each year will likely result in an increase in the abundance and survival of juvenile and adult Chinook salmon and steelhead. The draft SED asserts that:

> [S]cientific evidence indicates that in order to protect fish and wildlife beneficial uses in the SJR basin, including increasing the populations of SJR basin fall-run Chinook salmon and Central Valley steelhead to sustainable levels, changes to the

[11] One of the stated "goals" of the draft salinity objectives is to "balance actions needed to reasonably protect southern Delta agricultural beneficial uses with the needs for water to meet other beneficial uses of water." (Draft SED, at p. ES-11.) However, the draft SED does not identify a similar "balancing" goal for the LSJR flow objectives. (See Draft SED, at p. ES-10.)

> current flow regime of the SJR basin are needed. Specifically, a more natural flow regime from the salmon bearing tributaries (Stanislaus, Tuolumne, and Merced Rivers) is needed during the February through June time frame.

(Draft SED, App. C, at p. 3-2.) However, the draft SED overlooks that "unimpaired flow" is not, and cannot be, the same as a "natural" flow regime in a highly modified ecosystem such as the Bay-Delta. The draft SED also states that "[u]sing a river's unaltered hydrographic conditions as a foundation for determining ecosystem flow requirements is well supported by scientific literature." (*Id*. at p. 3-41.) This statement fails to acknowledge that "unimpaired flow" is not the same as "unaltered hydrographic conditions" because the physical structure of the streams, rivers, and the Bay-Delta estuary has been so altered that unimpaired flow conditions will not reflect or mimic the "natural" hydrographic conditions that existed in the predevelopment era. The "unimpaired flow" regime is a simplistic short-hand approach that attempts to provide more variability in flow, but such a flow regime will not approximate "natural flow," nor will it restore the complex habitat that native fish species are adapted to or many of the functions that predevelopment flows may have provided.

First, draft POI measures would modify the hydrograph in the lower reaches of these tributaries, the San Joaquin River and Delta, all of which are highly altered. The SED should explain that even to the extent the percent of the unimpaired hydrograph approach may approximate natural hydrology in the upper tributaries, the draft POI measures would modify the hydrograph in unnatural ways in the lower reaches of these tributaries, the San Joaquin River and Delta.

Second, the draft POI only includes a portion of the year, even though the existing standard includes flows in October. The draft SED does not provide an adequate explanation for why excluding nearly half of the year's hydrograph still represents "natural" conditions. Juvenile steelhead rear within in the San Joaquin River tributaries year-round and require suitable instream flows and cold water temperatures, particularly in the late spring, summer, and fall to support their growth and survival. Similarly, adult fall-run Chinook salmon adults migrate into the San Joaquin River system in the fall (September-December) where they spawn and eggs incubate. Providing instream flows and maintaining suitable cold water for salmon spawning and egg incubation is critical to their reproductive success and subsequent abundance (year class strength). While it may be true that additional flow in the spring could be biologically beneficial, limiting changes in flow to less than half the year is not "natural."

Third, the draft POI describes a process where the Executive Director could decide in any year to deviate from the pattern of the hydrograph based on an exercise of his or her discretion indicating that a different flow would benefit the fishery. (Draft SED, App. K.) The SED provides no discussion of the types of habitat and biological monitoring data, rationale, or analyses that would be used as the technical basis for modifying the instream flow schedule within a year. The reservation of authority for the Executive Director further deviates from a "natural" pattern.

Fourth, while the calculated percent of the unimpaired hydrograph approach may approximate natural flow patterns in the tributaries below the dams, it does not do so downstream on the San Joaquin River and in the south Delta. Once flow enters the valley, it cannot be considered "natural" as the current channel configuration and physical environment are drastically transformed from historic conditions. Levees, channelization, and land use changes

have dramatically altered the relationship between instream flows and seasonal floodplain and wetlands inundation on the lower San Joaquin River and Delta from historic conditions. The functional relationships and biological benefits to juvenile salmonid rearing on intermittently inundated habitat in the basin no longer mimic natural processes or conditions that are part of the implied foundation for the unimpaired flow strategy. Today's highly altered conditions are relevant because the seasonal timing and magnitudes of flow under historic conditions were highly modified through interactions with channels, wetlands and floodplains, groundwater recharge, consumptive use by native vegetation, and evaporation. These interactions moderated the timing and magnitude of outflow, and dictated localized hydrodynamic patterns. These interactions also affected the functions that these flows provided; functions that are not necessarily replicated by equivalent flows through today's channels.

The recent SFEI Report, Sacramento-San Joaquin Delta Historical Ecology Investigation: Exploring Pattern and Process, contains a detailed description of the historic south Delta. The report describes the physical environment as well as the likely historic hydrograph, as follows:

> The South Delta is defined by the distributaries and meanders of the San Joaquin River upstream of the central Delta. At the landscape scale, the south Delta historically presented an array of tidal wetlands interwoven with distributary riverine channels and non-tidal floodplains across a broad transitional zone, or ecotone. Early travelers encountered rivers that were formable only late in the season, often with dense willow and oak riparian forest along their banks. Beyond forested natural levees, the land surface sloped away to meet a matrix of perennial wetlands (dominated by tule, Schoenoplectus spp.), patches of sedges and grasses, perennial and intermittent ponds, and overflow channels. This floodplain was challenging to traverse for much of the year, owing to annual inundation.

(SFEI, South Delta, at p. 309.) The SFEI report further describes 12,000 acres that once were comprised of an extensive mosaic of wetlands and adjacent upland habitat types of the south Delta, generally defined as extending from Roberts and Union Islands to the Stanislaus River. (*Ibid*.)

The historic hydrograph on the San Joaquin River was also different than on the Sacramento River, as follows:

> The south Delta marked the terminus of the San Joaquin River, a large riverine system that frequently overflowed its banks to fill numerous secondary channels, ponds, and floodplain wetlands. It conveyed floodwaters that spread and inundated land sometimes several feet in depth before much of it entered downstream tidal channels in the central Delta. In contrast to the more rainfall-event driven hydrograph of the Sacramento River, winter floods were less frequent on the San Joaquin, with flooding typically snowmelt-driven. The resulting hydrograph was characterized by fewer peak flood events and exhibited a gradual rise of river stage in the late spring and early summer…Also different from the northern flood basins, the south Delta floodplains were apparently less isolated from the river by natural levees (presumably related, in part, to the lower flood peaks and sediment supply in comparison to the Sacramento River). This greater hydrologic connectivity was maintained through multiple side channel systems that

> made floodplain hydrology more responsive to river stages and enabled water to pass through the system with relative speed. Masses of woody debris obstructed the main channels at certain locations, such as Old River near the present day Fabian Tract, affecting flows and habitat complexity. The combination of these factors meant that floodwaters in wetland complex, likely associated with the many secondary side channels and oxbow lakes. The comparison to the lower Sacramento River riparian forests, a greater proportion seems to have been composed of willows and other shrubs, as opposed to oaks and sycamores.

(SFEI, South Delta, at pp. 312-313.)

As a result of the changes that have occurred from historic conditions to present, making releases based on the calculated hydrograph will not result in the timing or magnitude of flows described above nor will it "mimic" the historic functions that instream flows supported for juvenile salmonid rearing and other biological processes. Similarly, the outflow from the San Joaquin River to the ocean will not approximate "natural" or historic conditions. This means that the through-Delta flows targeting improved juvenile salmon passage cannot be defined as "natural." The draft amendments and draft SED do not adequately reflect these facts.

There are ways to calculate historic or "natural" Delta outflows. During last year's Phase II workshops, Dr. Paul Hutton presented one estimate of historic outflow calculated by Dr. Phyllis Fox and Dr. Dan Howes. They used the landcover published in Chico (2003) as a representation of historic vegetation. Next, they calculated the evapotranspiration of each landcover type (using two different estimation methods) and then multiplied the evapotranspiration rate by the acreages of each vegetation type. Finally, they added up the total estimated water loss from evapotranspiration and subtracted that volume from Delta inflow to estimate the contribution of San Joaquin River flows to Delta outflow. Admittedly, this initial method is somewhat crude as it only provides an estimate of average annual Delta outflow, and does not account for seasonal variability or annual or interannual hydrologic variation.

Since the Phase II workshops, the Public Water Agencies have continued to refine tools for calculating historic or "natural" Delta inflow and outflow. The Public Water Agencies are developing a simple water balance model that estimates natural (pre-development) Delta inflows and Delta outflows that would have occurred in the absence of human activity. Both historical and pre-development Delta inflows will be developed to represent a wide range of hydrologic conditions for an 88-year period from 1922 through 2009. Delta outflows will be calculated using a flow mass balance framework, accounting for all in-Delta depletions. Calculations of unimpaired Delta inflows and Delta outflows will extend previous unimpaired flow calculation work undertaken and published by DWR. Specifically, DWR's estimates of unimpaired flows will be modified to account for: (1) valley floor depletion of water supplies through evapotranspiration of native vegetation and riparian lands; (2) bank overflow and detention storage in low-lying areas within the Valley floor; and (3) seasonal variation in groundwater storage. This new modeling effort will make it possible to estimate both seasonal and annual variation in San Joaquin River hydrology and will provide the foundation for a more robust and defensible analysis of alternatives than is currently presented in the SED.

In a second project, the Public Water Agencies are collaborating with SFEI and UCD to utilize modeling techniques to evaluate the characteristics of Bay-Delta salinity transport

associated with "natural" Bay-Delta hydrology. The goal of this effort is to develop an UnTRIM model based on a three-dimensional mesh for the Bay-Delta representing bathymetry and topography under "natural" conditions. The value of this effort is to support restoration efforts by developing an understanding of the functions and processes provided under a natural flow regime, and to be able to compare and contrast unimpaired flow calculations. Results of this modeling will be used, in part, as the foundation for designing habitat restoration projects that mimic natural flow-habitat functions.

b. There Is A Lack Of Evidentiary And Analytical Support For The Draft Program Of Implementation's Proposed Flow Regime

While flows are important for ecological functions and physical processes that support native fish populations, it does not follow that an "unimpaired flow" regime in a highly altered watershed and estuary will provide the conditions needed to support those biological and ecosystem processes. The draft SED does not contain an analysis establishing that the salmonid population viability factors (e.g., abundance, spatial extent or distribution, genetic and life history diversity, and productivity) can be achieved by providing flows that mimic the natural hydrograph. Even if this analytical connection had been made, it has not been sufficiently established that the implementation of the draft POI would provide "natural" flows under which the fish evolved and were adapted (e.g., the relative magnitude, duration, timing, and spatial extent of historic flows). As discussed in detail below, the SED fails to provide analytical or evidentiary support for the presumption that the proposed flow regime will support native fish populations.

An "unimpaired flow" regime implemented without careful consideration of the biological and ecosystem processes that the flows are intended to support is unlikely to provide the intended protection for fish and wildlife beneficial uses. Also, an unimpaired flow regime implemented without consideration of how the hydrological system has been altered or without consideration of other habitat needs of native fish populations is unlikely to be an effective approach to restoring and maintaining native fish populations. In addition, factors other than flows or exports are having a dramatic impact on salmon survival in the southern Delta. The survival levels are so low now, that even in the high flow years of 2005, 2006 and 2011 these survival rates (likely altered by increases in predation by invasive species) are not high enough to sustain salmon abundance. In fact, the draft SED's technical report quotes the Independent Panel Review of the VAMP studies with the following: The review panel concludes that "'the very low recent survival rates seem unlikely to be high enough to support a viable salmon population, even with favorable conditions for ocean survival and upstream migration and spawning success for adults' (Hankin, et al. 2010)." (Draft SED, App. C, at p. 3-39.)

4. The Proposed "Adaptive Management" Approach Is Flawed

a. The Proposed Flow Regime Fails To Implement The Draft Narrative Flow Objective

Under the draft program of implementation, the Executive Director would have the authority to change the timing and magnitude of flows within the February – June period each year, provided the total quantity of water dedicated to instream flow releases is not less than the quantity that would be have been dedicated under a percent of the hydrograph approach each year. (Draft SED, App. K.) A newly formed Coordinated Operations Group ("COG") made up of

the fishery agencies (DFW, NMFS, and USWS) would make recommendations to the Executive Director regarding how he or she should schedule each year's reservoir releases. (*Ibid.*) The San Joaquin River Monitoring and Evaluation Program would be responsible for monitoring, implementing special studies, and evaluating the performance of the flow management strategy on the viability of native salmonid populations, including the abundance, spatial extent, diversity, and productivity of fall-run Chinook salmon and steelhead. (*Ibid.*) The practical result of the proposed "adaptive management" structure is that it changes the program of implementation into something other than a percent of the hydrograph approach. Rather than mimicking the actual hydrograph during the February-June period each year, the program of implementation would function more like a water bank where withdrawals can be made at any time throughout the spring (February – June). The total quantity of water available for additional flows is established by the percent of the hydrograph approach, but the timing of flows is established by the Executive Director and the COG. Such an approach results in a failure to satisfy the narrative objective of "…flows that mimic natural hydrologic conditions…." (*Ibid.*) The flows will not be targeting more natural conditions, rather the flows will be whatever the Executive Director orders each year.

b. <u>The Proposed Flow Regime May Be Operationally Infeasible</u>

It may be infeasible to use the percent of unimpaired hydrograph in a real-time forecasting operation, making a 14-day average period particularly confounding. A short averaging period requires precision and real-time information that does not currently exist. This averaging period would be very difficult to implement as reservoir operators and diverters would be asked to make releases in excess of the required percent of the hydrograph based on predictions of what the hydrograph might look like at the end of the season. The SED provides no discussion or analysis of how actual hydrologic variability and uncertainty would be addressed each year when modifying instream flow schedules and magnitudes.

The Public Water Agencies incorporate by reference a presentation by the Department of Water Resources, Francis Chung and Messele Ejeta, titled Estimating California Central Valley Unimpaired Flows, Phase I, workshop: Presentation and Discussion of Draft Technical Report on the Scientific Basis for Alternative San Joaquin Flow and Southern Delta Salinity Objectives, January 6, 2011. The main points from DWR's presentation were as follows:

- The unimpaired hydrograph can be significantly different from the natural flows;
- The unimpaired hydrograph is a conceptual quantity estimated through various means;
- The unimpaired hydrograph is an imprecise estimate, and will require further improvement before being used as an operations flow criterion. This improvement can be made with careful design, time, and expert effort.
- Implementing the proposed flow criteria in real-time operations will require timely acquisition of field data to estimate the unimpaired hydrograph.
- Timely acquisition of field data, and, under certain circumstances, forecasting certain components of the unimpaired hydrograph will pose extra challenges and increase the level of uncertainty and reduce water supply reliability to the SWP and CVP project operations.

Neither the draft POI nor the draft SED provide any description of how the adaptive management process would be implemented on a real-time basis in light of the inherent uncertainty in actual

hydrologic conditions within the basin. Instead, the draft POI and SED assume perfect knowledge of February-June hydrology each year and the ability to adaptively manage variation in monthly instream flows in real-time.

c. The Proposed "Adaptive Management" Is Not True Adaptive Management As Used In A Scientific Framework

Adaptive management in a scientific context is something very different than what is being proposed in the draft POI. The approach outlined in the draft POI is basically water balance accounting and re-allocation of instream flows among months to address hydrologic variability within a year. Such an approach is not true adaptive management. In the proposed adaptive management structure, decision-making is not linked to a rigorous study plan of hypotheses testing and monitoring. There is no process or thresholds for determining when a change in the implementation measure is scientifically appropriate.

Adaptive management provides a means for carrying out and assessing alternative management actions in the face of uncertainty. The adaptive management process, when appropriately implemented, should facilitate testing of management alternatives, evaluation of outcomes, iterative modifications of management actions as new information is developed through monitoring and experimentation, and learning. Adaptive management cannot be used to compensate for a lack of knowledge, the variability and complexity of ecological systems and biological processes affecting salmonid population dynamics, or underestimating sources of uncertainty including socio-political uncertainty. If the State Water Board is going to pursue adaptive management, it needs to follow a true scientific model of monitoring, special studies, and hypotheses testing. To accomplish true adaptive management, the State Water Board must develop a detailed adaptive management plan and associated experimental design for monitoring the performance of the instream flow strategy on metrics of salmonid viability before it adopts an amendment to the Bay-Delta Plan. Such actions cannot be deferred.[12]

5. The Draft Program Of Implementation Would Result InFuture Amendments To The Water Quality Control Plan Without The Procedures Required By Law

The draft POI would effectively allow for amendments of the water quality control plan through an adaptive management program, without complying with the procedural requirements of Porter-Cologne and the APA that are applicable to the promulgation of a water quality control plan. The draft POI states that the "State Water Board has determined that 35 percent of unimpaired flow is required from February through June from each of the Merced, Tuolumne, and Stanislaus Rivers on a 14-day running average, *unless otherwise approved by the State Water Board through the adaptive management framework described below*." (Draft SED, App. K, at p. 3 of 11, italics added.) The draft POI allows a "Coordinated Operations Group" to propose annual adaptive management of flows during the February through June period and the adaptive management

[12] During the State Water Board's Phase II, Workshop 3, Analytical Tools, the Public Water Agencies provided a review of the literature detailing the necessary elements of an adaptive management plan. They incorporate herein by reference the following presentations on the issue of adaptive management: (1) Public Water Agencies' written submittal: Analytical Tools: Technical Assessment Methods for Evaluating Changes to the Delta Plan, Sections 2.1-2.1.9.; (2) Presentation, Mr. Wayne Lifton, Cardno-Entrix, Adaptive Management, Workshop 3; and (3) Presentation, Dr. Ray Hillborn, Life Cycle Models, Decision-Making and Resolving Scientific Uncertainty, Workshop 3.

"does not have to rely on the unimpaired flow percentage method, but instead can use pulse flows or other management approaches, as long at the requisite unimpaired flow percentage [of 25 percent] for the entire February through June period is met." (*Id*. at p. 4 of 11.) In addition, the draft POI allows the State Water Board or the Executive Director of the State Water Board, to approve modifications to the required base flow and percentage of unimpaired flows based on "subsequently developed information . . .." (*Id*. at p. 5 of 11.) These provisions of the draft POI effectively allow the State Water Board and the Executive Director to amend the water quality control plan to require different base flows and a different flow regime. This approach, not only improperly delegates authority to the Executive Director and Coordinated Operations Group, but denies the public procedural protections afforded by law.

Porter-Cologne and the APA require the State Water Board to provide an opportunity for public notice and comment before the State Water Board adopts any amendment to a water quality control plan. Porter-Cologne requires the State Water Board to provide notice of a public hearing and to hold a public hearing regarding a proposed water quality control plan, before adopting any plan. (Water Code, § 13244.) In addition, the State Water Board must comply with the APA procedures applicable to rulemaking prior to the adoption or amendment of a water quality control plan. (23 C.C.R. §§ 649.1, 649(a).) The APA requires that a state agency permit "both oral and written statements, arguments, or contentions" at the public hearing for the rulemaking proceeding and the state agency "shall consider all relevant matter presented to it before adopting, amending, or repealing any regulation." (Gov. Code, § 11346.8, subd. (a).) The APA also prohibits a state agency from adopting or amending a regulation which has been changed from that which was originally made available to the public, unless the change is "nonsubstantial" or "sufficiently related to the original text that the public was adequately placed on notice that the change could result from the originally proposed regulatory action." (Gov. Code, § 11346.8, subd. (c).) These procedural provisions are intended to provide the public with prior notice and an opportunity for comment, before a water quality control plan is amended or adopted. They are also intended to allow the State Water Board (not the Executive Director through a delegation of power)[13] the ability to make informed decisions. The draft POI contemplates an "adaptive management" process that would effectively deny the public important rights and usurps the State Water Board's responsibility to establish objectives, by allowing the flow regime to be determined and approved annually, at the discretion of the Executive Director and Coordinated Operations Group. Such an approach effectively allows the water quality control plan to be amended each year. Such an approach is contrary to the procedures provided for in Porter-Cologne and in the APA. The annual changes would amount to unlawful, underground regulations.

[13] The draft POI allows the Executive Director of the State Water Board to independently approve modifications to the 35% of unimpaired flow regime based on "subsequently developed information" or requests by the newly formed Coordinated Operations Group. (Draft SED, App. K.) Such an approach effectively allows for amendments to the water quality control plan, without any further review or consideration by the State Water Board. This would be an improper delegation of the State Water Board's water quality planning powers and duties. (*See Cal. Assn. of Nursing Homes etc. Inc. v. Williams* (1970) 4 Cal.App.3d 800, 813 [agency's incorporation of standards developed outside of the rule-making process without independent consideration of the underlying evidence and without public or judicial access to that evidence transgresses fundamental demands for the adoption of administrative regulations].) In fact, the Water Code expressly prohibits a regional water quality control board from delegating any of its powers and duties related to the issuance or modification of any water quality control plan to its executive officer. (Water Code, § 13223, subd. (a).) The same prohibition should apply when the State Water Board is modifying or issuing a water quality control plan pursuant to Water Code section 13170.

6. The Role Of The Implementation Workgroup Must Be Limited

The draft POI provides for the establishment of an Implementation Workgroup to develop recommendations for implementing the new flow requirements while minimizing water supply costs. (Draft SED, at p. ES-12.) The recommendations would be included in an Implementation Plan submitted to the Executive Director. (*Ibid*.) The SED further states, "The implementation plan would then be considered in State Water Board water right proceedings, Federal Energy Regulatory Commission licensing proceedings, or during other implementation actions to achieve the February-June flows." (*Ibid*.)

The draft POI cannot dictate where and how the committee's implementation plan will be considered by future decision-makers, as the decision-makers should exercise their own discretion when considering the evidentiary weight afforded the plan. The committee's implementation plan should also be appropriately qualified as being purely informational, as the State Water Board members must exercise their independent judgment in satisfying their legal obligations, without having their discretion apparently limited by the committee's implementation plan. To avoid the appearance of an inappropriate delegation of the State Water Board's authority to the Implementation Workgroup, the program of implementation and SED should make clear that the State Water Board members will make an independent determination of the appropriate balancing of beneficial uses.

II. SPECIFIC COMMENTS ON SUBSTITUTE ENVIRONMENTAL DOCUMENT

A. The Substitute Environmental Document Does Not Accurately Describe The Bay-Delta Conservation Plan

The SED's description of the Bay-Delta Conservation Plan ("BDCP") is inaccurate. (See, Draft SED, at pp. 1-12 and 7-48.) Several corrections are warranted. First, the water conveyance facilities are only one component of the overall BDCP. Second, the current remanded biological opinions will not be in operation until the "…the new water conveyance infrastructure identified in the Plan becomes operational," (SED at 7-47), rather, the current remanded BiOps will be in effect until new interim BiOps are completed pursuant to the timeline established by the federal court. The BDCP BiOps will be completed at the time of project approval but will not be controlling of water project operations until the new facilities are operational. Third, while the BDCP was developed in collaboration with various entities, the BDCP document is being prepared by the Department of Water Resources, in close coordination with the Departments of Interior and Commerce, and the California Department of Fish and Wildlife.

A more precise description of the BDCP is found in the introduction of the Preliminary Draft BDCP, pp. 1-1 – 1-2, stating:

> The Bay Delta Conservation Plan (BDCP or Plan) sets out a comprehensive conservation strategy for the Sacramento–San Joaquin River Delta (Delta) designed to restore and protect ecosystem health, water supply, and water quality within a stable regulatory framework….
>
> The BDCP serves as a natural community conservation plan ("NCCP) under the state's Natural Community Conservation Planning Act (NCCPA), and a habitat

conservation plan (HCP) under Section 10 of the federal Endangered Species Act (ESA)…

Consistent with the goals of the NCCPA, the BDCP has been designed to mitigate for the effects of the activities proposed in this Plan (covered activities), and to conserve threatened and endangered species in the Plan Area. The Plan also provides substantial public benefits, including helping prevent species from becoming threatened or endangered, improving Delta water quality, and reducing future risks to the Delta from earthquakes, levee failure, and climate change. Funding to achieve these important goals will come from a variety of sources.

B. Legal And Analytical Defects Of The Substitute Environmental Document Related To The Draft Lower San Joaquin River Flow Objectives And Program Of Implementation

1. The SED Fails To Describe The Various Flow Regimes That Are Possible Under the Draft Program Of Implementation And Fails To Analyze The Potential Impacts Of Those Flow Regimes

The SED does not provide any analysis of the potential environmental effects of the range of possible flow patterns the Executive Director may order in the future, thereby rendering the SED legally inadequate. The SED should have evaluated a prescribed range of possible alternative management actions that could be taken by the Executive Director, and the potential environmental effects of those actions (e.g., effects on upstream coldwater pool management in each reservoir and the ability to maintain suitable water temperatures to support oversummering juvenile steelhead) and provide sufficiently cold water (less than 56 F) for fall-run Chinook salmon spawning and egg incubation in the fall (e.g., October-December)). The SED also should have explained the biological circumstances and underlying scientific basis for modifying instream flow schedules or magnitudes when such deviation would be justified.

The proposed "adaptive management" approach fails to include any protection against the Executive Director ordering flows in excess of the designated percent of the hydrograph, which is reasonably foreseeable if excess releases are ordered early in the year and then (like this year) the hydrology turns very dry. The program of implementation analyzed in the SED only requires that not less than the total quantity of water be dedicated to flow, not more. The SED does not address the potential adverse impacts to other beneficial uses of water, reductions in coldwater pool, or reservoir carryover storage under circumstances when predictions of the unimpaired hydrology and associated instream flow schedule result in greater releases than prescribed under the flow alternatives.

2. The SED Fails To Provide A Sufficient Analytical Link Between Flow Function And Expected Benefit For Salmonids And The Proposed Implementation Program

The SED fails to provide a legally or scientifically sufficient analytical link between the proposed narrative objective and implementation flows, and potential flow derived benefits for salmonids. The fundamental basis of the narrative objective is that an increased magnitude of instream flows that mimic actual seasonal hydrologic conditions during the later winter and spring each year is predicted to result in an increase in the abundance and survival of juvenile and adult

Chinook salmon and steelhead. However, the SED does not contain an analysis establishing that the salmonid population viability factors (e.g., abundance, spatial extent or distribution, genetic and life history diversity, and productivity) can be achieved by providing flows that mimic the natural hydrograph. Even if this analytical connection had been made, it has not been sufficiently established that the implementation of the proposed SED flow alternatives would provide "natural" flows under which the fish evolved and were adapted (e.g., the relative magnitude, duration, timing, and spatial extent of historic flows).

Appendix C of the SED describes two general categories of expected benefits from the percent of unimpaired flow approach: (1) additional flow is needed to significantly improve production (abundance) of fall-run Chinook salmon [upstream]; and (2) the primary influence on adult abundance is flow 2.5 years earlier during the juvenile rearing and outmigration life phase (Kjelson et al 1981; Kjelson and Brandes 1989; AFRP 1995; Baker and Morhardt 2001; Brandes and McLain 2001; Mesick 2001b; Mesick and Marston 2007; Mesick 2009); Mesick 2010 a-d [downstream]). (Draft SED, App. C, at p. 3-29.) However, the draft SED provides only a high level, and incomplete, review of the literature regarding the unimpaired flow management concept, and fails to link the flows actually being proposed with the flows studied in the literature. In addition, the SED fails to acknowledge the high level of uncertainty and highly variable responses within aquatic communities under the unimpaired flow strategy and the effects of factors such as habitat modifications (e.g., levee construction that alters floodplain inundation, channelization, loss of wetland and riparian vegetation, water storage by dams, cold water pool management and exposure to seasonally elevated water temperatures particularly during the late spring, summer, and fall, groundwater extraction, gravel mining, loss of spawning gravels and habitat complexity, etc.) and changes in biological relationships (e.g., increased risk of predation, exposure to contaminants, influence of hatchery operations, competition for limited suitable spawning and rearing habitat, changes in macroinvertebrate prey composition and abundance, invasive species, etc.).

The SED relies primarily on older flow-survival studies and out-dated assumptions about the primacy of spring smolt outmigrants without considering how the results of those studies comport with the newer studies and data. The SED does not synthesize information from these references and more recent studies into an analytical framework that is then systematically applied to expected results of each of the alternatives to assess the predicted response, and level of uncertainty, in the biological metrics (e.g., juvenile salmon survival, reproductive success, adult abundance, adult escapement, etc.) as part of the evaluation of alternatives. The SED presents no quantitative evaluation of the change in upstream habitat quality or availability for salmonid spawning or juvenile rearing as a function of changes in instream flows under the alternative flow regimes. Further, the SED does not provide any discussion of the poor relationship between spring flow and juvenile survival observed in the VAMP studies since 2006 and the apparent change in the spring flow-adult escapement relationship that is the foundation and technical basis for the SED analyses and findings.

a. Insufficient Linkages With Proposed Flows And Expected Benefits In The Tributaries

Chapter 7 of the SED defers to Appendix C for a description of the biological benefits of the proposed range of implementation flows. However, Appendix C does not include an analysis of the benefits of the proposed flows on the population dynamics of either steelhead or fall-run Chinook salmon; rather Appendix C contains a general description of the biological benefits that

could be expected from a broad range of increased flows, without specifying how the specific flows being proposed would provide anticipated biological benefits. Chapter 7 does not analyze the potential benefits of the proposed implementation flows as Chapter 7 is solely focused on analyzing whether the proposed implementation flows would have any potentially significant negative effects.

When describing potential upstream benefits, Appendix C cites studies where a hydrograph approach was applied in various restoration efforts around the world. (*See, e.g.*, Draft SED, App. C, at pp. 3-41 – 3-42.) The Public Water Agencies provided a review of this literature during the Water Board's Phase II workshops last year and herein incorporate the Public Water Agencies Workshop 1 submittal, Ecosystem Changes to the Bay Delta Estuary: A technical Assessment of Available Scientific Information, sections 6.1 and 6.2, by reference.

Appendix C assumes that all increases in flow will provide measureable improvements in species viability without supporting analyses using data from studies conducted on the San Joaquin River and its tributaries; despite the fact the related literature explains that this is an inappropriate assumption. The literature explains ecosystem response to increased flows are complicated, not a monotonic response to flow alone. As asked and answered in Poff, *et al.* (1997):

> Can reestablishing the natural flow regime serve as a useful management and restoration goal? We believe that it can, although to varying degrees, depending on the present extent of human intervention and flow alteration affecting a particular river [emphasis added].

The literature further explains that it cannot be assumed that additional flow will always provide species benefits. Poff and Zimmerman (2010) reviewed 165 papers related to the natural flow regime. A narrative summary of the reported results from the synthesis of available scientific literature by Poff and Zimmerman (2010) strongly corroborated previous, less comprehensive, reviews that document highly variable ecological responses to all types of flow alteration. The literature review by Poff and Zimmerman (2010) revealed some sensitivity of different ecological groups to alterations in flow magnitudes, but consistent robust statistical relationships were not detected between flows and many important biological responses of the aquatic community. The Poff and Zimmerman (2010) results revealed:

> Macroinvertebrates showed mixed responses to change in flow magnitude, with abundance and diversity both increasing and decreasing in response to elevated flows and to reduced flows. Fish abundance, diversity and demographic rates consistently declined in response to both elevated and reduced flow magnitude. Riparian vegetation metrics both increased and decreased in response to reduced peak flows, with increases reflecting mostly enhanced non-woody vegetative cover or encroachment into the stream channel. [emphasis added.]

Poff and Zimmerman (2010) explained, "Given the alteration of flow regimes is typically confounded with other environmental factors, we would not necessarily expect unambiguous relationships between single measures of flow alteration and ecological response." These confounding relationships have also been observed by other researchers. Bunn and Arthington (2002) describe the uncertainties associated with attempting to restore "natural" flow to promote ecological restoration.

> In writing this review, we often encountered reports of river systems affected by multiple stressors and were unable to definitely separate the impacts of altered flow regimes from those of the myriad of other factors and interactions. How much of an observed decline in species diversity can be attributed directly to modified flow compared to diffuse inputs of nutrients and contaminants? A similar problem occurs in our attempt to unravel the cause and effect of exotic species on aquatic diversity. Is an observed decline in native fish species the result of a modified flow regime or direct impact of an introduced species (or both)? Ecological science is not yet able to answer these questions, important as they are.
>
> Ecologists still have much to learn about the ecological significance of individual flow events and sequences of events, and descriptive science can take us only so far in unraveling these linkages. The advice from aquatic ecologists on environmental flows might be regarded at this point in time <u>as largely untested hypotheses about the flows that aquatic organisms need and how rivers function in relation to flow regime.</u> [emphasis added.]

These studies explain why the Water Board cannot rely on the assumption that a percent of the hydrograph approach has been tried elsewhere without also considering the relative success of those efforts in meeting the desired biological goals and functions, and the potential for success in the San Joaquin River system and south Delta. Ours is a highly altered system, both physically and ecologically, and the relationships between flows and habitat functions for salmonids no longer mimic natural or historic conditions. The expert panel during the 2010 flow proceedings nearly unanimously concluded, flow alone is not likely to restore the system or achieve the goals of salmonid recovery, yet that seems to be the assumption underlying the analysis presented in the SED.

The only place where the actual implementation flows are compared to potential flow-rated benefits to salmonids is in Chapter 7 of the SED. The functions identified in Appendix C that could be enhanced by flow are described qualitatively with no technical support or analysis and include: "native fish communities," food web support, habitat, geomorphic processes, temperature modification, and water quality. (Draft SED, at p. 3-42.) The analysis in Chapter 7 does not support a conclusion that the proposed flows would improve these functions and in fact the SED provides no analyses of, or where analyses are provided, no support for potential beneficial changes in a number of these attributes. For example:

- Chapter 7 concludes that turbidity and gravel mobilization will not be changed significantly: Alternatives 2 and 3 are not expected to affect the frequency of overbank or bed mobilization flows in the Stanislaus, Tuolumne, and Merced Rivers. (Draft SED, at p. 7-105.) The SED states:

  > [P]eak flows would occasionally be sufficient to cause gravel transport in the upper gravel-bedded reaches and some instream bank erosion, but the <u>frequency and magnitude of these events would not be sufficient to cause long-term changes in sediment transport rates</u>. Higher rates of sediment transport are also expected to occur in the lower sand-bedded portions of the major SJR tributaries and the SJR, but the frequency, duration, and

> magnitude of increased suspended sediment and turbidity levels are expected to be minor and within the range of historic levels….

(Draft SED, at p. 7-106, emphasis added.)

Alternative 4 is also expected to remain below the capacities of the existing channels and below thresholds associated with gravel mobilization in the upper reaches of the major SJR tributaries. (Draft SED, at p. 7-106.)

- Chapter 7 concludes that food availability and floodplain inundation will not be changed significantly: The SED concludes that under all alternatives, "the primary processes that alter food web support, including the magnitude and frequency of bed mobilization flows and floodplain inundation flows…are not expected to change substantially…." (Draft SED, at p. 7-114, emphasis added.) While there is "some potential" for increased floodplain inundation on the Tuolumne River "impacts on food availability resulting from changes in flow, nutrient transport, and water quality (food web support) would be less than significant on the major SJR tributaries. (*Ibid*., emphasis added.)

- Chapter 7 concludes that redd and fish stranding will not change significantly: For each alternative, the SED concludes:

> The modeling results…indicate…the potential for significant redd dewatering and fish stranding impacts on the Stanislaus River in March…All other rivers would either result in no change from the baseline with respect to redd dewatering or a reduction in the potential for redd dewatering…Therefore, redd dewatering and stranding impacts on Chinook salmon and steelhead populations in the Stanislaus, Tuolumne, and Merced Rivers under LSJR Alternatives…would be less than significant.

(Draft SED, at pp. 7-111 – 7-112.)

- Chapter 7 does not support a conclusion that water quality will be significantly changed: While the SED concludes that the lower flows of Alternative 2 would result in a significant impact to water quality for juvenile salmonids and other fish species, there is insufficient evidence provided to support this conclusion. In fact, the introductory text indicates that increased flows may be equally likely to increase or decrease pollutants.

> Increased flows would have the potential to increase mobilization and concentration of pollutants in surface waters in the tributaries and LSJR, potentially increasing exposure of aquatic organisms to toxic substances…However, increased flows would also provide benefits to indicator species by diluting existing pollutants in the water column, and any other pollutants that may be mobilized from the sediment on the bottom of the riverbed and along the river channel.

(Draft SED, at p.7-101.)

There is no data provided on existing pollutants levels in the water column versus in sediments on which to draw any conclusion regarding whether flow would have a positive or negative effect on water quality.

The SED conclusions in the remaining categories of flow functions are difficult to interpret because of unsupported assumptions. Nevertheless, all other categories were determined to have a less than significant impact, or a significant and unavoidable impact. What is not evaluated in the SED or its Appendix C is whether the proposed change in flow will result in a measureable improvement in salmonid viability as reflected in improved reproduction, improved survival, increased adult abundance, etc.

b. Insufficient Linkages Between Proposed Flow At Vernalis And Increased Salmonid Survival

Appendix C states that the second rational for the proposed implementation alternatives is that the primary influence on adult abundance is flow 2.5 years earlier during the juvenile rearing and outmigration life phase (Kjelson et al 1981; Kjelson and Brandes 1989; AFRP 1995; Baker and Morhardt 2001; Brandes and McLain 2001; Mesick 2001b; Mesick and Marston 2007; Mesick 2009; Mesick 2010 a-d [downstream]). (Draft SED, App. C, at p. 3-29.)

The studies cited above are based on analyses of old data, many new studies have been completed in more recent years. (See Figure 1.) The SED should have updated the Kjelson regressions to include all of the available data, and then evaluated how the regression is supported (or not supported) by the latest data on escapement, recent VAMP tagging experimental results for juvenile Chinook salmon survival, etc. The SED discusses many of the more recent studies, which illustrates how the flow relationships are uncertain and complicated by other factors, and then apparently ignores the recent studies and relies solely on the older work. As an example of recent data that was overlooked, the SED provides no analysis of flow-survival or flow adult escapement using data collected in recent years (e.g., after 2006) when the juvenile salmon survival has been observed to be consistently low (about 5%) and largely independent of spring flow at Vernalis.

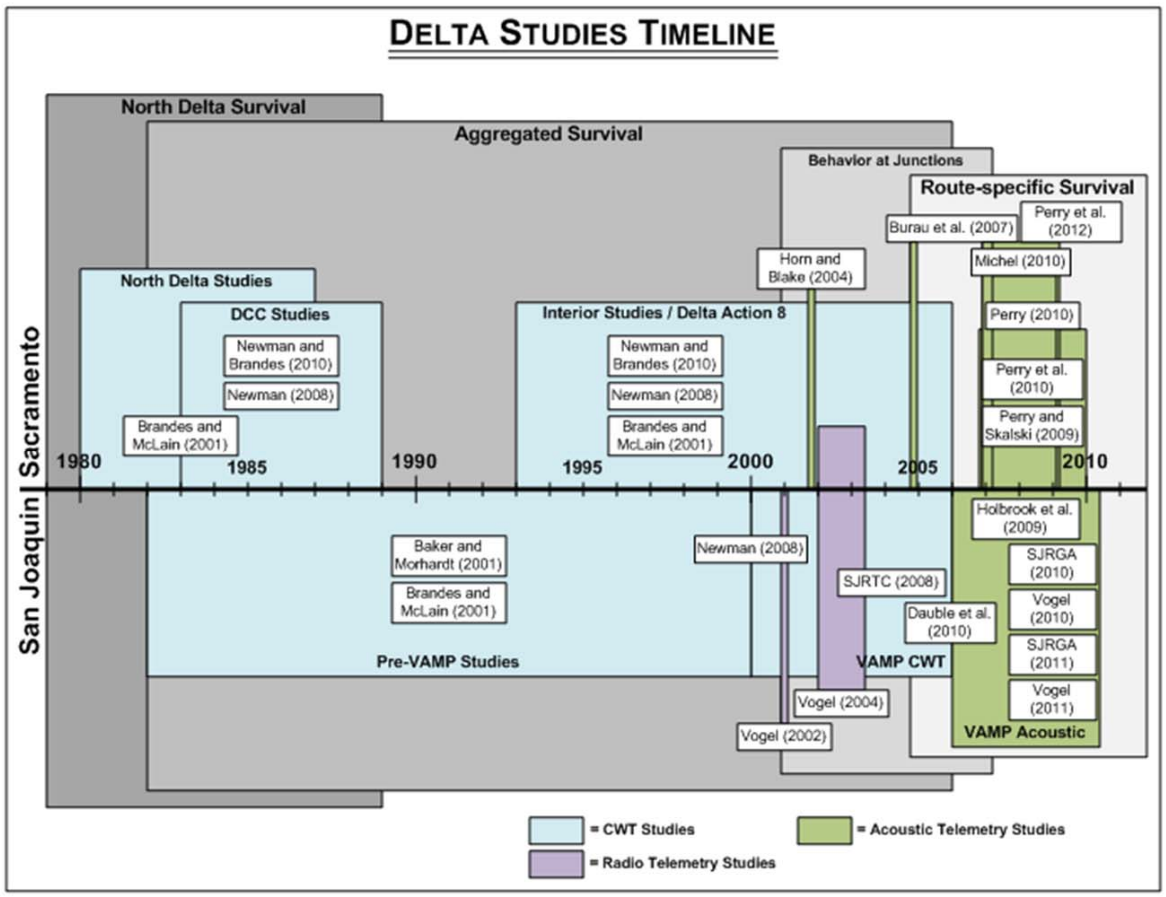

Figure 1. Summary of field studies and data analysis related to lower river and Delta survival studies. Colored rectangles indicate time period for specific field studies. Citations (in small white rectangles) indicate authors and year of reported analysis. The location of citations links the analysis to its data source. Though some studies were published recently, source data were often from more than 10 years old.

In an independent panel review of the VAMP studies, experts concluded: "'the very low recent survival rates seem unlikely to be high enough to support a viable salmon population, even with favorable conditions for ocean survival and upstream migration and spawning success for adults' (Hankin, et al. 2010)." These conclusions do not take into account, but are consistent with ,the recent data from the acoustic tag studies conducted in 2011 and recently summarized at the 2011 Bay Delta Science Conference by the team of Rebecca Buchanan (University of Washington) Patricia Brandes (USFWS) and Kevin Clark (DWR) in a presentation titled "Survival and Route Selection of Juvenile Chinook Salmon in the Southern Sacramento- San Joaquin River Delta – 2012". The acoustic tagging studies were conducted in the last half of May and first half on June in 2011. The flows during these periods were a little more than 10,000 cfs, which are very high flows for the San Joaquin River during these periods historically. Even at these high flows the survival from Vernalis through the Delta to Chipps Island was only 2%. Of extreme interest is that of the fish that survived to Chipps Island, 64% of them came through the CVP Tracy fish screening facility and were trucked around the Delta. This means that the natural fish survival through the Delta Channels in the high flow year of 2011 was less than 1%.

Specific flow regimes could have been quantitatively evaluated by interpreting available data (through 2010) for adult Chinook abundance and San Joaquin River flow 2.5 years earlier.

The SED appears to assume a simple, positive linear response between average spring flows and adult escapement. However, careful analysis reveals this relationship is not linear and is driven largely by a handful of observations of San Joaquin River flows (at Vernalis) greater than 10,000 cfs. The influence of very high flow events is depicted clearly in Figure 2, where a simple linear relationship using all flows years shows a weak positive relationship (R^2<0.36) for March, April and May. In contrast, when observations with average monthly flows greater than 10,000 cfs are excluded, the relationships weakens substantially, particularly for the month of May (R^2=0.04). This distinction is critical because controlled, non-flood flows at Vernalis, even at 60% unimpaired flow, will always be less than 10,000 cfs. The assumed simple linear relationship between spring flow and subsequent spawning escapement, wherein any increase in flows will lead to a proportional increase in Chinook salmon abundance, is not consistent with available data. This strongly implies the assumed simple positive linear relationship is an inadequate basis for flow management. Rather, effective flow regime management requires that the mechanism of the benefit be understood and accounted for. For example, the flow and adult abundance relationship suggests a threshold effect (which develops at flows greater than 10,000 cfs) rather than a simple linear pattern. Thus, flow increases from 1,500 to 3,000 (for example) may yield poorer than expected benefits. The analysis also needs to consider the timing and duration of flow pulses. Such analyses might reveal that a one week duration, large magnitude flow pulse in March would yield greater benefits than four weeks of 5,000 cfs flows in May. This point is made even more significant in light of recent studies showing that early emigrants (fry and parr) contribute substantially (more than 50%) to successful adult spawner abundance.[14]

[14] Sturrock, AM, Johnson, RC, Wikert, JD, Weber, PK, Heyne, T (2012) When to bolt: fry or smolt? Estimating survivorship of juvenile salmon migratory life histories using otolith strontium isotopes. 7th Biennial Bay-Delta Science Conference poster presentation. Sacramento.

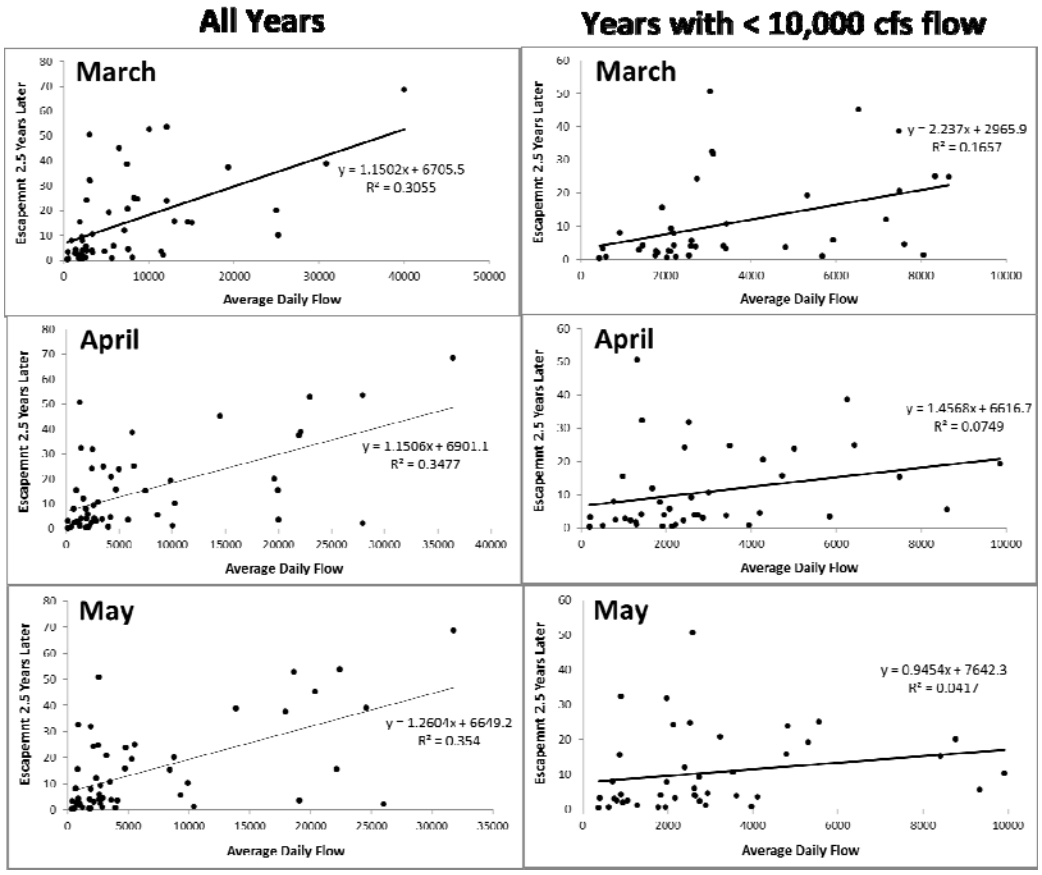

Figure 2. Relationship between average San Joaquin River flow at Vernalis flow and San Joaquin River basin in-river spawning escapement 2.5 years later. Flow data from DayFlow. Spawning abundance data from GrandTab, 1956 through 2010 combined for Merced, Tuolumne and Stanislaus Rivers. Graphs in left column show relationship by month for all years. Graphs in right column show relationship by month including only those years with monthly average flows less than 10,000cfs.

The SED must explain why the newer studies were ignored in favor of the older studies. Moreover, the SED must explain how the proposed implementation flows relate to the body of information that forms the justification for the flow proposal. Stated alternatively, are the implementation flows within the range of flows evaluated in the relevant studies and what is the likelihood that the proposed flows will provide measureable increases in salmonid viability (abundance)?

C. The Alternatives Analyses Is Legally And Analytically Defective

The draft SED must include an "analysis of reasonable alternatives to the project . . .." (23 C.C.R. § 3777, subd. (b)(3).) A substitute environmental document prepared under the State Water Board's certified regulatory program is considered to be the "functional equivalent" of an environmental impact report ("EIR") that would otherwise be required under California Environmental Quality Act ("CEQA"). (*City of Arcadia v. SWRCB* (2006) 135 Cal.App.4th 1392, 1422.) Therefore, the CEQA Guidelines' requirements regarding the range of alternatives that must be analyzed in an EIR are instructive for determining the range of alternatives that must be analyzed in a SED. An EIR must "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate

the comparative merits of the alternatives." (14 C.C.R. § 15126.6, subd.(a).) An EIR "must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation." (*Ibid*.) In addition, the Lead Agency "must publicly disclose its reasoning for selecting those alternatives." (*Ibid*.) The range of potential alternatives analyzed in an EIR must "include those that could feasibly accomplish *most* of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects." (14 C.C.R., § 15126.6, subd.(c), italics added.) Thus, the draft SED must include an analysis of the reasonable alternatives to the draft amendments to the Bay-Delta Plan that: (1) accomplish most of the basic objectives of the project; and (2) could avoid or substantially lessen one or more of the significant effects of the project.

1. The Goals And Objectives Of The Project Are Too Narrowly Drawn And Lead To An Unreasonably Constrained Alternatives Analyses

As part of a legally sufficient project description, CEQA requires a clearly written statement of the objectives sought by the proposed project. (Cal. Code of Regs., tit. 14, §15124(b).) Project objectives are to aid in the development of a reasonable range of project alternatives. (*Ibid*.) But, the SED goals and objectives are too narrowly drawn. The SED goals and objectives unreasonably limit the alternatives to the months of February through June, limit the alternatives to only three of the tributaries in the watershed (the Stanislaus, Tuolumne, and Merced Rivers); and limit flows to those that "…mimic the natural hydrographic conditions to which native fish were adapted." (Draft SED, at p. 3-1.) There are a number of alternatives that could contribute to improved salmon viability but were precluded from consideration because of the overly narrow goals and objectives. For example, there are a number of alternative flow patterns to the "unimpaired flow" regime, as well as non-flow actions, that could provide fishery benefits. These options should have been included as alternatives. Ironically, through the proposed adaptive management program, the SED is contemplating a variety of flows that would not mimic the natural hydrographic conditions, but the SED just fails to include them as alternatives and evaluate the potentially significant environmental effects associated with those flow regimes.

2. The Draft SED Fails To Analyze Reasonable Alternatives To A Flow Objective

The draft SED analyzes a single water quality objective—a flow objective--for the reasonable protection of fish and wildlife beneficial uses. (*See* Draft SED, at p. 3-3 ["LSJR Alternatives 2, 3, and 4 are comprised of a narrative objective and an associated program of implementation."].) This analysis is inadequate because it does not provide an analysis of the "reasonable alternatives" to a flow objective. (23 C.C.R. § 3777, subd. (b)(3).) "Reasonable alternatives" to the flow objective are any alternatives that could accomplish most of the basic goals of the amendments to the water quality control plan. (14 C.C.R., § 15126.6, subd. (c).) In reviewing and amending a water quality control plan, the State Water Board's fundamental goal and statutory mandate is to establish water quality objectives that in its judgment will ensure the "reasonable protection of beneficial uses . . .." (Water Code, § 13241.) Thus, in seeking to establish water quality objectives that will ensure the reasonable protection of fish and wildlife beneficial uses, the State Water Board must take a broad view, and consider a variety of factors, including the environmental characteristics and quality of the waters under consideration. (*Id*.) To achieve the basic goal of providing for the reasonable protection of fish and wildlife beneficial uses, the State Water Board should consider the various water quality characteristics or constituents that affect such beneficial uses and establish reasonable water quality objectives for those characteristics or

constituents. The draft SED fails to analyze reasonable alternatives to a flow objective which could feasibly accomplish the basic goal of providing for reasonable protection of fish and wildlife beneficial uses, and which could avoid or substantially lessen the significant effects of a flow objective. The range of alternatives needs to be expanded to include an analysis of non-flow alternatives that could provide for the reasonable protection of fish and wildlife beneficial uses.

3. The Draft SED Fails To Analyze Reasonable Alternatives To "Mimicking The Natural Hydrograph" Or To The "Unimpaired Flow" Regime

The identified "objectives" or "goals" of the draft amendments to the LSJR flow objectives and associated POI are as follows: (1) to provide flow conditions in the LSJR and three eastside tributaries sufficient to support and maintain the natural production of native fish populations, including "flows that mimic the natural hydrographic conditions" to which native fish species are adapted; (2) to consider relevant factors in establishing the objectives; (3) to provide for adaptive management of flows, while minimizing water supply costs; (4) to provide for appropriate monitoring and evaluation program to inform adaptive management of LSJR flows and future changes to the Bay-Delta Plan; and (5) to provide for coordination of regulatory processes related to LSJR flows. (Draft SED, at p. 3-2.) The first stated goal—to provide flow conditions that support and maintain native fish populations—appears to pre-determine that this goal requires "flows that mimic the natural hydrographic conditions." The assumption that "flows that mimic natural hydrographic conditions" must be part of the goal of supporting native fish populations constrains the alternatives analysis and results in a range of alternatives that merely analyzes various percentages of "unimpaired flow." In fact, the draft SED does not analyze *any* alternative to the draft narrative flow objective; instead it only analyzes different percentages of "unimpaired flow" as alternative programs of implementation.

The draft SED "evaluates four alternatives for LSJR flows during the February-June time frame, including the No Project Alternative (LSJR Alternative 1) and three other LSJR Alternatives (LSJR Alternatives 2, 3, 4)." (Draft SED, at p. ES-11.) However, LSJR Alternatives 2, 3, and 4 all contain the same narrative objective and only differ in terms of the percentage of unimpaired flow specified in the program of implementation for each of the "alternatives." The draft SED states that these "unimpaired flows were selected as alternatives to capture a range of potential flow alternatives that the State Water Board may implement." (Draft SED, at p. ES-12.) However, the draft SED fails to analyze alternatives that do not use the "unimpaired flows" approach. For example, the draft SED fails to explain why the "functional" approach in the existing WQCP, which is based on providing flows for specific ecological and physical processes needed to support native fish populations during certain times of year, is no longer a "reasonable" flow alternative. Nor does the draft SED analyze any alternatives that "mimic the natural hydrographic conditions" by using an approach other than "unimpaired flow." At a minimum, the draft SED must analyze all "reasonable" alternatives that achieve most of the basic goals of the LSJR objectives, if those alternatives could potentially reduce significant impacts. The draft SED fails to analyze whether there are flow alternatives that would support native fish populations and that could potentially reduce the significant impacts to water supply. By limiting the alternatives analyzed to percentages of "unimpaired flow" the draft SED constrains the State Water Board's ability to evaluate whether there are alternative flow regime approaches that could potentially reduce the significant impacts associated with the Preferred LSJR alternative. Alternative approaches could include, for example, approaches that examine the essential physical and ecological processes necessary to support native fish populations and the actions necessary to provide those processes.

4. The Draft SED Fails To Analyze An Alternative That Would Include Flows From The Upper San Joaquin River

All of the LSJR alternatives analyzed in the draft SED involve a program of implementation that requires certain percentages of "unimpaired flow" from three tributaries to the San Joaquin River—the Merced, Tuolumne, and Stanislaus Rivers. (*See* Draft SED, at pp. 3-5 – 3-6; App. K.) The draft SED fails to analyze any LSJR alternative that would include flow requirements from the upper San Joaquin River. However, under the logic of the draft SED, including flows requirements from the upper San Joaquin River is a "reasonable" alternative that could feasibly accomplish the goal of using unimpaired flow as a flow regime, and that could substantially lessen some of the significant impacts related to imposing flow requirements on only the three tributaries. Evidence in the record shows that under unimpaired conditions (1984-2009), the upper San Joaquin River at Friant would have provided 30% of the flow at Vernalis (Draft SED, App. C, at p. 2-24), yet the draft SED does not analyze a single alternative that would require flows from the upper San Joaquin River. In light of the upper SJR's contribution to flow under unimpaired conditions, it is inexplicable why the draft SED does not consider and analyze an alternative that requires flows from this part of the watershed.

5. The Draft SED Lacks Substantial Evidence To Support The Conclusion That There Are No Feasible Alternatives To The Preferred LSJR Alternative

None of the LSJR flow alternatives are feasible because there is no real-time data that would enable water suppliers to manage their diversions on a 14-day running average percentage of unimpaired flow. In addition, there is no substantial technical support for the fundamental assumptions that (1) any percentage of unimpaired flow will mimic the natural hydrograph in the LSJR or three eastside tributaries, or that (2) managing flow at 35%, 40%, or 60% of unimpaired flow will result in any benefit to steelhead, salmon, or other sensitive aquatic species that depend on the LSJR for any part of their life cycles. As stated, the SED must evaluate a reasonable range of feasible alternatives that will actually achieve measurable improvements in or protection of aquatic species beneficial uses.

Nevertheless, in addition to these fatal flaws in the unreasonably narrow range of alternatives, the SED fails to consider LSJR Alternative 2 as a "feasible" alternative that would avoid significant impacts to groundwater, recreation, agriculture, service providers, and energy use and climate change. Thus, even if LSJR Alternative 2 were feasible, which it is not, the SED would have to evaluate it as a means of avoiding otherwise significant impacts of the Preferred LSJR Alternative and Alternatives 3 and 4.

A SED must include "[a]n analysis of reasonable alternatives to the project and mitigation measures to avoid or reduce any significant or potentially significant adverse environmental impacts . . . ." (Cal. Code Regs., tit. 23, § 3777, subd. (b)(3).) This is consistent with the fundamental substantive mandate in CEQA that prohibits public agencies from approving projects with significant environmental effects if "there are feasible alternatives or mitigation measures" that can substantially lessen or avoid those effects. (*Mountain Lion Foundation v. Fish and Game Commission* (1997) 16 Cal.4th 105, 134; see also Pub. Resources Code, § 21002 ["it is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects . . ."].)

In many places, the SED concludes that there are no feasible mitigation measures because the only way to lessen or avoid certain substantial impacts would be to reduce flow, but then concludes that reduced flow is part of another alternative, so it is not a feasible mitigation measure. (E.g., Draft SED, at p. 10-27 ["Requiring less flow cannot be independently applied under LSJR Alternative 3 as a mitigation measure because requiring [less] flow would be inconsistent with the terms of LSJR Alternative 3 . . . ."].) By dismissing other flow regimes as infeasible mitigation measures, the SED ignores the possibility that there may be feasible alternatives that would substantially lessen or avoid the Preferred LSJR Alternative's otherwise significant impacts while achieving most of the project's goals and objectives. (Draft SED, at pp. 20-21 [finding preferred alternative will have significant and unavoidable impact on groundwater because there are no feasible mitigation measures]; 20-24 [same for recreational opportunities]; 20-26 [agricultural resources]; 20-26 -20-27 [service providers]; 20-27 [energy resources and climate change].)

Thus, the Preferred LSJR Alternative has several significant impacts that could be avoided by adopting LSJR Alternative 2, or another feasible alternative that would modify flow to support identified functions and values in the LSJR and tributaries. But the SED lacks substantial evidence that would support a finding that LSJR Alternative 2 is any less feasible than other LSJR alternatives.[15] Instead, the SED relies on the unsupported conclusion that a percentage of LSJR flows from February through June will mimic the natural flow regime and benefit sensitive aquatic species that use or migrate through the LSJR. Thus, in many places, the SED fails to provide substantial evidence that supports the conclusion that the impacts of the Preferred LSJR Alternative (or the impacts of LSJR Alternatives 3 and 4) are significant and unavoidable because it lacks any evidence that LSJR Alternative 2, or another alternative that is based on the best available science, is infeasible or would not achieve most of the goals of the plan.

Ultimately, Phase 1 of the updates to the Bay-Delta Plan should drop the percentage of unimpaired flow alternatives because they cannot be implemented on the proposed 14-day running average, and because there is no technical basis for the assumption that unimpaired flow will protect or benefit sensitive species. Instead, a reasonable range of feasible alternatives that avoid or substantially lessen the impacts of Phase 1 should be formulated based on the best available scientific information about what LSJR flows will actually improve the functions and values needed by steelhead and salmon that rely on the LSJR.

6. The Draft SED Fails To Provide Sufficient Information For The State Water Board To Evaluate Whether There Are Less Costly Alternatives[16]

Before adopting any "major regulation," the State Water Board must evaluate the alternatives to the requirements of the proposed regulation and "consider whether there is a less costly alternative or combination of alternatives which would be equally as effective in achieving increments of environmental protection in a manner that ensures full compliance with statutory mandates within the same amount of time as the proposed regulatory requirements." (Health & Safety Code, § 57005, subd. (a).) A "major regulation" is "any regulation that will have an economic impact on the state's business enterprises in an amount exceeding ten million dollars

[15] None of the LSJR alternatives are feasible as a percentage of unimpaired flow based on a 14-day running average, since there is no real-time data on precipitation and runoff that would enable diverters to operate to meet the objective.

[16] Notwithstanding its placement, the comment raises an independent error with the proposed amendments – a violation of Health and Safety Code section 57005.

($10,000,000) . . .." (*Id.*, subd. (b).) A "regulation" is "every rule, regulation, order, or standard of general application or the amendment, supplement, or revision of any rule, regulation, order, or standard adopted by any state agency to implement, interpret, or make specific the law enforced or administered by it, or to govern its procedure." (Gov. Code, § 11342.600.)

Here, the proposed plan update is a "regulation." (*See SWRCB. Office of Admin. Law* (1993) 12 Cal.App.4th 697, 703 ["a regulation which is part of a water quality control program is a regulation under the APA"], *Id.* at p. 702, fn. 4 [State Water Board conceded that "'water quality control plans adopted pursuant to Porter-Cologne set regulatory standards of general applicability which apply, interpret and make specific the requirements of Porter-Cologne'"].) The proposed update is subject to the requirements of Health and Safety Code section 57005 because the economic impact of that regulation on the state's business enterprises is estimated to be more than ten million dollars. (*See e.g.*, Draft SED, at p. 18-2, Table 18-1 [estimating that LSJR Alternative 3, with 30% unimpaired flow required, would result in $40 million in lost crop revenues annually].) As a result, the State Water Board must evaluate whether there are less costly alternatives that would be equally effective in achieving environmental protection. The State Water Board, however, has not done that. Lesser costly alternatives would likely include alternatives that move past the use of flow to water quality characteristics and constituents (sediment, temperature, etc.) that may be directly affecting the beneficial uses. The State Water Board should not adopt any plan amendments until it has complied with Health and Safety Code section 57005.

D. Specific Comments Regarding Chapter 5 – Water Supply, Surface Hydrology, And Water Quality

1. The Draft SED Confuses The Concepts Of "Unimpaired Flow" And "Natural Flow"

The draft SED states that the "hydrology of the SJR as measured at Vernalis is greatly altered from the unimpaired runoff conditions." (Draft SED, at p. 5-7.) The draft SED describes "unimpaired flow" as the "river flow at a specified location that would occur if all runoff from the watershed remained in the river, without storage or diversion." (*Ibid.*) The draft SED asserts that the "unimpaired monthly hydrology . . . approximate[s] flows of a more natural pattern." (*Ibid.*) This assertion confuses the concepts of "unimpaired flow" and "natural flows" and suggests that "unimpaired flow" approximates "natural flow." However, "unimpaired flow" is a calculation of a hypothetical flow condition that never existed in the Bay-Delta. In contrast, "natural flows" are the actual flow conditions that existed in the Delta during the predevelopment era. Only "natural flow" approximates the flows under which native fish species evolved.

The assertion that "unimpaired flow" approximates "natural" flow patterns ignores the fact that the Bay-Delta and Central Valley is a highly altered ecosystem. In the predevelopment era, historic inflows flooded out the original river channels into wetlands and floodplains that reduced the flood peak and supported vast acreages of natural vegetation. In contrast, any "unimpaired flow" regime would occur in the current, highly modified system, where outflow rushes through rock-lined channels surrounded by levees. The distinction between "unimpaired flow" and "natural flows" was articulated by DWR over 30 years ago during its testimony at the 1987 Bay-Delta Plan hearings:

> Since unimpaired flow estimates assume present channel configurations and levee and flood bypass systems, they are not the same as natural flows (i.e., flows that occurred in a state of nature, before development). Natural flows through the Delta would probably be *far smaller* than unimpaired flows due to consumptive use by extensive natural marshes and riparian areas that were later leveed and reclaimed. Monthly distribution of flows would also be different.

(California Department of Water Resources (DWR) 1987, p. 10, italics added.). The draft SED should be revised to acknowledge and clarify that an "unimpaired flow" regime will not mimic "natural" flow patterns, because the "unimpaired flow" regime would be implemented in a highly modified ecosystem.

2. Regulatory Setting

The draft SED states that the "[r]elevant federal programs, policies, plans or regulations related to water supply, surface hydrology and water quality are described [in section 5.3.1]." (Draft SED, at p. 5-50.) Section 5.3.1 in turn describes the federal Clean Water Action ("CWA"), the Federal Antidegradation Policy and the Raker Act. (*Id*. at pp. 5-50, 5-51.) However, there are federal laws in addition to those described in section 5.3.1 that are relevant to water supply, surface hydrology and water quality. For example, implementation of the federal Endangered Species Act significantly affects water supply in California, by mandating certain flows and restricting water supply diversions. Other federal laws that affect water supply and surface hydrology include federal reclamation law and FERC's licensing program for hydroelectric projects. Section 5.3.1 should be revised to include a discussion of these federal laws and any others that affect water supply, surface hydrology and water quality, either directly or indirectly.

The draft SED states that the "relevant state programs, policies, and regulations related to water supply, surface hydrology, and water quality are described [in section 5.3.2]." (Draft SED, at p. 5-51.) However, there are state laws and programs in addition to those described in section 5.3.2 that are relevant to water supply, surface hydrology and water quality. For example, Fish and Game Code section 5937 requires "[t]he owner of any dam shall allow sufficient water at all times to pass through a fishway, or in the absence of a fishway, allow sufficient water to pass over, around or through the dam, to keep in good condition any fish that may be planted or exist below the dam." In addition, Fish and Game Code section 1602 prohibits any entity from substantially diverting or obstructing the natural flow of any river, stream, or lake without prior notice to the Department of Fish and Wildlife and in some cases, requires conformance with a streambed alteration agreement. Also, the Central Valley Regional Water Board's Irrigated Lands Regulatory Program (ILRP) regulates discharges from irrigated lands within its jurisdiction, including from irrigated lands within the plan area, and this program affects water quality. Section 5.3.2 should be revised to include a discussion of these state laws and programs and any others that affect water supply, surface hydrology and water quality, either directly or indirectly.

E. Specific Comments Regarding Chapter 6 – Flooding, Sediment, And Erosion

1. The Environmental Setting Is Legally Inadequate Because It Lacks Any Description Of Flood Control Storage And Operations For New Don Pedro And New Melones Reservoirs

The environmental setting establishes the environmental baseline against which the project's environmental impacts must be assessed. (Cal. Code Regs., tit. 14, §15125.) The environmental setting must be accurately described in enough detail to enable the State Board, responsible and trustee agencies, and the public to assess the significance of any project alternative's environmental impacts. Generalized references to aspects of the environmental setting are inadequate. (*Galante Vineyards v. Monterey Peninsula Water Mgmt. Dist.* (1997) 60 Cal.App.4th 1109, 1122.)

The rainfall flood control storage and operations for Lake McClure are described, but no similar description is offered for New Don Pedro or New Melones Reservoirs. Instead, the draft SED simply states that "New Don Pedro and New Melones Reservoirs have similar flood control and flood control operating rules." The flood control storage and operations of New Don Pedro and New Melones Reservoirs should be added to the SED since they are key aspects of the environmental baseline. (Draft SED, at p. 6-4.)

2. The Impact Analysis Is Deficient Insofar As It Only Modeled The Flows For The Water Years 1999-2008, When The SED Itself Reveals That Recent Floods Were Recorded In All Three Eastside Tributaries In 1983, 1986, 1995, 1997, And 2006

The SED discloses that recent floods were recorded in the areas of, and high flows were recorded in, each of the three eastside tributaries in 1983, 1986, 1995, 1997, and 2006, and the Merced River experienced high flows in 2005 as well. (Draft SED, at pp. 6-12, 6-13, and 6-16.) However, the State Board only estimated unimpaired flow for water years 1999-2008, claiming without any evidentiary support that "[t]his time frame provides a representative range of flows . . . ." (Draft SED at p. 6-20.) There appears to be no substantial evidence in the record to support this assertion. Given the flood conditions reported in the period between 1983 and 2006, it appears that a broader range of water years is required to provide a representative sample.

Absent a truly representative sample, the analysis of potential flood, sediment and erosion control impacts of the LSJR flow alternatives is fatally flawed, and likely underestimates the potential significance of the impacts. For instance, the SED discloses that "the 1997 flood [on the Tuolumne River] resulted in bank overtopping near Modesto, Waterford, La Grange, and Roberts Ferry . . . ." (Draft SED, at p. 6-13.) Yet 1997 was not included in the "representative" sample of years for modeling and comparison of alternatives to baseline conditions.

3. The Impact Analysis In The SED Impermissibly Fails To Explain To The Reader How The Analysis Was Performed, Or Why Certain Assumptions Were Made

To serve its fundamental purpose as an informational document, an EIR, and thus, a SED, "must include detail sufficient to enable those who did not participate in its preparation to understand and consider meaningfully the issues raised by the proposed project." (*Laurel Heights*

Improvement Assn. v. Regents of the Univ. of California (1988) 47 Cal.3d 376, 404-405.) Accordingly, the SED "must reflect the analytic route the agency traveled from evidence to action." (*Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 733.) "[T]he public and decision-makers, for whom the EIR is prepared, should also have before them the basis for [the agency's opinion] so as to enable them to make an independent, reasoned judgment." (*Santiago Water Dist. V. County of Orange* (1981) 118 Cal.App.3d 818, 831.)

Instead of presenting the evidence and logic underlying the assumptions made in the impact analysis, the SED presents a confusing analysis, and simply refers the reader to Appendix F.1 and Appendix L for an explanation. For instance, according to the SED, the percentage of unimpaired flow requirements "might be waived as a result of public health and safety concerns" when the NOAA action stage of the rivers is reached. (Draft SED, at p. 6-20, emphasis added.) But instead of using the NOAA action levels to model flood flows under the various alternatives, the SED states that "[t]he WSE modeling performed for this chapter, and other chapters, uses monthly flow limits derived from observed flows above which the unimpaired flow requirement no longer applies. The model results are compared to those using the NOAA action stage in Appendix L . . . . The modeling and incorporation of the limits are also discussed in Appendix F.1." (Draft SED, at p. 6-20.)

The same mismatch between how the flood control curves and daily operations would actually be implemented at the three reservoirs under the LSJR flow objective alternatives, and how they were modeled (based on NOAA action levels as a proxy) reappears on page 6-22. Only there, the SED first states that "[a]lthough the monthly reservoir operation during the February-June period would be slightly different under the LSJR alternatives, the same end of month flood control storage space would be maintained and the same daily flood-control releases would be made during major rainfall runoff events, with the same downstream maximum flood-control releases." (*Ibid*., emphasis added.) But in the next sentence the SED inconsistently states that "reservoir storages would often be at the monthly flood control levels in many of the years . . . ." (*Ibid*., emphasis added.) The reference to Appendices F.1 and L are unhelpful in explaining how the two methods compare, or what the comparison supposedly demonstrates, leaving the public and decision-makers in the dark as to whether the analysis and conclusions are actually supported by substantial evidence.

4. The WSE Model Uses Unrealistic Assumptions About The Way Dams Are Operated On The Eastside Tributaries

In Appendix F.1, the SED discloses that the "rule curves" for modeling and establishing downstream flow targets for the LSJR flow objectives were formulated using an unrealistic assumption that diversion dams on the three eastside tributaries are operated based on storage levels at the end of January of each water year.

> To compare the WSE model results with the CALSIM baseline results, several cases were run to determine the approximate percentage of unimpaired flow targets that was most similar to the CALSIM II baseline river flows for each of the three eastside tributaries. This was done by comparing the distributions of the WSE and CALSIM II February–June modeled flows. The target percentage of unimpaired flow for the WSE model was adjusted until the distribution of February-June flows generally matched the CALSIM II flow distribution. The results of CALSIM II February–June flows closely match the WSE model results for the LSJR Alternative 3 flow targets

on the Stanislaus River and for the LSJR Alternative 2 targets on both the Tuolumne and Merced Rivers.

In the second step, the end of January storage verses annual diversion "rule curve" was developed to match the CALSIM II relationship between January storage levels and annual diversions for the major reservoirs on each tributary. The CALSIM II annual diversions were divided by the maximum annual diversion determined for each tributary, resulting in a percent of maximum annual diversion actually delivered each year. This result was then plotted against the January storage for the CALSIM baseline results. The WSE storage-diversion rule-curve was adjusted to provide a similar distribution of annual water supply diversions. The "rule-curve" results in a lower percentage of the maximum annual diversion being delivered when the January storage is lower. In general, substantial cutbacks to diversions are necessary when reservoir storage is less than roughly one half of the full capacity. Using the CALSIM II baseline results as a guide, diversion delivery rule curves were developed that resulted in annual diversions that were similar to those of CALSIM II. The WSE rule curves were also adjusted to match the end-of-September storages (carryover storage) from the CALSIM II model. Minimum allowable storage levels were specified for each reservoir and used as a reference line to tally the number of times storage fell below this level.

(Draft SED, App. F.1 at pp. F.1-20.)

Diversion dams are currently operated by determining the reservoir storage and snowpack prior to the beginning of the growing season, not at the end of January. However, the modeling used to estimate the impacts of the LSJR assumes that the dams will be operated to deliver water based on storage levels at the end of January of each year. (*Ibid*.) This methodology results in unrealistic modeling that undermines the analysis of impacts on a host of resources, including flood control.

Once the State Water Board has revised its modeling to incorporate realistic assumptions about how reservoirs would actually be operated under the various project alternatives, every section that relies on the WSE modeling results will require revision in light of the new modeling results.

5. <u>The Impacts Of LSJR Alternatives 3 And 4 Appear To Be Significant And Unavoidable On The Stanislaus River Because The Percentage Of Monthly Flows Greater Than The Level At Which Seepage Occurs Is Increased Significantly During Certain Months</u>

According to Tables 6-12 and 6-13, LSJR Alternatives 3 and 4 would result in a substantial increase in the percentage of monthly flows greater than 1,500 cfs, which is the level above which the Stanislaus River has experienced seepage. For instance, at Ripon, under the Baseline scenario, the percentage of monthly flows above 1,500 cfs would be 56%, 50%, and 11%. For April, May and June. (Draft SED, at p. 6-22, Table 6-13.) Under LSJR Alternative 3, it would be 30%, 62% and 29%, and under Alternative 4, it would be 70%, 84%, and 52% for the same three months.

Despite these substantial increases in the percentages of monthly flows when seepage would occur, the SED concludes that these impacts are less than significant for LSJR Alternative 3

because "on an annual basis, these flows are the same as baseline." (Draft SED, at p. 6-26.) With respect to Alternative 4, which clearly would exceed baseline by a substantial amount, both in terms of certain months, and on an annual basis, the SED concludes that the substantial increase in seepage into adjacent agricultural land does not take the form of surface inundation, and the flows would not cause additional erosion; therefore, even these substantial monthly and annual increases are less than significant.

The SED therefore either discounts substantial monthly increases by pointing to annual seepage, or it dismisses substantial increases in seepage altogether because no matter the increase, it will not result in inundation or erosion.

F. Specific Comments Regarding Chapter 7 – Aquatic Resources

1. Best Available Science

a. Best Available Science

Many of the sections in Chapter 7 such as those describing species life histories and stressors are poorly documented and many of the finding are not supported by either references or analyses. For example, many of the references cited in support of species descriptions are based on literature from the 1970s and 1980s and do not reference newly published studies and literature. Examples of missing reference citations include, but are not limited to, Maunder and Deriso (2011) delta smelt life cycle, MacNally, *et al.* (2010) and Thompson, *et al.* (2010) on analyses of factors related to trends in pelagic species, Glibert, *et al.* (2011) on the role of ammonia and nutrient ratios as a factor affecting primary production, Merz, *et al.* (2011) on the spatial relationship between salinity gradients and delta smelt geographic distribution, Jeffres, *et al.* (2008) on salmonid habitat use of seasonally inundated floodplains, Rosenfield and Baxter (2007) on population dynamics of longfin smelt, Murphy, *et al.* (2011) on issues related to the use of surrogate species, Bowen, *et al.* (2009) and Bowen and Bark (2010) on results of the Head of Old River non-physical barrier tests, CDFG (2009) status review of longfin smelt, CDFG SALSIM model (2012) for assessing effects of variation in instream flows on fall-run Chinook salmon survival and abundance in the San Joaquin River system, acoustic tag studies conducted in 2011 and recently summarized at the 2011 Bay Delta Science Conference by the team of Rebecca Buchanan (University of Washington) Patricia Brandes (USFWS) and Kevin Clark (DWR) in a presentation titled "Survival and Route Selection of Juvenile Chinook Salmon in the Southern Sacramento- San Joaquin River Delta – 2012, and many others.

The inclusion of the ICF International (2012) reference in place of recent primary literature is inappropriate since the ICF material is not a primary reference source but rather a compilation of information from a variety of sources, is an administrative draft that is not available to the public, and has not been subject to public review.

The SED discusses flow regulation on the Stanislaus River but does not discuss the IFIM study that was conducted for use as the technical basis for establishing the instream flow recommendations in support of the 1997 agreement. (Draft SED, at p. 7-30.) Results of the IFIM study showing the relationship between weighted usable area (WUA) and instream flow for various lifestages of Chinook salmon could, and should, have been used as part of the assessment of predicted changes in upstream spawning and rearing habitat as a function of each alternative flow scenario. The response of instream habitat for salmonids is substantially more complex than

reflected by a simple assumption that more flow produces more and higher quality habitat. Habitat suitability for a given lifestage of Chinook salmon and steelhead (and for other fish as well) is an interaction among physical factors such as water depth, water velocity, substrate, and cover (Raleigh, *et al.* 1986). As instream flow increases the suitability of habitat may decrease in response to water depths and water velocities that increase to levels that are no longer suitable. In the absence of analyses of potential changes in habitat quality and availability based on habitat preferences and suitability no meaningful comparison of the effects of variation in seasonal instream flows on upstream habitat can be made. The simplifying assumption in the SED that more flow will result in more upstream habitat is not supported technically and may result in misleading and inappropriate conclusions.

The SED analyses of potential flow-salmonid relationships fails to use analytic tools such as the juvenile salmon passage survival model, lifecycle models for Chinook salmon, the salmon egg mortality model, and juvenile salmon rearing model and other tools for assessing and evaluating the effects of the range of potential management actions on the reproductive success, survival, and abundance of salmonids predicted in response to the range of management strategies. . Examples of analytic tools that potentially could have been used in the assessment include the Delta Passage Model, IOS (Zeug, *et al.* 2012), the CDFG SALSIM model, USBR egg mortality model, USBR SALMOD model, DSM2 and others. NMFS is also in the process of developing a Chinook salmon lifecycle model (initially focused on winter-run) that may provide insight into the assessment. The SED simply assumes, without justification, that more flow during the February-June period each year will, in a positive linear relationship, always produce increased benefits to salmonid populations.

Chapter 7 of the SED presents virtually no biological analysis of the predicted response of various lifestages of Chinook salmon or steelhead to the changes that would occur in the seasonal timing and magnitude of instream flows under each of the alternatives included in the SED. For example, the SED presents no comparative analysis of changes in the quality or quantity of spawning or juvenile rearing habitat in the upstream tributaries under the alternatives (see discussion of IFIM above). Similarly, the SED presents no comparative analysis of changes in egg survival for juvenile Chinook salmon under the alternatives, no analysis of changes in egg survival and hatching as a function of seasonal variation in instream flows and water temperatures under each alternative, and no comparative analysis of changes in juvenile rearing habitat suitability and juvenile abundance that can be used to evaluate the biological response of the target species to the proposed actions. No results of lifecycle population modeling are present in the SED that would have provided prediction of the potential effects of implementing each alternative management strategy on the abundance of adult Chinook salmon and the contribution of the proposed actions on adult escapement to the San Joaquin River basin.

Similarly, the SED provides no analysis or discussion of the level of uncertainty associated achieving the salmonid population goals. In the absence of a stated biological goal (e.g., increase average adult salmon abundance by 50%) there is no technical basis presented in the SED for evaluating the ability of each of the alternatives (no project, 20, 40, or 60% unimpaired flow allocation) as the preferred project based on the ability to achieve the biological goal, given the level of biological uncertainty, with the greatest flexibility and least impacts on other beneficial uses. The technical analysis of alternatives presented in the SED lacks scientific rigor and therefore the selection of a preferred alternative appears to be arbitrary.

There are uncertainties inherent in each of these biological analyses (that should have been discussed and disclosed in the SED) but uncertainty is not a sufficient justification for the complete absence of comparative analyses among alternatives for the key metrics of interest. In the absence of comparative biological analyses for various salmonid lifestages both in upstream habitat and during migration through the lower river and Delta, the SED is incomplete and deficient.

The absence of references to these and other recent scientific investigation of aquatic resources in the Delta suggest a lack of understanding and depth of knowledge of recent findings and new results as technical support and foundation for the assessment. The absence of the application of analytical tools for comparative analysis of the potential response of various salmonid lifestages to the proposed alternative actions further undermines the rigor, credibility, and usefulness of the SED.

b. Disjointed And Fragmented Presentation Of Information

The discussion in Chapter 7 frequently requires the reader to go to other sections of the document or appendices for information required to evaluate the assessment details (see Draft SED, at pp. 7-30, 7-34, 7-38, 7-41, 7-43, 7-59 and elsewhere in Section 7 for examples). The format of the assessment leads to a disjointed and fragmented presentation. The presentation should be largely stand-alone with technical support from other sections and appendices. The key elements of other analyses or technical support needed to fully interpret results of the assessment presented in Chapter 7 should be summarized in the assessment to allow the reader the opportunity to understand the foundation and basis for the assessment results, interpretation, and conclusions.

The discussion of the approach and application of various analytical tools used in comparative analyses of the potential biological response of each lifestage of Chinook salmon and steelhead (this analysis is completely missing from the SED) should discuss and disclose the key assumptions and functional relationships (e.g., flow-habitat in each tributary, temperature-egg mortality relationships, juvenile survival-flow relationships, adult escapement-flow relationships, etc.) used in the biological analyses, with each updated to include the most recent data available and not simply relying on outdated analyses. Similarly, the discussion and interpretation of results should include considerations of factors other than seasonal flows that affect the response of salmonids and their population dynamics, as well as areas of uncertainty in the predicted response (for many of the relationships that would be used to support these analyses, 95% confidence intervals can be estimated on the range of predicted biological response to a given alternative that can then help inform comparative analyses among alternatives).

As currently presented, Chapter 7 does not adequately present the needed technical foundation to evaluate the assessment results and feels like material is scattered in various sections, and appendices, to obscure results and potential problems with the analyses rather than provide a transparent foundation for the assessment.

c. Flow-Survival Relationships

The foundation for analysis of alternatives for salmonids is based on flow-abundance relationships over the past several decades developed by CDFW (adult escapement to the San Joaquin River basin vs. spring flow 2.5 years earlier) and CWT based flow-survival relationships from VAMP studies. As noted above, all of the functional relationships used to support the SED biological analyses need to be updated to reflect the most current data and interpretations

available. Chapter 7 of the assessment does not present either of these key and fundamental relationships, but rather directs the reader to the 200+ page appendix C for this foundational material. These key relationships are used to support the fundamental assumption of the assessment that more spring flow in the San Joaquin River and its tributaries improves the survival and abundance of Chinook salmon and steelhead. There is no discussion, however, that these two relationships were developed only for fall-run Chinook salmon and that no data are presented or available to date on the flow-survival relationship or flow-abundance relationship for steelhead (and yet the same fundamental relationship is used in the analysis for steelhead with no technical support or disclosure). These two relationships are also used to conclude that increased spring flows on the tributaries will result in increased salmonid abundance and survival with no discussion or disclosure that these relationships were developed only for the mainstem San Joaquin River and are not specific to any of the tributaries. There are data from CWT studies on survival flow relationships for the tributaries but these data were not analyzed or included in the assessment. As noted above, this more recent data shows that salmon survival through the south Delta channels has been reduced to less than 5% and in 2011 (a high flow year of about 10,000 cfs) was actually less than 1%. These reductions of salmon survival are likely due to increase predation by invasive species that cannot be corrected with higher flows. As the IPR of the VAMP studies noted: "'the very low recent survival rates seem unlikely to be high enough to support a viable salmon population, even with favorable conditions for ocean survival and upstream migration and spawning success for adults' (Hankin et al. 2010)."

Chapter 7, should present a discussion, for example, of the data on adult fall-run Chinook salmon escapement and spring flows 2.5 years earlier. This is a fundamental element of the foundation used as the basis for the SED. First, all the data used in this relationship should be updated to include adult Chinook salmon escapement estimates through 2011.

Second, results of the CDFW's prior analysis of these data focused on average flow at Vernalis during April through May and therefore provide no technical basis for the seasonal period selected for use in the proposed implementation alternatives that are based on flows over the period from February through June. As currently presented, there is no analysis in SED, Chapter 7, that establishes the rational for specific flow levels in February-March or June as part of the evaluation of the effects of various alternatives on salmonid population dynamics. Similarly, the SED presents no comparative analysis of alternatives regarding the effects of the proposed instream flows on spawning, egg incubation, hatching success, fry rearing and survival, etc., during the February-March time period nor any biological rational for the role of instream flows in the lower river and Delta for salmonids throughout June since the vast majority of juvenile migration is completed (and typically seasonal water temperatures are highly stressful) by June. The absence of rigorous analyses of the life history and functions of salmonids for use in assessing the relative biological benefits of the various alternatives (e.g., what is the biological value to juvenile Chinook salmon of providing higher flows in June to their population dynamics and survival when compared to the effect of this action on reducing reservoir storage and coldwater pool for over-summering steelhead and for meeting the 56 F temperature criteria for Chinook salmon egg incubation in October) is a major deficit in the SED analyses.

Third, the flow-escapement relationship developed originally by CDFW represents adult returns to the entire San Joaquin River basin and cannot be used to support findings related to the flow-abundance relationship for any specific tributary as was suggested in the SED.

Fourth, the flow-abundance relationship is driven to a large extent by adult escapement that occurred one or more decades ago (e.g., 1983, 1958, 1969, 1998, 1982, and 1967) in response to very high (flood flow) conditions in which river flows during April and May averaged over 15,000 cfs. Had the flow-abundance relationship been limited to a range of managed flows that are consistent with the flow range under the proposed alternatives the predicted changes in comparative abundance of adults among alternatives would be substantially less than that predicted by using flood flows in the analysis. It is also important to acknowledge that adult fall-run Chinook salmon escapement in 2006 was very low despite have an average April-May flow at Vernalis of 20,000 cfs which, based on the assumed flow-escapement relationship would have been predicted to result in adult escapement of approximately 30,000 salmon, rather than the low escapement actually observed. Chapter 7 provides no discussion or analyses of these and other factors important to the interpretation of results of comparisons among alternative actions.

The assessment discusses the more recent studies, and then apparently disregards those results without explanation. This is inappropriate because there appears to be a fundamental change in the flow-survival relationships (and likely the flow-abundance relationship for fall-run Chinook salmon on the mainstem San Joaquin River) in recent years. Results of VAMP and pre-VAMP studies showed a marked declining trend in juvenile fall-run Chinook salmon survival over the period from the late 1990s through mid-2000s. In 2006 survival estimates between Durham Ferry and Chipps Island declined to approximately 5%. Survival has remained at these low levels through 2011. The decline in survival has been independent of San Joaquin spring flows and SWP/CVP exports. In fact, in 2011 San Joaquin River flows were high and yet survival was low. These recent results are counter to the foundation assumptions used in developing the assessment and the strategy of developing alternative flow scenarios that result in increased flows (e.g., 60% unimpaired spring flow alternative) in the February-June period.

It has been hypothesized that predation on juvenile salmon during downstream migration in the lower San Joaquin River and Delta by species such as largemouth bass and striped bass has increased in recent years and substantially altered the flow-survival relationship. The SED assessment does not present or discuss these recent data or the level of uncertainty that the proposed range of alternative actions would achieve the goal of increased salmonid survival.

Results of the 2011 studies lead to a number of key questions regarding the effectiveness of increased spring flow for increasing juvenile salmonid survival that are not transparent in the Chapter 7 assessment.

The absence of technical support for many of the SED findings undercuts the weight that can be given to the analysis and interpretation of results presented in Chapter 7.

d. Flow Modeling

The model analysis of changes in flows is based on the median monthly flow derived for each model scenario. (Draft SED, at p. 7-58.) The use of the median flow in these analyses is not appropriate and fails to properly analyze potential adverse impacts that are most stressful in dry and critically dry hydrologic conditions. The median values may be biased by high flow periods that are not captured in a more detailed comparative analysis of conditions among alternatives. In previous environmental documents the use of median values has been rejected by state and federal agencies. (For example, in the 2010 draft BDCP Effects Analysis State and Federal resource agencies commented that the use of average flows for a month across years or average flows over a

period of months within a year were not acceptable for use in assessing fishery related impacts or potential benefits and requested that comparative analyses be performed to eliminate the use of averages and median flows in the analysis.) The conventional approach toward flow assessment has been a month by month comparison each year over an 82 year period of hydrologic record for use as a technical basis for assessing the potential for adverse impacts. (For example, see the Stockton Delta Water Supply Project 2005 EIR fishery analysis; Stockton 2005.) A similar detailed assessment is also the standard approach to conducting water temperature effects analysis rather than relying on averages or median values. (For example, water temperature modeling used as part of effects analyses for salmonids is typically conducted at an hourly or six-hour time-step to reflect seasonal and diel variation in water temperatures that affect fish growth and survival.)

The comparative analysis of differences among alternatives needs to reflect variation in hydrologic conditions (water year conditions) which are not disclosed in the current approach to the assessment.

In addition, the assessment focuses primarily on the February-June period but needs to also analyze changes in environmental conditions within each area year-round to reflect the habitat requirements and life history of each of the target species. This is particularly important for steelhead that require one or more years of juvenile rearing in the rivers where summer temperatures and flow conditions are important.

The application of additional biological models such as the USBR egg mortality model and the USBR SALMOD models can be applied to improving the quantitative assessment of effects of changes in water temperature on salmonids.

As a result of the issues related to the thresholds and criteria used in the assessment and the reliance on median monthly conditions in the analyses, all of the findings presented in Chapter 7 comparing significance of various alternative release strategies lack the support of substantial evidence, and should be re-analyzed.

e. Steelhead

Results of fishery monitoring on the San Joaquin River tributaries (snorkel surveys, rotary screw traps and weirs) and mainstem (Mossdale trawl) provide information on the resident *O. mykiss* (steelhead) population within the basin as well as information on migratory steelhead. Results of these surveys indicate that the steelhead population inhabiting the San Joaquin River system is very small and may be largely supported by the production of the resident trout population. (See presentation by NMFS to SWRCB regarding steelhead status in the San Joaquin River available at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/060611wrkshp/nmfs.pdf.) No quantitative estimates of the abundance of adult steelhead returning to the basin to spawn are available or whether the steelhead population is self-supporting or dependent on adult strays from other river systems. Appendix C states that steelhead are on a continuing decline (Draft SED, App. C, at p. 3-28), but evidence suggests they were never abundant in the San Joaquin, but were instead the occasional offspring of an abundant resident population that migrated within freshwater, but seldom to sea. Recent otolith microchemistry analysis has revealed that a high percentage of smolts had resident mothers. (Zimmerman, *et al.* 2009.) Thus, a natural flow regime in the San Joaquin does not support a steelhead "population."

Historically, steelhead migrated into the higher elevation reaches of the San Joaquin River system (similar upstream habitat as historic spring-run Chinook salmon) where summer water temperatures remained cool and supported juvenile rearing over the summer months. (Moyle 2002, NMFS 2009.) Steelhead juveniles rear in freshwater for one or more years before migrating to coastal marine waters. (Moyle 2002, NMFS 2009.) With the construction of rim dams within the San Joaquin River basin steelhead have been restricted to lower elevation habitat and rely on coldwater from the dams to provide suitable flow and temperature conditions throughout the spring, summer, and fall months. Exposure of juvenile steelhead to elevated summer temperatures and the associated limited physical habitat available for summer rearing are thought to be limiting factors affecting carrying capacity of tributary rivers for steelhead rearing. (NMFS 2009.) As a result of the importance of maintaining suitable summer water temperatures to support juvenile steelhead rearing in the upstream tributaries, the SED must include a rigorous and well documented analysis of the effects of each alternative scenario on individual reservoir storage (by month over all 82 years included in the simulation modeling) coupled with fine-grained (1 hour or 6 hour time step) water temperature modeling of habitat conditions as a function of seasonal meteorological conditions and distance downstream of each dam. Results of these temperature analyses, especially during the summer of drier years when reservoir storage is reduced by both hydrologic conditions and the proposed seasonal instream flow releases between February and June under each proposed alternative management scenario included in the draft SED. The current steelhead population in the basin is very small and adverse changes in summer flow and water temperature associated with the proposed action has the risk of contributing to high juvenile mortality or potentially extirpation of steelhead from the basin.

Appendix C makes the explicit assumption that flows for Chinook will be good for steelhead. (Draft SED, App. C, at p. 3-13.) This is inaccurate. The natural flow regime in the San Joaquin basin was dominated by spring runoff, which probably supported spring-run Chinook to a greater degree than fall-run Chinook. Examples from several other river systems demonstrate that the transition point in a river system from supporting fall-run to spring-run Chinook is also the transition point between predominantly anadromous and resident life histories of rainbow trout. Flow regimes that tend to support spring-run Chinook also tend to support resident rainbow, which historic evidence indicates was the case in the San Joaquin Basin.

2. Regulatory Setting

The regulatory setting section, SED at Section 7.3, is missing several important elements including CVPIA-AFRP, (Draft SED, at p. 7-48), the interim Biological Opinions for USFWS and NMFS (*Id.* at p. 7-48), the current update of the USFWS Native Delta Fish Recovery Plan, (*Id.* at p. 7-49), recognition of the development of a Central Valley salmonid recovery plan by NMFS (*Id.* at p. 7-49), the CDFG ITP for SWP export operations (*Id.* at p. 7-50), and development of BDCP, (*Id.* at p. 7-5). There is also no real discussion of Essential Fish Habitat management under NMFS. The discussion of the status of longfin smelt at p. 7-20 should include a discussion of the recent USFWS determination. The SED also incorrectly characterizes the OCAP consultation as the BiOps are not expected to be in effect until the BDCP becomes operational, as there are court established deadlines for the completion of new biological opinions prior to the operation of new conveyance facilities. (Draft SED, at p. 7-48.)

3. Alternatives

There is no evaluation of alternatives for how to get the most good from use of the limited water available. Carryover storage in reservoirs will obviously be affected in many years and there is no consideration of how that should affect choice of amounts and duration of flow prescriptions. The tradeoffs to fish of spreading the use of water across 5 months rather than focusing on specific functions are not discussed. Use of a salmon lifecycle model and/or other analytical tools is needed to assess the relative contribution of various elements of the proposed management strategies and the associated predictions of biological benefits to the population dynamics of the target species. For example, rather than providing higher sustained flows over extended periods during the February-March period for fry migration the application of short-duration pulse flow migration cues may be a more effective management strategy. Results of these comparative analyses would be useful in identifying substantial differences in management strategies that impacts how water operations could support productive salmon runs.

4. Environmental Setting

a. Striped Bass

The assessment on page 7-24 of the draft SED notes that striped bass are a pelagic species included in the POD. The discussion fails to note that both delta and longfin smelt are also POD species. The SED discusses striped bass predation mortality on juvenile Chinook salmon within Clifton Court Forebay but does not discuss the larger issue of predation mortality in the San Joaquin River and its tributaries and within the Delta on the survival of juvenile Chinook salmon and steelhead. (Draft SED, at p. 7-25.) Results of acoustic tagging studies conducted in the past several years have shown that predation is a major factor affecting juvenile salmonid survival. (E.g., Buchanan, *et al.*, 2013.) Predation mortality on a regional scale may or may not be related to river flows. For example, it can be hypothesized that an increase in stream flows will result in faster downstream migration by juvenile Chinook salmon and therefore will reduce the duration of exposure and risk of predation mortality (increased juvenile survival). Data are available from VAMP studies and the USBR Six-year steelhead study, as well as other experimental studies of juvenile salmon migration and survival in the lower rivers and Delta that could have been analyzed in the draft SED to inform this analysis. There is also a growing body of recent scientific information from acoustic tagging studies in the rivers and Delta that demonstrate the high levels of mortality occurring on juvenile salmon as they migrate downstream that appears to be largely independent of river flow. The absence of discussion of predation on juvenile salmonid survival and how predation could contribute to the observed decline in salmon survival to approximately 5% in the lower San Joaquin River that appears to be largely independent of river flow (e.g., see results of 2006 and 2011 VAMP survival studies)[17] is a major omission from the assessment and may significantly bias the interpretation of the potential effects of flow on survival and abundance of Chinook salmon.

[17] Buchanan, R., Presentation to Delta Science Conference, October 2013 [Lowest observed survival for San Joaquin River acoustic telemetry to date occurred in spring of 2011 when river inflows were greater than 10,000 cfs].

b. Delta Smelt

The draft SED states that delta smelt prefer areas where fresh and brackish water mix in the salinity range of 2–7ppt. (Draft SED, at p. 7-10.) The SED should also state that delta smelt are known to occur year round in the Cache Slough region, which is fresh water. (Merz, *et al.* 2011; Baxter, *et al.* 2010; Sommer, *et al.* 2011).

The SED states that delta smelt larvae are transported downstream to the low salinity habitat. (Draft SED, at p. 7-19.) This was the thinking prior to discovery of a year-round subunit of delta smelt in the Cache Slough region. It is now known that downstream transport is not an obligate life history trait. (Baxter, *et al.* 2010; Merz, *et al.* 2011.)

The draft SED states that changes in delta smelt habitat quality in the San Francisco estuary can be indexed by changes in X2 and that over the range of historical experience the quantity or suitability of estuarine habitat increases when outflows are high (USBR 2008). (Draft SED, at p. 7-43.) Prior to 1987 this may have been true, but not for delta smelt, which have never been shown to have a statistically significant relationship to X2. (Jassby, *et al.* 1995; Kimmerer 2002; Kimmerer, *et al.* 2009.) Also, post-1987 the relationships between X2 and many species abundances have declined or have broken down (e.g., the longfin smelt relationship). (Kimmerer 2002; Kimmerer, *et al.* 2009.)

The SED states that turbidity in the southern Delta is low, which may reduce habitat for delta smelt and other species (Feyrer 2004; Feyrer and Healey 2003; Feyrer, *et al.* 2007; Monsen, *et al.* 2007; Nobriga, *et al.* 2008), and therefore flow patterns that cause delta smelt to move into the southern Delta are likely to negatively affect the population. (Draft SED, at p. 7-45.) The link between turbidity and delta smelt presence is well established. The south Delta is acknowledged to be too clear for delta smelt except during rainfall runoff events, when the pumps are already controlled by the USFWS biological opinion on delta smelt.

The SED states that changes in Delta inflows from the LSJR have the potential to alter LSZ salinity gradients and the location of X2, which can influence temperature, turbidity, and other habitat characteristics (Moyle, *et al.* 2010). (Draft SED, at p. 7-46.) In fact, LSJR flows exert little influence on X2 location and have virtually no effect on water temperatures downstream of the Delta. (Wagner, *et al.* 2011.)

The SED states that the export facilities are known to entrain most species of fish inhabiting the Delta (Brown, *et al.* 1996) and are of particular concern in dry years, when the distributions of delta smelt and longfin smelt shift upstream, closer to the diversions (Stevens, *et al.* 1985; Sommer, *et al.* 1997). (Draft SED, at p. 7-43.) It must be added that there is little evidence that entrainment has a population-level effect on either delta smelt or longfin smelt. Entrainment is no longer considered a major threat to longfin under the existing BiOp. (USFWS (2012).)

c. Longfin Smelt

Page 7-10 of the draft SED indicates that longfin smelt can be found in both the seawater and freshwater areas. While this is true, they are found in far lesser numbers in freshwater areas except during spawning. (Moulton 1974; Chibgu, *et al.* 1998; Chigbu 2000; CDFG 2009; Rosenfield 2010; Rosenfield and Baxter 2007.) They are generally limited to the LSZ and westward. (Gray, *et al.* in prep.) Spawning takes place in freshwater. (Wang 1986; Moyle 2002.)

The SED states that longfin smelt eggs typically hatch in February and disperse downstream. (Draft SED, at p. 7-20.) The principal nursery for larvae is the Suisun and San Pablo Bays. (*Ibid*.) However, a large number of larvae are also caught in the Napa River. (Hobbs, *et al.* 2006; Gray, *et al.* in prep.) It should be further noted that the existing surveys do not cover the entire range of Bay-Delta longfin smelt, and therefore the extent longfin spawn in freshwater tributaries in the Bay is largely unknown.

d. White Sturgeon

The SED states that white sturgeon inhabit riverine, estuarine, and marine habitats at various life stages during their long lives (BDCP 2010) and that the greatest portion of the population occurs in the brackish portion of the estuary, moving in response to salinity changes. (Draft SED, at p. 7-14.) This statement is from Kolhorst, *et al.* (1991), which is based on data from the 1970s-1980s. Wang (2007) concluded that the majority of the white sturgeon larval population is believed to be in the upper Sacramento River, although more larvae are found in Suisun Bay and Montezuma Slough in wet years. The SED should reflect the updated understanding offered by Wang (2007).

e. Splittail

The SED describes Sacramento splittail as a large minnow endemic to the Bay-Delta and confined to the lower reaches of the Sacramento River and SJR, the Delta, Suisun and Napa Marshes, and tributaries of northern San Pablo Bay (Wang 1986; Moyle, *et al.* 2004). (Draft SED, at p. 7-20.) Splittail are a fairly long lived species with high reproductive potential. Reproductive success is greatest in those years when high river flows associated with flood events result in seasonal inundation of floodplains where adult splittail successfully spawn and eggs incubate. (Moyle, *et al.* 2004, Moyle 2002.) After hatching the larval splittail remain associated with inundated floodplain vegetation for a period of time before dispersing downstream and the floodplain inundation recedes. (Moyle, *et al.* 2004, Moyle 2002.) The SED Chapter 7 presents no analysis of the changes in water surface elevations that would occur at various locations within the tributaries or mainstem river associated with each of the proposed alternatives nor any assessment of the potential change in seasonal floodplain habitat inundation that may occur under the alternatives that would affect spawning habitat for splittail. The SED alternatives could have the potential to increase the seasonal inundation of floodplain habitat by higher winter releases or may result in a reduction in floodplain inundation as a result of reductions in reservoir carry over storage. Much of the San Joaquin River system is incised and has been channelized which may preclude floodplain inundation under the alternatives and therefore provide no biological benefit to splittail spawning. In the absence of such biologically based comparative analyses there is no technical basis presented in Chapter 7 to assess the potential for beneficial or adverse impacts of the alternatives on splittail. This is an example of the types of analyses that are missing throughout Chapter 7 of the SED.

f. Rainbow Trout

The SED describes rainbow trout as landlocked steelhead. (Draft SED, at p. 7-23.) While they are genetically identical to steelhead, rainbow trout are not always landlocked. Depending on stream conditions, steelhead trout may volitionally choose to not migrate to the ocean. As discussed above, the San Joaquin River tributaries support populations of resident trout. Resident trout inhabit the rivers throughout the year. As discussed above for steelhead, late spring,

summer, and fall flows and water temperatures are important in determining habitat quality and availability for resident trout. Detailed hydrologic simulations of monthly reservoir storage and coldwater pool volumes are needed for all 82 years of the modeling coupled with detailed (hourly or 6 hour time step) water temperature model results for a range of seasonal meteorological conditions and distances downstream of each dam for use as a technical basis for assessing the potential effects of each alternative on resident rainbow trout. These detailed analyses are not presented in Chapter 7 of the draft SED.

g. Indicator Species, Fall Run Chinook Salmon And Steelhead

The SED states that indicator species were selected for the environmental analysis because they meet one of the following criteria: (1) they are native species whose populations in California are declining and/or have received a special-status designation by federal or state resource agencies, or (2) they are recreationally important game fish species. (Draft SED, at p. 7—53.) Use of indicator or surrogate species in environmental analyses must be done with caution. Care must be exercised to assure that the surrogate species actually has the same or largely similar life history characteristics and habitat requirements as the target species. (Andelman and Fagan 2000; Dale, *et al.* 2004; Murphy, *et al.* 2011.)

The discussion of trends in salmon escapement presented on page 7-29 and Figure 7-1 in the draft SED are poorly documented. In discussing Figure 7-1 the assessment concluded that the highest returns occur after years of high spring flows, yet Figure 7-1 does not include any data on river flows. This same issue occurs on page 7-33 in reference to Figure 7-2. Similarly, the analysis of escapement on page 7-29 discusses adult returns in the 1970s, 1980, and 1990s but provides no discussion of adult returns between 1999 and 2012 despite the data being readily available in GRANTAB. The assessment also discusses results of juvenile monitoring in 1996-2005 but fails to discuss any more recent monitoring results. This also applies to the discussion on steelhead monitoring in 2006-2007 on page 7-29, but does not provide any reference of results of more recent monitoring despite steelhead being identified in the assessment as a key indicator species. Similarly, on page 7-32, the draft SED presents estimates of predation from PFMS in a 1999 report, but fails to discuss more recent efforts by AFRP and others to assess mortality on juvenile salmon from predation.

The SED states that LSJR flow alterations can potentially create an environment that is physiologically stressful to most organisms that utilize the Bay-Delta and X2, including Chinook salmon and Central Valley steelhead. (Draft SED, at p. 7-46.) In fact, neither salmon nor steelhead make use of the LSZ for either spawning or rearing.

The assessment also incorrectly identifies Sacramento pikeminnow as a nonnative predator, but the Sacramento pikeminnow is actually a native species. (Draft SED, at p. 7-32.)

h. Environmental Stressors

(i) Tuolumne River Gravel Augmentation

The discussion of the Tuolumne River starting on page 7-35 of the draft SED could be expanded to include more recent information on gravel augmentation, e.g., in Table 7-6, as well as activities associated with investigations on predation and interactions with gravel pits as well as other studies done in support of FERC hydroelectric relicensing and other programs.

(ii) Merced River Habitat Conditions

The discussion of habitat conditions on the Merced River at, page 7-39 of the draft SED is primarily based on information reported by Stillwater in 2002. There have been a number of activities since 2002 (see Stillwater 2002 for the Merced River corridor restoration plan) to start to improve habitat conditions that are not included in the assessment discussion. Similarly, the discussion of the hatchery on page 7-39 does not include any discussion of the current hatchery review process and development of a hatchery genetics management plan (HGMP); the hatchery management plans are being developed by CDFW for Central Valley salmonid hatcheries as part of a broader west coast review of hatchery management by state and federal resource agencies. The draft SED discusses diseases in the hatchery and wild populations based on studies conducted in 2000 and 2002, but does not mention the current disease investigations and assessments that have been conducted as part of the VAMP survival studies.

(iii) The Discussion Of Delta Inflows And Hydrodynamics Is Incomplete And Inaccurate

The discussion of Delta hydrodynamics on page 7-43 does not present any of the recent analyses of OMR and salvage, the USBR six-year steelhead survival studies, the 2012 Stipulation Study, results of VAMP, and a number of other relevant sources of information.

The Delta inflows and hydrodynamics discussion on page 7-43 focuses exclusively on project operations and entrainment. In addition, the discussion in Chapter 7 improperly attributes hydrodynamics in the Delta to CVP/SWP export operations with little or no discussion of the effects of other in Delta diversions, gate and barrier operations, and no mention of the impact of tides on hydrodynamics. (Draft SED, at p. 7-44.) This is an incomplete and inaccurate description of inflows and hydrodynamics.

(iv) Diversions And Entrainment

It is only an hypothesis that pumping may confuse outmigrating salmonids, but the draft SED presents it as if it is established fact. . (Draft SED, at p. 7-44.) There are no studies that have established this hypothesis. In fact, studies to date have shown that survival through Old and Middle River is not necessarily worse than survival on the mainstem of the San Joaquin River. (Buchanan, *et al.* 2013.) Results of juvenile Chinook salmon survival studies conducted in 2011 as part of VAMP using acoustic tags, for example, showed that the survival of juvenile salmon migrating from the lower San Joaquin River into Old River and subsequently to the export facilities was higher than comparative survival for those juvenile salmon that migrated downstream in the mainstem San Joaquin River. (Buchanan, *et al.* 2013.) Further, preliminary results of analysis of acoustic tag data for juvenile steelhead released and monitored as part of the 2012 Stipulation Study show that route selection and survival do not vary substantially in response to SWP and CVP export rates or OMR reverse flows; instead, – tidal currents appear to be a major factor affecting the migration behavior of juvenile salmonids within Delta channels. (Hanson 2012.)

This section improperly characterizes hydrodynamics as being exclusively driven by project operations without any mention of the tides, San Joaquin River flows, etc. , and there is no mention of in-Delta diversions and their adverse impacts on salmon survival in the southern Delta. The SED must be revised to take the most recent evidence into account, and to assess the impacts of all stressors on salmon survival in the southern Delta.

(v) Water Quality

The discussion of turbidity, delta smelt habitat and flow presented in Chapter 7 is based on several errors and omissions. The discussion of delta smelt habitat presented by Feyrer, *et al.* 2007 and Feyrer, *et al.* 2010 cited on page 7-45 has to do with the low salinity zone,- not the south Delta. What flow patterns does the State Board believe bring delta smelt into the south Delta? (Draft SED, at p. 7-45.) Chapter 7 presents no analysis or data on the area within the central and south Delta considered in the SED to be within the zone of the influence of the water projects. Similarly, Chapter 7 presents very little information on the salinity tolerance of various key fish species and lifestages considered in the analysis. In addition, the draft SED neither compares the ranges of salinities (monthly over the 82 years of simulation) that would occur under the various alternatives being analyzed, nor does it assess a certain salinity range that would cause physiological stress to any of the fish species in question. Thus, there is no basis to determine if the salinity ranges in the south Delta are a concern.

See discussion regarding existing environmental conditions for discussion of effects of agricultural discharges in Lower San Joaquin.

(vi) Predation

Predation mortality has been identified as a major source of mortality on juvenile salmonids migrating through the lower San Joaquin River and Delta at specific locations such as the Head of Old River (Bowen, *et al.* 2009, Bowen and Bark 2010) and with Clifton Court Forebay (Gingras and McGee 1997, Clark, *et al.* 2009) and elsewhere (SJRGA 2010). Predation is a significant concern throughout the Delta. See discussion above regarding the role of predation on juvenile Chinook salmon mortality in the lower river and Delta. Recent studies have also demonstrated the significance of predation by fish such as striped bass on mortality of juvenile Chinook salmon further upstream in the tributary rivers as well.

5. The Draft SED Fails To Analyze The Full Range Of Stressors On Sensitive Native Fish Species In The Southern Delta And Lower San Joaquin River

To cite but one example of Chapter 7's failure to analyze the full range of stressors in the southern Delta, there is no discussion of the effects of the introduced Asian clam and nutrients on the food web and the food resources on pelagic species in Chapter 7. In the absence of a discussion and consideration of the importance and role of other stressors on the fish species of interest, an inappropriate conclusion can be drawn from the draft SED that by simply providing greater seasonal flows under one or more of the alternatives, the biological objective of increased salmonid abundance and population viability will be achieved. In reality, flow alone is not going to accomplish the biological goal of salmonid restoration or recovery. As reflected in the 2006 escapement data and 2006 VAMP survival study, providing higher flows does not assure higher juvenile survival or greater adult abundance. (SJRGA 2007.) Other factors such as predation, food availability, and ocean conditions are important in determining salmonid population dynamics that are largely independent of river flow.

6. Impact Analysis

a. There Is No Scientific Evidence Presented In The Draft SED Or Appendices To Support The Assumption That 60%, 40% Or 20% Of Unimpaired Flows Will Support The Biological Functions Necessary To Support Viable Fish Populations

The staff justification cites pieces of information that sound relevant, but they make no attempt to integrate that information into a quantitative forecast of benefits to be gained by implementing their objective. The functional mechanisms that lead to increased salmon production need to be identified and quantified and linked to flow rates, or else there is no basis for selecting any of the flow alternatives. Independent reviewers of the Joint Stipulation similarly found fault with NMFS that functional relationships to quantify how fish were expected to respond to mandated water operations were lacking, and that lack of linkage led to a flawed adaptive management experiment. (Delta Stewardship Council 2012 available at http://deltacouncil.ca.gov/sites/default/files/documents/files/secure/LOOAR_2012/rev_mat/LOOAR_2012_rev_2012_10_01_Joint_Stip_report_FINAL.pdf.) No scientific evidence is presented to substantiate that providing flows at 60%, 40% or 20% of unimpaired flows will support the biological functions necessary to support viable fish populations. There is no evaluation of how alterations to the present system, including channelization, loss of floodplain, loss of tidal wetlands, and other dramatic changes in pre-development natural hydrologic and ecological conditions will alter how native fish respond to the flow regime. Key alterations that may influence salmon response to flow are invasive species (particularly predators) and channelization.

b. The Thresholds Of Significance Lack the Support of Substantial Evidence in the Record

The impact assessment repeatedly applies a threshold of significance indicating that the change in occurrence of an aquatic impact criterion needs to be at least 10% greater than the baseline to represent a significant adverse impact. (E.g. Draft SED, at pp. 7-3 and 7-4.) However there is no discussion or rationale presented in Chapter 7 to support the 10% threshold of significance used in these analyses. In other Central Valley environmental documents, a difference of 5% has been used for purposes of impact analysis based on the variance (noise) expected in simulation model results to distinguish a real predicted change in a given metric from the baseline. (For example, the BDCP Effects Analysis applied a 5% significance threshold reflecting the inherent errors and uncertainties in simulation model results.) By selecting a 10% threshold of significance, the assessment in Chapter 7 may underestimate impacts that would have been detected using the 5% threshold of significance. An increase in salmonid egg or juvenile mortality of 5% can be biologically significant. The assessment needs to provide technical support and transparency regarding how the 10% threshold was established, and it must justify departing from the 5% threshold that is used in other EIR analyses of impacts to sensitive aquatic resources in the Delta. In the absence of a meaningful discussion and technical foundation for this fundamental element of the assessment methodology the threshold criteria appears to be arbitrary.

c. AQUA-1: Changes In Availability Of Warm Water Species Reservoir Habitat Resulting From Changes In Reservoir Levels

The assessment applies a number of questionable and unsupported criteria for assessing potential impacts to various target fish species. For example, the assessment of fluctuations in

water surface elevation in the reservoirs on spawning success of largemouth bass is based on a decrease in surface elevation of 15 feet in a month. (See, e.g. Draft SED, at p. 7-60.) The rationale presented in the assessment is weak and poorly supported by any technical analysis of appropriate criteria for use in assessing the effects of decreased water surface elevation on spawning. Habitat suitability as a function of water depth is well known for largemouth bass spawning. The criteria used in the assessment conclude that there would be no adverse impact on spawning when reservoir elevation decreases by less than 15 feet. Habitat suitability, however, indicates that many largemouth bass spawn in water that is 4 feet in depth or less. (Stuber, *et al.* 1982.) If, in this example, if a bass nest is in 4 feet of water and the reservoir level decreases by 10 feet before the eggs have hatched and the fry have left the nest, the nest would have been completely dewatered and the reproduction lost. But the 15-foot threshold of significance used in the assessment would imply that there was no significant adverse impact to bass. In order to be meaningful, the thresholds of significance need to be sensitive to the species habitat requirements and habitat preferences. There are a number of Central Valley environmental documents that present criteria and rationale for assessing impacts on largemouth bass spawning resulting from reservoir levels decreasing during the spring that can serve as a much better model than that presented in Chapter 7.

d. AQUA-2: Changes In Availability Of Coldwater Species Reservoir Habitat Resulting From Changes In Reservoir Storage

Changes in reservoir elevation can also result in passage barriers to the upstream migration of coldwater species inhabiting the reservoir and block access to spawning habitat which was not addressed or discussed in the assessment. (Draft SED, at p. 7-63.) As in the flow analysis, the evaluation of changes in reservoir elevation should be done for every year in the 82 year simulation period by month to assess habitat changes under various hydrologic and release regimes.

The discussion of changes in coldwater pool habitat at page 7-64 is based on end of September elevation. But a more robust analysis would be based on monthly changes in hypolimnion volume for each reservoir. In addition, changes in hypolimnion volume by month would also be needed to include reservoir coldwater pool volume in the water temperature modeling for downstream conditions.

e. AQUA- 3: Changes In Quantity/Quality Of Spawning, Rearing, And Migration Habitat Resulting From Changes In Flow

The current approach in Chapter 7 is oversimplified and provides a fundamentally misleading and incorrect analysis of alternatives and habitat conditions for the target salmonid species.

The assessment assumes that an increase in flow in a given month represents an improvement in habitat conditions for salmonids. As discussed above, the use of previous flow-survival relationships is questionable as a technical basis to assume, as was done in Chapter 7, that an increase in flow results in an increase in survival or abundance of salmonids. Further, the assessment relies on an evaluation of changes in wetted area as an assessment criterion. (Draft SED, at p. 7-58.) The assessment assumes that an increase in wetted area represents an improvement in habitat conditions for Chinook salmon and steelhead. There is no technical basis to support this assumption. Habitat suitability for various lifestages of Chinook salmon and

steelhead is determined by parameters such as water depth, velocity, substrate, and cover, – not simply wetted area. Depending on the geometry of a given channel an increase in flow in a very wide and flat channel would increase the wetted area to a large extent but the depth and velocity of the wetted channel margin would not be suitable for salmonids (e.g., the wetted area may only be several inches deep) while in a confined channel a change in flow would not result in a change in wetted area but may result in an increase in depth or velocity that no longer provides suitable habitat for a given lifestage of fish. These differences are not be accounted for in the current analysis presented in Chapter 7. As an alternative approach, changes in suitable habitat for salmonids is typically based on changes in weighted usable area (WUA) based on habitat suitability curves as is done in IFIM analyses.

f. AQUA-4: Changes In Exposure Of Fish To Stressful Water Temperatures From Changes In Reservoir Storage And Releases

A water temperature threshold for the incipient lethal temperature for juvenile steelhead rearing of 84 F is used in the assessment. (Draft SED, at p. 7-89.) There is no discussion of the source of information used in developing that incipient lethal threshold criterion. The typical incipient lethal temperature threshold used for juvenile steelhead is 26 C or 78.8 F. (Myrick and Cech undated.) Water temperature, especially during the summer rearing period for juvenile steelhead, is a major limiting factor in many Central Valley rivers, and using a higher temperature threshold, as was done in the assessment in Chapter 7 results in underestimating adverse impacts to a listed species. This analysis needs to be supported by scientific data and significance criteria that provide an objective and transparent technical analysis of potential effects to juvenile steelhead. The analysis also needs to address the temperature tolerance of juvenile fall-run Chinook salmon that may be oversummering in the rivers as discussed on page 7-33 and elsewhere in Chapter 7.

Currently, there is no discussion or analysis presented on summer water temperatures for rearing juvenile fall-run Chinook salmon in the assessment.

The water temperature modeling is important in evaluating potential effects associated with the various flow alternatives. It was not clear from Chapter 7 exactly how the temperature modeling was performed. There was discussion of using a 6-hour time step temperature model but then it appears that a daily average model was actually used in the analysis. How the maximum daily temperatures were derived, a critical step in the biological assessment, was not described. The calibration and validation of the temperature model was not described or presented as a graph and statistical comparison of actual versus predicted temperatures over a range of flow and seasonal conditions. Therefore, there is no information presented that can be used to assess the accuracy of the water temperature model at various locations and seasons. Similarly, there was no discussion regarding the basis for selecting the water temperature model applied in this assessment. Additionally, it was not clear how the water temperature model accounted for seasonal changes in cold water pool volume in each reservoir through each of the years, including carryover storage etc., in developing meaningful predictions of summer and early fall temperatures for use in the assessment. There also needs to be a specific analysis of the ability to meet suitable water temperature conditions in October for fall-run salmon egg incubation (typically less than 56 F) as part of the assessment of changes among alternatives.

This information was not disclosed in the assessment in a way that could be used to evaluate the effects on reproductive success of fall-run that spawn in October. The draft SED

must be revised to include this information to ensure that its analysis of temperature impacts is supported by substantial evidence in the record.

g. AQUA-5: Changes In Exposure To Pollutants Resulting From Changes In Flow (Dilution/Mobilization Effects)

The draft SED's analysis of exposure to pollutants is inadequate and does not support a conclusion that water quality will be significantly changed.

While the SED concludes that the lower flows of LSJR Alternative 2 would result in a significant impact to water quality for juvenile salmonids and other fish species, there is insufficient evidence provided to support this conclusion. In fact, the introductory text to AQUA-5 indicates that increased flows may be as likely to increase as to decrease pollutant concentrations.

> Increased flows would have the potential to *increase mobilization and concentration of pollutants* in surface waters in the tributaries and LSJR, potentially increasing exposure of aquatic organisms to toxic substances... However, increased flows would also provide benefits to indicator species by *diluting existing pollutants* in the water column, and any other pollutants that may be mobilized from the sediment on the bottom of the riverbed and along the river channel.

(Draft SED, at p. 7-101, italics added.) There is no data provided on existing pollutants levels in the water column versus in sediments on which to draw any conclusion regarding whether increased flow would have a positive or negative effect on water quality.

The analysis also claims "[d]ecreased flows could also result in increased temperatures, which generally increase the toxic effects of metals and reduce the survival time of Chinook salmon if lethal levels of metals are present." (Draft SED, at p. 7-101.) No citation is provided to support this statement. While increased temperature may increase toxic effects of metals, the opposite is true for pyrethroids. Increased temperatures decrease the toxicity of pyrethroids (Phillips et al 2004; Anderson et al 2006. [18])) Since no data is presented on actual pollutants present, there is no way to determine whether changes in temperature will have a positive or negative effect on pollutant toxicity.

h. AQUA-6: Changes In Exposure To Suspended Sediment And Turbidity Resulting From Changes In Flow (Mobilization)

Chinook salmon and steelhead evolved under natural conditions in which rainfall and stormwater runoff across a watershed resulted in a coincident increase in instream flows and an increase in river turbidity. (Moyle 2002.) Sediments from the watershed were washed by the runoff into the streams and river, primarily during later winter and spring storms. Results of fishery monitoring continue to show that pulse flows coincident with increased turbidity provide an environmental cue that stimulates downstream migration by juvenile salmon and steelhead.

[18] Anderson BS, Phillips BM, Hunt JW, Worcester K, Adams M, Kapellas N, Tjeerdema RS. 2006. Evidence of pesticide impacts in the Santa Maria River watershed, California, USA. Environ Toxicol Chem 25:1160–1170.

Phillips BM, Anderson BS, Hunt JW, Nicely PA, Kosaka RA, Tjeerdema RS, deVlaming V, Richard N. 2004. In situ water and sediment toxicity in an agricultural watershed. Environ Toxicol Chem 23:435–442.

(NMFS 2009.) Operation of upstream dams and reservoirs, however, change the dynamic interaction between storm flows and turbidity. The reservoirs trap inflows from the watershed and the residence times of water within a reservoir allow fine sediments to drop out of suspension resulting in a reduction in turbidity. As a result, releases of freshwater from a reservoir may be able to mimic the accretion and recession patterns of a storm event but are de-coupled from the natural turbidity signal that is also thought to be important in the biological response of juvenile salmonids to a flow release. There have been a number of studies conducted on Central Valley rivers in which pulse flow events have been provided by reservoir releases during the spring that did not result in a corresponding cue for downstream migration as reflected in results of fishery monitoring. (EBMUD unpublished data.) With increased channelization, levee stabilization, channel bed armoring, and reductions in peak flows by reservoir operations, sediment mobilization from the watershed limited to areas downstream of the dam typically do not provide strong turbidity cue when driven by reservoir releases. Thus, simply providing increased flows through reservoir releases will not assure that the function relationships and mechanisms important to the life history of salmonids will be re-established.

i. AQUA-7: The Analysis Of Changes In Redd Dewatering And Fish Stranding Losses Resulting From Flow Fluctuations Is Inadequate Because It Is Based On Median Monthly Flow

The hydrologic analyses presented in Chapter 7 were based on monthly average conditions and the statistical median monthly flows estimated by the model. (Draft SED, at p. 7-108.) This analysis is largely insensitive to the actual conditions that would result in redd dewatering and juvenile stranding. Rather than using a comparison of median monthly flow that can obscure meaningful changes in flows that occur in specific months under specific hydrologic conditions, a comparison of flows each month over the 82 year period of modeling would be more appropriate for assessing the potential for redd dewatering. Criteria for the magnitude of flow fluctuations that would result in a change in water surface elevation from one month to the next during the egg incubation period is the typical approach used in these types of analyses. Ramping rates and a maximum change in flow (surface elevation) are also typically prescribed at mitigation and avoidance measures. Further, juvenile stranding frequently results from short-duration flow fluctuations such as associated with storms or changes in dam operations that may occur over a period of hours or days. The analyses presented in the SED cannot detect these short-duration type of events (Draft SED, at pp. 1-108 – 1-112.) As discussed above, specific ramping rate criteria are typically used to avoid the risk of juvenile stranding as part of a CEQA analysis.

j. AQUA-8: The Analysis Of Changes In Spawning Habitat Quality (Spawning Gravel) Resulting From Changes In Peak Flows Is Not Supported By Substantial Evidence

Typically information on the grade of a river, channel width, velocities, and characteristics of the substrate are used in hydraulic models to estimate the river flow rate that would mobilize gravel movement and bed load transport. That flow would then be used to estimate whether the managed flows under each alternative would be sufficiently high to result in gravel movement. No analyses of this type were presented in Chapter 7 of the SED for use as a technical basis for assessing effects of flow management on spawning gravels in the upstream reaches of each tributary river. (Draft SED, at pp. 7-112 – 7-113.) Thus, the conclusions regarding effects of the LSJR flow alternatives on spawning habitat quality are not supported by substantial evidence.

k. AQUA-9: The Analysis Of Changes In Food Availability Resulting From Changes In Flow, Nutrient Transport, And Water Quality (Food Web Support) Lacks The Support Of Substantial Evidence

The draft SED provides only a generalized qualitative discussion of potential changes in nutrients and food supplies in response to the various alternatives. (Draft SED, at pp. 7-113 – 7-114.) Data similar to that described above for the IFIM analyses can be used to help provide additional information on potential changes in instream habitat conditions that would affect macroinvertebrate production and food supplies for juvenile salmon and other fish. (Gard 2006.) As noted above, if food production downstream of the dam in a limited reach of the river where water temperatures are suitable is insufficient to provide adequate flood resources, then carrying capacity will be limited and the survival and abundance of fish will not respond to changes in flow alone as predicted. Also, as seasonal water temperatures increase, for example in response to reduced coldwater pool reserves, the metabolic rate of juvenile oversummering steelhead will increase and their growth and survival will decrease if there is not adequate food production in the area of the river they inhabit. The SED provides very little discussion or disclosure of the importance of flood production in supporting juvenile rearing habitat and how variation in seasonal flows under the alternatives can affect these relationships.

Moreover, the SED states that, "[t]he primary processes that alter food web support include magnitude and frequency of bed mobilizing flows and floodplain inundating flows." (Draft SED, at p. 113.) Changes in residence time and nutrient loads and concentrations are also key determinants of productivity and food availability. Neither of these is analyzed in the draft SED. Increased flows generally decrease residence time which can increase or decrease primary production depending on numerous factors. (Lucas et al 2009. [19])

Changes in nutrient loads, forms, and concentrations also impacts food availability and quality in complex ways. (Glibert et al 2011.[20]) However, the draft SED lacks any analysis of how any of the alternatives might change nutrient loads, forms, or concentrations and how those changes might impact food availability.

The introductory comments to this section are misleading. The SED states, "[i]n general, increased spring flows were assumed to create and improve aquatic and riparian habitat, increase aquatic production, and nutrient input from terrestrial sources." (Draft SED, at p. 7-114.) This section should acknowledge what is described in the individual alternative analyses that increased flows only provide these functions if they are allowed to spill out of riprap lined channels and reconnect with the adjoining land, or if they are of sufficient magnitude to mobilize bed sediments.

Until these deficiencies are remedied, the analysis of AQUA-9 lacks the support of substantial evidence.

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[19] Lucas, L.V., J.K. Thompson, and L.R. Brown. 2009. Why are diverse relationships observed between phytoplankton biomass and transport time? Limnol. Oceanogr., 54(1): 381–390.

[20] Glibert, P.M., D. Fullerton, J.M. Burkholder, J.C. Cornwell, and T.M. Kana. 2011. Ecological stoichiometry, biogeochemical cycling, invasive species, and aquatic food webs: San Francisco Estuary and comparative systems. Reviews in Fisheries Science, 19(4):1-60.

l. AQUA-10: The Analysis Of Changes In Predation Risk Resulting From Changes In Flow And Water Temperature Lacks The Support Of Substantial Evidence

It has been hypothesized that increased flow during the late winter and spring migration period for juvenile salmonids contributes to a reduction in the risk of predation mortality and increased juvenile survival. (Stillwater 2003, NMFS 2009.) The potential mechanisms underlying this hypothesis, however, have not been tested. Studies on the migration timing of juvenile salmonids have shown evidence of increased migration coincident with increased instream flow and increased turbidity associated with storm events. (Stillwater 2003, NMFS 2009.) A reduction in predation mortality may therefore not be the direct result of increased flow but rather the associated effects on increased turbidity that makes detection of a juvenile salmon by predators more difficult and/or a reduction in water temperatures that reduces the metabolic rate and prey consumption rates of the predators as well as reducing potential thermal stress on the prey and thereby increasing their ability to avoid predators. It can also be hypothesized that increased flow results in increased water depths and velocities that reduce habitat suitability for predatory fish and thereby reduce predator densities and the associated risk of predation mortality.

No studies or data have been developed to support the hypothesis regarding the effects of increased flow on predator habitat and densities in the San Joaquin River basin or Delta. Predatory fish such as striped bass are able to inhabit a wide range of riverine and tidal areas and there is no evidence that increased flows within the range that would be managed on the San Joaquin River system would reduce striped bass densities or the densities of other predatory fish such as largemouth bass that use physical structures as a refuge from increased flows and velocities. Studies are currently being conducted to further evaluate the potential mechanisms that affect the risk of predation. (Cavallo, *et al.* 2012.)

Predation mortality has been identified as a major factor affecting the survival of juvenile salmonids in Central Valley rivers and the Delta. (Cavallo, *et al.* 2012, SJRGA 2010, Buchanan, *et al.* 2013.) However, Chapter 7 is devoid of any analysis that could show a relationship between river flow and predation rates. (Draft SED, at pp. 7-114 – 7-117.) In fact, using either coded wire tags or acoustic tag technologies it is extremely difficult to determine when and where predation mortality has occurred (e.g., if an acoustically tagged juvenile salmonid is preyed on the tag continues to send out a signal while in the stomach and digestive track of the predator, it is very difficult to determine that a predation event has occurred). There is currently no data or analysis that would support predictions of an incremental change in predation mortality as a function of flow within the range of alternatives considered in the draft SED. The draft SED's discussion seems to be founded on the unproven assumption that simply providing more flow will result in a reduction in predation mortality for migrating juvenile salmonids.

In fact, the most relevant studies on predation undermine the SED's assumption that higher flow will translate into lower predation. The results of the 2006 VAMP survival study found that juvenile salmon survival in the lower San Joaquin River and Delta was low (2-9% based on Chipps Island recoveries) presumably as a result of high predation rates, despite having high flows at Vernalis during the spring migration period (average Vernalis flow in May 2006 exceeded 26,000 cfs). (SJRGA 2007.) There is no technical analysis or basis presented to support a finding that one or more of the flow alternatives considered in the SED would result in a predictable reduction in predation mortality for juvenile salmonids migrating within the lower San Joaquin River and

Delta. In the absence of a credible technical analysis no conclusion can be drawn regarding the potential relationship between flow and predation in Chapter 7 of the SED.

m. AQUA-11: The Analysis Of Changes In Disease Risk Resulting From Changes In Flow, Water Temperature, And Water Quality Lacks The Support Of Substantial Evidence

The draft SED provides no information or analysis of the potential effects of the alternatives on the risk of disease on the health and survival of salmon, steelhead, and other fish. (Draft SED, at pp. 7-117 – 7-121.) Although the risk assessment would need to be largely qualitative, information on changes in seasonal water temperatures from the detailed temperature analysis discussed above would be an important element in this analysis. As discussed above, detailed comparative analyses of changes in seasonal water temperatures, by month over the 82 year period, by location are not presented in Chapter 7. Without this detailed analysis, the SED's conclusions about disease risk lack the required support of substantial evidence in the record.

n. AQUA-12: The Analysis Of Changes In Fish Transport Resulting From Changes In Flow Is Based On Unsupported Hypotheses

As discussed above, it can be hypothesized that changes in seasonal flows during the juvenile salmonid migration period could potentially result in changes in migration rates and route selection that can influence the risk of predation, entrainment, and other sources of mortality. But it is unknown whether juvenile salmon migrate through the lower river and Delta faster (shorter period of time) when river flows are greater. There is a body of data collected as part of VAMP, (including pre-VAMP), the 2012 Stipulation Study, the USBR Six-year study, and other investigations that can be used to directly test and evaluate this hypothesis as part the SED analysis. (Hanson 2012.) These types of analyses, however, were not done or presented in Chapter 7 of the SED. Thus, the analysis of changes in fish transport lacks the support of substantial evidence.

o. AQUA-13: The Analysis Of Changes In Southern Delta And Estuarine Habitat Resulting From Changes In SJR Inflows And Export Effects Should Be Supplemented With Delta Passage Modeling Results

The influence of San Joaquin River flows on hydrodynamics and habitat conditions diminished substantially with distance downstream into the tidally dominated Delta channels. (DWR DMS2 unpublished data.) Results of salinity simulation model analyses and hydrodynamic modeling (e.g., DSM2 estimates of water velocities and direction) can be used to develop comparisons of key metrics as indicators of habitat change at various locations within the Delta as a function of the proposed alternative flow scenarios. Application of routing models such as the Delta Passage Model ("DPM") have the ability to model comparative migration by juvenile salmon through the Delta in response to changes in hydrodynamics associated with river flows, expert's, etc. (Cavallo, *et al.* 2011.) These types of comparative analyses could be done to help inform decisions regarding the potential effects of various alternative instream flow schedules and operations. However, it appears that no such studies have been performed or used as part of the technical and analytic framework for assessing fishery effects of alternatives considered in Chapter 7 of the draft SED. (Draft SED, at pp. 7-123 – 7-125.)

7. The Discussion Of Mitigation By Way Of Adaptive Management Lacks The Support Of Substantial Evidence

Chapter 7 frequently describes mitigation for adverse impacts on flows during the February-June period by relying on adaptive management assuming that if the total volume of water released was the same and therefore impacts could be mitigated by re-allocation of releases among months. (Draft SED, at pp. 7-67, 7-76, 7-111.) There is no discussion in Chapter 7, however, of how this would actually occur. There is no discussion of how hydrologic uncertainty over the period would be addressed and assumed that perfect knowledge of hydrology for the entire February-June period is known. If this is in fact a mitigation strategy Chapter 7 needs to have a more robust and technically sound discussion of how this would be applied on each of the contributing tributaries. There also needs to be a discussion of other regulatory issues such as meeting flood control requirements, FERC requirements, other agreements and commitments, coordination among reservoirs and allocation of contributions to meeting flow conditions, etc. as part of the discussion of adaptive management. The current discussion of adaptive management presented in Chapter 7 is overly simplistic and inadequate to assess whether or not this is a feasible method to mitigate and avoid adverse impacts in flow allocation among months.

G. Specific Comments Regarding Chapter 8— Terrestrial Biological Resources

Page 8-2, Section 8.1, Table 8-1, BIO-1, LSJR Alternative 1: Impacts of LSJR Alternative 1 and SDWQ Alternative 1 (the No Project Alternative) are not presented in this table. The reviewer is instead referred to Chapter 15 for an analysis of the No Project Alternative. This is inconvenient, and the rationale for separating out the analysis of the No Project Alternative into a separate chapter is not provided. This makes it more difficult for the reviewer to make side-by-side comparisons of the alternatives in this table.

Page 8-13, Section 8.2.2: The text at the bottom of the second paragraph introduces the discussion of vegetation, wildlife, and special-status species that are specific to the area of potential effects for the SDWQ alternatives that follows. This however seems to contradict the statement made on page 8-1 (last two sentences on the page) that state that: "*The SDWQ alternatives are not expected to result in significant adverse modifications to the existing terrestrial habitat or result in impacts on plant and animal species. Therefore, the SDWQ alternatives are not analyzed in detail in this chapter.*"

Page 8-23, Section 8.4.2, last bullet on the page: "…the lowest monthly flows on the Stanislaus would be eliminated under SLFR Alternatives 2, 3 and 4.": Additional explanation of why the lowest monthly flows would be eliminated is needed. This is also true on the next page for the bullets concerning the Merced and Tuolumne, and the LSJR.

Page 8-24, Section 8.4.2: The first full paragraph of text indicates that the effect of LSJR Alternatives 3 and 4 on the terrestrial system below Vernalis would be largely immeasurable. More explanation is needed here. Does immeasurable mean indistinguishable from existing conditions? Does it mean no effect?

Page 8-25, Section 8.4.2, the text that refers to Tables 8-6a-c: "*For the purpose of relative comparison, the tables summarize the percent of time the reservoirs would fluctuate greater than 10 feet*." This statement would be clearer if illustrated with an example.

Page 8-25, Section 8.4.2, second paragraph: While direct and indirect impacts are defined, the analysis that follows does not typically distinguish between direct and indirect impacts. Further distinctions between impacts that are direct and indirect could be added.

Page 8-28, Section 8.4.3, BIO-1, middle of third paragraph: "*This periodic inundation could create conditions suitable for dispersal and establishment of riparian plants through sediment deposition, water transport of plant seeds and fragments to new locations, increased water availability, and reduced competition from upland plant species (e.g., nonnative grasses) that are intolerant of prolonged submergence*." This statement should be modified to acknowledge that the periodic inundation may also increase competition from some invasive nonnative plants that are relatively tolerant of prolonged submergence, including Himalaya blackberry and giant reed.

General comment for the impact analysis: Subheadings should be added to guide the reviewer through the text. For example, under the description of LSJR Alternative 2 on pages 8-29-31, headings for the Stanislaus River, Tuolumne River, Merced River, Reservoirs and Salinity text should be added to distinguish one area of focus from another.

General comment: Beneficial effects of the alternatives receive inconsistent treatment in this chapter. Beneficial effects are described in some instances (at the bottom of page 8-33 where the benefits of greater water availability to support riparian growth are mentioned) while little mention of beneficial effects are described elsewhere.

Page 8-37, Section 8.4.3, BIO-4, LSJR Alternative 2, first paragraph: The analysis concludes that there would be a significant impact on special-status animal species resulting from the loss of riparian vegetation on the Stanislaus River. If true, this statement should be supported by a full description of the impacts on each affected special-status species.

Page 8-39, Section 8.4.3, BIO-4, LSJR Alternatives 3 and 4: The conclusion in the first paragraph that the impacts would be similar to those identified for LSJR Alternative 2 merits some explanation.

H. Specific Comments Regarding Chapter 9 – Groundwater Resources

1. The Impact Analysis For Groundwater Resources Is Legally Inadequate Because It Fails To Use Existing Models Of Groundwater Basins In The Plan Area To Estimate The Impacts Of LSJR Alternatives On Groundwater

"The purpose of an environmental impact report [and, by extension, a SED] is to provide public agencies and the public in general with detailed information about the effect which a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project might be minimized; and to indicate alternatives to such a project." (Pub. Resources Code, § 21061.) When assessing impacts, "an agency must use its best efforts to find out and disclose all that it reasonably can." (Cal. Code Regs., tit. 14, § 15144.)

The analysis of impacts on groundwater resources is limited to identifying whether or not groundwater pumping may increase by more than five percent. (Draft SED, at p. 9-2, Table 9-1; 9-21.) There are groundwater models available for the Turlock Basin, the Modesto Basin and the Eastern San Joaquin Basin, as well as regional groundwater models for the Central Valley. These existing models should have been used to quantify the impacts on groundwater resources.

Instead, the SED purports to use conservative assumptions, and uses the results from the WSE and assumed baseline groundwater pumping rates. (Draft SED, at pp. 9-21 – 9-23.) Ultimately, the SED performs a qualitative analysis of the potentially significant effects of groundwater pumping.

The State Board should use the existing groundwater models, and make a reasonable good-faith effort to disclose the impacts on groundwater basins in the plan area instead of basing its analysis on purportedly conservative assumptions.

2. The Impact Analysis Fails To Evaluate Reasonably Foreseeable Indirect Impacts From Increased Reliance On Groundwater

Impacts on groundwater resources could have the effect of lowering groundwater levels basin-wide, which could result in impacts such as reduced accretions to rivers (for gaining rivers, e.g., Tuolumne River), increased seepage from rivers, subsidence, as well as the air emissions from increased groundwater pumping lifts and increased energy use. In addition, as reliance on groundwater increases, this may impact the salinity and total dissolved solids in the groundwater applied to crops, which can cause increased salinity in irrigation discharges to the LSJR and its tributaries. These reasonably foreseeable indirect impacts should be analyzed with available groundwater models, as noted above.

3. The Impact Analysis Fails To Evaluate The Impacts On Groundwater In A Range Of Water Year Types For The San Joaquin Valley

The SED fails to evaluate the impacts of the various LSJR alternatives on a number of resources, including groundwater, under the standard San Joaquin Valley Water Year Hydrologic Classifications (wet, above normal, below normal, dry and critical). This is crucial because the same percentage increase in reliance on groundwater in a critical year may be significant, whereas the same percentage increase in a wet or above normal year may not. Thus, the Impact Analysis should be performed using existing models of groundwater basins for the standard range of water year types.

4. The Conclusion That The State Board Lacks The Funding Needed To Exercise Its Legal Authority To Regulate Groundwater Extractions Is Not Supported By Substantial Evidence

The SED states that the State Board has the legal authority to mitigate otherwise significant impacts on groundwater resources resulting from LSJR Alternatives 3-4, as well as the Preferred LSJR Alternative. (Draft SED, at pp. 9-27 – 9-27; 20-21.) But the SED concludes that neither approach is economically feasible due to unspecified budgetary constraints. There is no substantial evidence in the record to support this assertion. Thus, the SED is vulnerable to legal challenge under CEQA. (*County of San Diego v. Grossmont-Cuyamaca Community College Dist.* (2006) 141 Cal.App.4th 86, 108 [where the record contained no estimate of the lead agency's cost to mitigate traffic impacts, conclusion that mitigation was economically infeasible lacked the required support of substantial evidence].)

The SED should either supplement these conclusions with the required evidence, or the State Board should commit to implementing all feasible mitigation within its legal authority.

I. Specific Comments Regarding Chapter 10 – Recreational Resources And Visual Quality

1. The Analysis Of Reservoir Water Levels Is Based On Flawed Or Unrealistic Assumptions, That Undermine The Impact Analysis For Recreational Resources That Are Sensitive To Water Levels In Reservoirs

In Appendix F.1, the SED discloses that the "rule curves" for modeling and establishing downstream flow targets for the LSJR flow objectives were formulated using an unrealistic assumption that diversion dams on the three eastside tributaries are operated based on storage levels at the end of January of each water year. (Draft SED, App. F.1 at pp. F.1-20.)

Diversion dams are currently operated by determining the reservoir storage and snowpack prior to the beginning of the growing season, not at the end of January. However, the modeling used to estimate the impacts of the LSJR assumes that the dams will be operated to deliver water based on storage levels at the end of January of each year. (*Ibid*.) This methodology results in unrealistic modeling that undermines the analysis of impacts on a host of resources, including recreational resources that depend on water levels in the reservoirs on the three eastside tributaries.

2. The Impact Analysis Discloses That The LSJR Alternative Selected To Support And Maintain The Natural Production Of Viable Native Migratory Fish Populations Lacks Any Evidentiary Basis

The SED lacks any substantial evidence that the salmonid population viability factors (e.g., abundance, spatial extent or distribution, genetic and life history diversity, migratory pathways, and productivity) can be achieved by providing flows that approximate a percentage of unimpaired flow.

In Chapter 10, the draft SED frankly acknowledges that "increased flows may improve conditions for fish. (Draft SED, at p. 10-26, emphasis added.) But "[i]t is unknown whether any increase in fish populations would be large enough to measurably enhance sport fishing opportunities, but some beneficial impact is anticipated." (Draft SED, at p. 10-26.) For LSJR Alternative 3, the SED states "increased flows [to 40% of unimpaired flow] *may* enhance fishing opportunities . . ." (Draft SED, at p. 10-28, emphasis added.) But it concludes that LSJR Alternative will not affect water-dependent recreational opportunities, including sport fishing, at all. (*Ibid*.)

These statements highlight the fact that the fundamental objective of the LSJR flow objective alternatives lacks the support of substantial evidence.

J. Specific Comments Regarding Chapter 11 – Agricultural Resources

1. The Description Of The Environmental Setting Lacks Adequate Discussion Of Water Rights Or Factors Contributing To Salinity Loadings In The Southern Delta

The draft SED's description of the environmental setting in the Southern Delta with respect to agricultural resources contains several flaws. First, the draft SED states that "[w]ater users in the SDWA claim riparian or appropriative rights that allow for direct diversion of surface water

from Delta waterways onto farmland." (Draft SED, at p. 11-12.) However, the draft SED does not provide any further discussion of the nature or scope of the claimed water rights within the SDWA or whether water users within the SDWA are diverting water under valid water rights. The draft SED seems to assume that these claimed rights actually "allow for direction diversion of surface water" however that assumption is unsubstantiated, and, as the discussion above concerning the draft amendments indicates, is unlawful. The draft SED should be revised to make it clear that the nature and scope of valid water rights in the Southern Delta has not been determined and that it is possible that some of the agricultural diversions in the Southern Delta are illegal.

The second flaw in the description of the Southern Delta's environmental setting is the draft SED's failure to acknowledge the various factors that affect salinity in the southern Delta. The draft SED states that "salinity in the southern Delta is strongly influenced by the concentrations at Vernalis." (Draft SED, at p. 11-12.) This bare assertion, without a discussion of the other factors that influence salinity in the southern Delta, creates an imbalanced and inaccurate description of salinity in the southern Delta. As acknowledged elsewhere in the draft SED, there are numerous factors that influence salinity in the Southern Delta, including:

> low flows; salts imported to the SJR Basin in irrigation water; municipal discharges; subsurface accretions from groundwater; tidal actions; diversions of water by the CVP, SWP, and local water users; channel capacity; and discharges from land-derived salts, primarily from agricultural drainage. Salinity in the southern Delta is also affected by evapo--concentration of salts due to local agricultural operations, and to a lesser extent, by local municipal wastewater treatment plant discharges. Poor flow or circulation patterns in the southern Delta waterways also cause localized increases in salinity concentrations.

(Draft SED, at p. 1-7.) The draft SED's description of water quality in the southern Delta (p. 11-12) should be expanded to identify these additional factors that affect salinity in the southern Delta.

2. Regulatory Setting

The draft SED states that the "[r]elevant state programs, policies, plans, or regulations related to agricultural resources are described in [section 11.3]." (Draft SED, at p. 11-13.) However, there are state programs and policies in addition to those listed in section 11.3 that relate to agricultural resources in the plan area. For example, the Central Valley Regional Water Board's Irrigated Lands Regulatory Program (ILRP) regulates discharges from irrigated lands within its jurisdiction, including from irrigated lands within the plan area. Another example, the Grasslands Bypass Project, is discussed in detail above. The draft SED should be revised to include a description of all relevant state programs, policies, plans, or regulations.

3. Impact Analysis

a. The Impact Analysis Makes Improper Assumptions That Lead To A Flawed Impact Analysis

There are several flaws in the draft SED's impact analysis for agricultural resources. First, the impact analysis assumes that under the SDWQ Alternatives, "salinity conditions in the southern Delta would not be degraded" because the "program of implementation for the numeric salinity objectives contained in SDWQ Alternatives 2 and 3 includes continued U.S. Bureau of

Reclamation (USBR) compliance with the Vernalis salinity requirement currently established in the 2006 Bay-Delta Plan and implemented through D-1641." (Draft SED, at p. 11-18.) This provision and the provisions requiring Reclamation and DWR to install, operate and maintain barriers, conduct monitoring and conduct studies are flawed for the reasons discussed above, which include but are not limited to the requirement that water right conditions necessary to implement objectives must be considered and determined in a subsequent adjudicative water right proceeding and that it is improper for the State Water Board to pre-determine water right conditions in this legislative water quality planning process

The second flaw with the impact analysis is that the "potential agricultural acreage impact (AG-1 and AG-2 for the SDWQ Alternatives) is estimated by assuming year-round irrigation salinity concentrations of 1.0 dS/m and 1.4 dS/m for SDWQ Alternatives 2 and 3, respectively." (Draft SED, at p. 11-18.) The assumption of steady-state salinity concentrations is not supported by substantial evidence in the record. The data show that salinity concentrations in the southern Delta fluctuate significantly throughout the year. (*See e.g.* Draft SED, App. F.2, at pp. F.2-69-72 [tables showing historical monthly salinity levels], F.2-77 [tables showing historical daily salinity levels].) Therefore, the draft SED's assumption that salinity concentrations would be either 1.0 EC or 1.4 EC year-round is not supported by substantial evidence and likely results in an over-estimate of the SDWQ Alternatives' impacts on agricultural resources. It would be more appropriate for the draft SED to assume salinity levels that reflect the historical variation in salinity levels throughout the year.

b. <u>The Impact Analysis Shows That A Salinity Objective Of 1.4 EC Would Have "Less Than Significant" Impacts On Agricultural Resources</u>

Even using very conservative assumptions, the draft SED's impact analysis shows that a salinity objective of 1.4 EC would have "less than significant" impacts on agricultural resources. (*See* Draft SED, at pp. 11-30, 11-33.) Assuming the "minimum amount of precipitation" and a year-round salinity level of 1.4 EC, a salinity objective of 1.4 EC is estimated to result in a 5% yield reduction in Dry Bean and a 3% reduction in Almonds. (Draft SED, at p. 11-30.) This impact analysis likely over-estimates the effects on agriculture, because it assumes minimum precipitation and it also assumes that irrigation water has a salinity level of 1.4 EC year-round. Both of those assumptions are conservative and the steady-state assumption for salinity levels does not reflect the lower concentrations of salinity that would occur throughout the irrigation season. (*See e.g.* Draft SED, App. F.2, at pp. F.2-69-72 [tables showing historical monthly salinity levels], F.2-77 [tables showing historical daily salinity levels].) The draft SED should explain why this alternative is not preferred – why it would not provide "reasonable" protection of agricultural beneficial uses of water in the southern Delta.

K. <u>Specific Comments Regarding Chapter 12 – Cultural Resources</u>

The analysis of reservoir water levels is based on flawed or unrealistic assumptions that undermines the impact analysis for cultural resources that are sensitive to water levels in reservoirs. In Appendix F.1, the SED discloses that the "rule curves" for modeling and establishing downstream flow targets for the LSJR flow objectives were formulated using an unrealistic assumption that diversion dams on the three eastside tributaries are operated based on storage levels at the end of January of each water year. (Draft SED, App. F.1 at p. F.1-20.)

Irrigation diversions are currently determined based on the reservoir storage and snowpack prior to the beginning of the growing season, not at the end of January. However, the modeling used to estimate the impacts of the LSJR assumes that irrigation diversion amounts will be based on storage levels at the end of January of each year. (*Ibid*.) This methodology results in unrealistic modeling that undermines the analysis of impacts on a host of resources, including cultural resources that depend on water levels in the reservoirs on the three eastside tributaries.

L. Specific Comments Regarding Chapter 13 – Service Providers

1. The SED Uses An Inappropriate Threshold of Significance For Evaluating Impacts To Drinking Water Supplies

The SED concludes that impacts to water quality for municipal drinking water purposes are less than significant based on a finding that the upper limit of the Secondary MCL for EC would not be exceeded. (Draft SED, at p. 13-2.) Use of the upper limit of the secondary MCL (1.6 EC) as the threshold of significance is inappropriate. At a minimum the threshold should be set to the WQCP's own water quality standard for protection of municipal and industrial uses of 1.0 EC. Alternatively, the threshold of significance should be set to the *recommended* secondary MCL of 0.900 EC.

2. The SED Lacks Substantial Evidence To Support Its Conclusions That Implementation Of The SDWQ Or LSJR Alternatives Would Have No Significant Impact On The SWP Or CVP

The SED concludes that none of the SDWQ or LSJR alternatives would substantially degrade water quality for municipal drinking water purposes. (Draft SED, at pp. 13-31 13-32.) The conclusion is based on a narrow focus on diversions in the Delta for direct use as drinking water, and it limits its discussion of the severity of impacts to compliance with the upper limit of the secondary drinking water MCLs. (Draft SED, at p. 13-32.) The SED finds no significant impact based on a determination that salinity in the southern Delta would be maintained under all alternatives within the historic range of salinity of 0.2 EC – 1.2 EC. However, these conclusions lacks the support of substantial evidence because no modeling was performed to determine these alternatives' potential impacts on water quality at the Banks or Jones Pumping Plants. .

In addition, the analysis is based on too narrow of a focus. Many water service providers experience impacts at salinities below the secondary MCL. Salinity in the drinking water supplies can cause corrosion, unpleasant taste and odor, economic impacts to utilities and their customers, and constraints on water recycling and groundwater management programs. Bromide, one component of salinity, can produce harmful disinfection byproducts in drinking water such as bromate and trihalomethanes (THMs) which are known human carcinogen. SWP and CVP water is already seasonally high in bromide, and bromate and THMs can easily form at levels of health concern, even with well-managed treatment. Drinking water suppliers that treat SWP and CVP water already must take steps to ensure bromate and THM levels do not exceed the MCLs.

Water service providers may experience increased costs to minimize or avoid those impacts by blending lower quality water with high quality water or incorporating additional treatment facilities or processes. However, these options may not be available or technically or economically feasible for all service providers. As the quality of a water source changes, the ability to blend and treat water changes; considerations absent from the proposed update and draft SED.

For example, water from the SWP is used by the Metropolitan Water District of Southern California ("MWD") to blend with the more saline water from the Colorado River Aqueduct. Thus, even if the levels of salinity in water in the southern Delta remains within the limits established for secondary MCLs, any increase in salinity that may affect the quality of SWP exports may have a significant adverse impact on the quality of water MWD supplies to its member agencies.

The SED should include modeling of the water quality impacts of all the alternatives at the Jones and Banks pumping plants, including modeling under different water year types, and revise the impacts analysis in light of the modeling results.

3. Regulatory Setting, California Drinking Water Standards Are Mischaracterized

The draft SED describes the Secondary MCL for specific conductance under the California Drinking Water Standards as something that can be exceeded. (Draft SED, at p. 13-23.) While there may be limited consequences from the Department of Public Health, exceeding a secondary MCL must be reported to consumers in annual water quality reports and can degrade public confidence in their utilities' performance. Most utilities establish their own objectives below the MCLs. In addition, throughout this section, the SED describes salinity as a constituent not harmful to human health. This characterization fails to acknowledge the effect of salinity on disinfection byproduct formation such as bromate and trihalomethanes (THMs) which are known carcinogens and regulated under California and federal drinking water standards.

4. The Environmental Setting And Analysis Of Impacts On Service Providers Improperly Omits Any Analysis Of The Contribution Of In-Delta Agricultural Discharges On Salinity In The Southern Delta

The SED accurately states that salinity in the southern Delta is a function of many factors, including the amount and salinity concentrations of SJR flow entering the southern Delta at Vernalis, daily tidal action, CVP and SWP operations, agricultural return flows, municipal wastewater discharges, and other influences. (Draft SED, at p. 13-7.) The SED discloses that the influence of in-Delta agricultural discharges and groundwater accretions is more pronounced than WWTP discharges in the southern Delta. (Draft SED, at p. 13-9.) However, the environmental setting focuses its discussion of contributions to salinity concentrations in the southern Delta on WWTP discharges, and omits any discussion or characterization of the contribution of agricultural return flows, which the SED identifies as a larger factor than WWTP discharges. (Draft SED, at p. 13-7 ["Winter salinity is mostly influenced by agricultural runoff . . ."; "Generally, when temporary barriers are installed, tidal exchange is reduced, and salinity in the southern Delta during these lower flow periods can increase as a result of other sources (e.g., discharge of agricultural drainage, discharge of WWTPs"].)

Indeed, while the contributions of WWTP and agricultural discharges in the southern Delta are acknowledged, the SED inaccurately, and inconsistently states that WWTP discharges and agricultural return flows generally reduce salinity because salinity is inversely proportional to flow in the southern Delta. (Draft SED, at p. 13-8.) While higher freshwater flows from upstream rivers and operations of the SWP and CVP projects will reduce salinity in the southern Delta, there is no evidence that increased discharges from WWTPs and southern Delta farmlands somehow

decreases salinity. To the contrary, the SED states that salinity in the southern Delta downstream from Vernalis generally increases. (Draft SED, at p. 13-8.)

Absent any attempt at quantifying or characterizing the agricultural discharges in the southern Delta, the Environmental Setting and impact analysis on service providers is fatally flawed. To remedy this deficiency, the State Board should require agricultural dischargers in the southern Delta to file reports of waste discharge disclose the results of the reports or modeling in the SED.

As it stands, instead of requiring dischargers of salts into the southern Delta to reduce their salinity inputs and fund their fair share of special studies and monitoring and reporting requirements, the State Board relies heavily on DWR and USBR for continuing to install temporary barriers, and for formulating, funding, and implementing costly studies and monitoring and reporting requirements. (Draft SED, App. K,.) In addition, Appendix H states that depending on the results of these additional special studies, "DWR may be required to install low lift pumping stations at the temporary barriers as a method of compliance." (Draft SED, App. H at pp. H-44, H-94.) Among other deficiencies discussed above, this is inconsistent with the mandate in the Water Code that requires the State Board to establish salinity objectives in a manner that can reasonably be achieved "through the coordinated control of *all* factors which affect water quality in the area." (Water Code, § 13241, subd. (c), italics added.)

The State Board should quantify all salinity inputs in the southern Delta, and the program of implementation should apportion responsibility for special studies and other measures, such as use of temporary barriers, fairly among the sources of salinity, not just the SWP and CVP.

5. The SED's List Of Water Suppliers Is Inaccurate And Should Be Revised To Include All Water Suppliers That Rely On Water That May Be Impacted By The LSJR Flow And Southern Delta Salinity Objectives

The SED only lists CVP (operated by the U.S. Bureau of Reclamation), SWP (operated by the Department of Water Resources), and Contra Costa Water District as "water suppliers." (Draft SED at pp. 3-18, 3-19.) There are many more water suppliers that will be affected by the implementation of the Preferred LSJR and SDWQ Alternatives. (Draft SED, at pp.13-5, 13-6, Table 13-2 [irrigation districts and their contracting water districts].) The SED, the Water Quality Control Plan and program of implementation, and any subsequent quasi-legislative or quasi-adjudicatory actions taken to implement the Phase 1 objectives, should study impacts to all water suppliers, and should incorporate fair-share limits on diversions to achieve the LSJR flow objective, and should impose all appropriate regulatory limits on WWTP and agricultural discharges.

6. The SED Fails To Analyze The Potential Impacts On Service Providers Under A Range Of Water Year Types

As noted above, the SED does not analyze the impacts on service providers under a range of water year categories. Thus, there is no way to know if the Preferred LSJR and SDWQ Alternatives or other alternatives will have more severe impacts on water supply in normal, below normal, or critical dry water years. Indeed, the SED discloses that "[t]here have been periodic exceedances [of the existing southern Delta salinity objective] in recent dry years at one or more of the southern Delta monitoring stations . . . ." (Draft SED, at p. 13-8.) Thus, it is clear that the impacts of discharges into the southern Delta have, and will continue to cause exceedances of the

existing and preferred alternative salinity objective in dry and critically dry years, and the SED's analysis and program of implementation should reflect that fact, instead of resorting to annual averages and generalizations about the historic range of salinity in the southern Delta.

7. The WSE Model Relies On An Unrealistic Assumption That Undermines The Impact Analysis For Water Suppliers

In Appendix F.1, the SED discloses that the "rule curves" for modeling and establishing downstream flow targets for the LSJR flow objectives were formulated using an unrealistic assumption that diversion dams on the three eastside tributaries are operated based on storage levels at the end of January of each water year. (Draft SED, App. F.1 at pp. F.1-20.)

Diversion dams are currently operated by determining the reservoir storage and snowpack prior to the beginning of the growing season, not at the end of January. However, the modeling used to estimate the impacts of the LSJR assumes that the dams will be operated to deliver water based on storage levels at the end of January of each year. (*Ibid*.) This methodology results in unrealistic modeling that undermines the analysis of impacts on water suppliers.

M. Specific Comments Regarding Chapter 19 – Antidegradation Analysis

The draft SED defers the "Antidegradation Analysis" and states that the State Water Board will consider "all relevant information and determine if the Lower San Joaquin River (LSJR) alternatives or southern Delta Water Quality (SDWQ) alternatives would unreasonably affect the water quality or adversely affect the designated beneficial uses of water from the estuary in the final SED." (Draft SED, at p. 19-1.) The Public Water Agencies acknowledges that the antidegradation analysis is being deferred to a later time. They expect to comment on that analysis once it is available for public review.

N. Specific Comments Regarding Chapter 20 – Preferred LSJR Alternative And SDWQ Alternative

The comments provided immediately below supplement or summarize other comments on the draft alternatives and draft SED, presented in this letter. Those comments are incorporated herein by this reference.

1. The Draft SED Fails To Explain Why The State Water Board Would Adopt A LSJR Flow Alternative That Has Significant Effects On Other Beneficial Uses Of Water

One of the basic purposes of CEQA is to "[d]isclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant effects are involved." (14 C.C.R. § 15002, subd. (a)(4).) The draft SED states that the Preferred LSJR Alternative "35 percent unimpaired flow requirement would strike a balance between providing water for protection of fish and other competing uses of water, including agriculture and hydropower generation." (Draft SED, at pp. ES-2, ES-3.) However, the draft SED estimates that the Preferred LSJR Alternative would result in a 9% decrease in water diversions in the plan area and a 14% and 10% decrease in water diversion on the Tuolumne and Merced Rivers, respectively." (Draft SED, at p. 20-8.) The draft SED fails to assess whether it is "reasonable" to cause significant impacts to agricultural beneficial uses of water in an effort to protect fish and

wildlife beneficial uses. The draft SED also fails to disclose the reasons why the State Water Board would adopt amendments to water quality control plan that have significant effects on beneficial uses of water. Therefore, the draft SED fails to fulfill one of the basic purposes of CEQA, which is to disclose to the public the reasons why the agency may approve a project with significant effects on the environment.

The draft SED also fails to explain why the 35% of unimpaired flow was selected as the preferred alternative, even though 30% of unimpaired flow is estimated to result in "less than significant" impacts on aquatic resources. (*See* Draft SED, at pp. 7-3 – 7-8.) For example, there is no analysis in the draft SED regarding the tradeoffs between the 30% and 35% unimpaired flow options, in terms of fish and wildlife versus water supply diversions. Without this information, the State Water Board does not have sufficient information to determine what constitutes a "reasonable" level of water quality protection, in light of the competing beneficial uses of water.

2. The Preferred LSJR Alternative Of 35% Of "Unimpaired Flow" Is Not Supported By Substantial Evidence In The Administrative Record

One of the identified "objectives" or "goals" of the draft amendments to the LSJR flow objectives is to provide flow conditions in the LSJR and three eastside tributaries sufficient to support and maintain the natural production of native fish populations, including "flows that mimic the natural hydrographic conditions" to which native fish species are adapted. (Draft SED, at p. 3-2.) To meet this objective, the Preferred LSJR Alternative would require 35 percent "unimpaired flow" February-June on each of the three eastside tributaries and on the SJR at Vernalis. (Draft SED, at p. 20-3.) However, "unimpaired flows" do not mimic the natural hydrographic conditions to which native fish species adapted because the Bay-Delta ecosystem has been highly altered from the predevelopment ecosystem to which native fish species adapted. As described in the draft SED, "unimpaired flow" is merely a calculation of the "river flow at a specified location that would occur if all runoff from the watershed remained in the river, without storage or diversion." (Draft SED, at p. 5-7.) An "unimpaired flow" regime will not mimic "natural" hydrographic conditions because the flows will be occurring in a highly altered system.

There does not appear to be any explanation, scientific analysis, or biological rationale for why 35% of the unimpaired hydrograph is the preferred implementation approach. (Draft SED, at pp. 20-1 – 20-29.) Further, the SED does not present any analysis of the biological benefits to Chinook salmon or steelhead population dynamics that would be achieved by implementing the preferred alternative (35% allocation) when compared quantitatively to other alternatives. Similarly, the SED provides no detailed comparative analysis of potential adverse impacts that would be avoided by implementation of the preferred alternative to salmonids and other beneficial uses when assessed in relationship to other alternatives (e.g., 20%, 40%, 60 %, the no project alternative, etc.).

The following are examples of the many unanswered questions raised by the SED's failure to analyze the preferred alternative. Why was 35% of the unimpaired hydrograph selected as the preferred alternative? In what way does 35% of the unimpaired hydrograph achieve the salmon viability factors? Does 35% of the unimpaired hydrograph improve salmon survival downstream of Vernalis? Does 35% of the unimpaired hydrograph improve the conditions in the upper tributaries (e.g., gravel transport, temperature, turbidity, spawning habitat, etc.) Why does 35% of the unimpaired hydrograph best meet the goals and objectives of the project? Was 35% selected only because this was somewhere in the middle between 20% and 60%? Does the selection of the

35% of the unimpaired hydrograph reduce potentially significant environmental effects; if so, which ones and to what extent are the significant effects minimized? In many cases the breakpoint between significant and insignificant impact fell between the 20% and 40% of unimpaired alternatives. Since the SED did not evaluate the 35% unimpaired flow alternative there is no way to determine its potential environmental impact.

There is not substantial evidence in the administrative record to support the conclusion that an "unimpaired flow" regime will support the physical and ecological processes necessary to support native fish populations. The draft SED fails to evaluate "unimpaired flow" in the context of a highly modified ecological system and instead assumes that the "unimpaired flow" approach is necessary to support native fish populations. That assumption is not supported by substantial evidence and fails to account for the complex and inter-related physical and biological characteristics of the Bay-Delta ecosystem. The confounding relationships between flows and other environmental factors make the ecological consequences of an "unimpaired flow" regime highly uncertain. The "natural hydrographic conditions" to which native fish species are adapted included a complex and dynamic habitat that has been significantly altered by human actions. An "unimpaired flow" regime will not restore those dynamic habitat functions and it will not mimic "natural" hydrographic conditions.

O. Specific Comments Regarding Appendix H Of The Substitute Environmental Document

Public Resources Code section 21159 requires the SED to include, at a minimum, all of the following:

> (1) An analysis of the reasonably foreseeable environmental impacts of the methods of compliance.
>
> (2) An analysis of reasonably foreseeable feasible mitigation measures.
>
> (3) An analysis of reasonably foreseeable alternative means of compliance with the rule or regulation.

Draft Appendix H sets forth the evaluation of methods of compliance. However, it erroneously includes as a "method of compliance" the construction and operation of low lift pumps in conjunction with the continued installation of temporary barriers in the southern Delta to address impaired salinity, and it omits any analysis of potential mitigation for impacts of developing new surface water resources in the southern Delta.

First, Draft Appendix H indicates that depending on the outcome of the additional special studies to be conducted by Reclamation and DWR, the State Water Board may require DWR to construct and operate low lift pumping stations. (Draft SED, App. H, at pp. H-44, H-94.) As stated, the cost to implement the temporary barriers is $6 million/year. Depending on the number and type of low lift pumping stations, the initial cost to construct those ranges from $5.5 million to $551 million, and annual costs to operate would cost between $1.4 million and $89.9 million. (*Id*. at pp. H-94 – H-95, Tables H-20 – H-23.)

Since the best available scientific data demonstrates that SWP operations have no adverse impact, and some beneficial impact on salinity in the southern Delta, there is no factual or legal basis to require DWR to construct or operate temporary barriers or low lift pumping stations to protect agricultural beneficial uses in the southern Delta due to elevated levels of salinity. Thus, the draft SED and Appendix H should remove this as a potential "method of compliance" with the new southern Delta salinity objective.

Second, Draft Appendix H discloses two potential surface water supply projects, the Davis-Woodland Water Supply Project ("DWWSP") and the Delta Water Supply Project ("DWSP"). (Draft SED, App. H, at pp. H-45 – H-46.) However, the environmental analysis of these projects is deficient, even at a programmatic level. The analysis omits any analysis of potential impacts of new diversions in the southern Delta on aquatic wildlife, including state and federally listed threatened and endangered species. (*Id*. at p. H-50.) In addition, there are no potentially feasible mitigation measures identified for any of those projects potentially significant adverse environmental impacts. (*Id*. at pp. H-100 – H-115, Table H-24.) Draft Appendix H should be revised to include an assessment of the potential impacts of new surface water supply projects in the southern Delta, and should identify potentially feasible mitigation measures to address any potentially significant impacts.

Attachment 3

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Attachment 4

(Relevant Legal Standards and Rules)

1. Beneficial Use & Highest Use of Water

The California Constitution declares:

> [T]hat because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. The right to water or to the use or flow of water in or from any natural stream or water course in this State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water.

(Sec. 2, Art. X, Cal. Constitution; *see* Water Code § 100 [same].) It is the declared policy of this state "that the use of water for domestic purposes is the highest use of water and that the next highest use is for irrigation." (Water Code, § 106.)

2. Water Quality

Our state legislature has found and declared "that activities and factors which may affect the quality of the waters of the state shall be regulated to attain the highest water quality which is *reasonable, considering all demands being made and to be made on those waters* and the total values involved, beneficial and detrimental, economic and social, tangible and intangible." (Water Code, § 13000, italics added.)

Pursuant to Water Code section 13170, the State Water Board "may adopt water quality control plans in accordance with the provisions of Sections 13240 to 13244, inclusive, insofar as they are applicable . . . ." A water quality control plan "consists of a designation or establishment for the waters within a specified area of all of the following: (1) Beneficial uses to be protected[;] (2) Water quality objectives[;] (3) A program of implementation needed for achieving water quality objectives." (Water Code, § 13050, subd. (j).) The "beneficial uses" of water that may be protected against quality degradation include, but are not limited to, "domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves." (Water Code, § 13050, subd. (f).) "Water quality objectives" are "the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." (Water Code, § 13050, subd. (h).) The "program of implementation" for achieving water quality objectives must include, but is not limited to, the following: "(a) A description of the nature of actions which are necessary to achieve the objectives, including recommendations for appropriate action by any entity, public or private[;] (b) A time schedule for the actions to be taken[;] (c) A description of surveillance to be undertaken to determine compliance with objectives." (Water Code, § 13242.)

A water quality control plan must conform to the policy that the activities and factors which may affect water quality "shall be regulated to attain the highest water quality which is *reasonable, considering all demands being made and to be made on those waters* and the total values involved, beneficial and detrimental, economic and social, tangible and intangible." (Water Code, § 13000, italics added; § 13240; § 13170.) The State Water Board "shall establish such water quality objectives in water quality control plans as in its judgment will ensure the *reasonable* protection of beneficial uses and the prevention of nuisance . . . ." (Water Code, § 13241, italics added.) Factors to be considered by the State Water Board in establishing water quality objectives shall include, but not necessarily be limited to, all of the following:

(a) Past, present, and probable future beneficial uses of water.
(b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.
(c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.
(d) Economic considerations.
(e) The need for developing housing within the region.
(f) The need to develop and use recycled water.

(Water Code, § 13241.)

In addition, the CWA requires the State to submit any revised or new beneficial uses (referred to as designated uses under the CWA) or water quality objectives (referred to as water quality criteria under the CWA) to the Administrator of the Environmental Protection Agency. The CWA provides:

> Whenever the State revises or adopts a new standard, such revised or new standard shall be submitted to the Administrator. Such revised or new water quality standard shall consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses. Such standards shall be such as to protect the public health or welfare, enhance the quality of water and serve the purposes of this chapter. *Such standards shall be established taking into consideration their use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes, and also taking into consideration their use and value for navigation.*

(33 U.S.C. § 1313, subd. (c)(2)(A), italics added.)

"In performing its regulatory function of ensuring water quality by establishing water quality objectives, the Board acts in a legislative capacity. The Water Quality Control Plan itself is thus a quasi-legislative document." (*U.S. v. SWRCB* (1986) ["Racanelli Decision"] 182 Cal.App.3d 82, 112.) "The established procedures for quasi-legislative acts are few." (*Id.* at p. 114.) Before adopting any water quality control plan, the State Water Board must first provide notice of a public hearing and hold a public hearing regarding the proposed water quality control plan. (Water Code, § 13244.) In conducting "rulemaking proceedings" such as any hearings designed for the adoption or amendment of a water quality control plan, the State Water Board must "comply with all applicable requirements established by the Legislature (Government Code Section 11340, et seq.)." (23 C.C.R. §§ 649.1, 649, subd. (a).) The Government Code requires that a state agency permit "both oral and written statements, arguments, or contentions" at the public

hearing for the rulemaking proceeding and the state agency "shall consider all relevant matter presented to it before adopting, amending, or repealing any regulation." (Gov. Code § 11346.8, subd. (a).)

Also, prior to adopting a water quality control plan, the State Water Board must submit the scientific portions of the WQCP, along with a statement of the scientific findings, conclusions, and assumptions on which the scientific portions of the WQCP are based and the supporting scientific data, studies, and other appropriate materials, to an external scientific peer review entity for its evaluation. (Health & Safety Code, § 57004, subd. (d)(1).)

3. Substitute Environmental Document

The State Water Board's regulations require that a SED prepared in lieu of an EIR include, at a minimum, the following information:

> (1) A brief description of the proposed project;
>
> (2) An identification of any significant or potentially significant adverse environmental impacts of the proposed project;
>
> (3) An analysis of reasonable alternatives to the project and mitigation measures to avoid or reduce any significant or potentially significant adverse environmental impacts; and
>
> (4) An environmental analysis of the reasonably foreseeable methods of compliance. The environmental analysis shall include, at a minimum, all of the following:
>
> (A) An identification of the reasonably foreseeable methods of compliance with the project;
>
> (B) An analysis of any reasonably foreseeable significant adverse environmental impacts associated with those methods of compliance;
>
> (C) An analysis of reasonably foreseeable alternative methods of compliance that would have less significant adverse environmental impacts; and
>
> (D) An analysis of reasonably foreseeable mitigation measures that would minimize any unavoidable significant adverse environmental impacts of the reasonably foreseeable methods of compliance.

(Cal. Code Regs., tit. 23, § 3777; subd. (b).) As to each "significant" impact identified under subdivisions (b)(2) and (b)(4)(B) of section 3777, a SED must contain findings as described in CEQA Guidelines section 15091,[21] and if applicable, a statement described in CEQA Guidelines section 15093.[22] (Cal. Code Regs., tit. 23, § 3777, subd. (d), § 3779.5, subd. (c).)

[21] Section 15091 of the CEQA Guidelines requires an agency to make one or more of the following findings for each of the significant effects of the proposed project:

Under CEQA, a "significant effect on the environment" means a "substantial, or potentially substantial, adverse change in the environment." (Pub. Res. Code, § 21068.)[23] Under the CEQA Guidelines, "effects" of the project include:

> (1) Direct or primary effects which are caused by the project and occur at the same time and place.
>
> (2) Indirect or secondary effects which are caused by the project and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect or secondary effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems.

(14 C.C.R. § 15358, subd. (a).)

4. Water Rights

A right to appropriate water is recognized as a private property right and "once rights to use water are acquired, they become vested property rights." (*Racanelli Decision*, *supra*, 182

> (1) Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effect as identified in the final EIR.
> (2) Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.
> (3) Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR.

[22] Section 15093 of the CEQA Guidelines states:

> When the lead agency approves a project which will result in the occurrence of significant effects which are identified in the final EIR but are not avoided or substantially lessened, the agency shall state in writing the specific reasons to support its action based on the final EIR and/or other information in the record. The statement of overriding considerations shall be supported by substantial evidence in the record.

[23] Section 15382 of the CEQA Guidelines provides a more detailed definition of "significant effect on the environment," as follows:

> a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant.

Cal.App.3d at p. 101.) The Constitution prohibits a state from depriving any person of property "without due process of law." (Sec. 1, Amendment XIV, U.S. Constitution.) Thus, appropriative water rights "cannot be infringed by others or taken by governmental action without due process and just compensation." (*Racanelli Decision*, *supra*, 182 Cal.App.3d at p. 101.) Therefore, the procedural protections provided by law with respect to appropriative water rights are necessary to ensure that due process is provided by the State.

The State Water Board regulations state that the following permit term shall be included in every water right permit issued by the Board:

> Water Quality Objectives. The quantity of water diverted under this permit and under any license issued pursuant thereto is subject to modification by the State Water Resources Board if, *after* notice to the permittee and an opportunity for hearing, *the board finds* that such modification is necessary to meet water quality objectives in water quality control plans . . . No action will be taken pursuant to this paragraph unless *the board finds* that (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges.

(23 C.C.R. § 780, subd. (b)(1), italics added.) The regulations also state that:

> (a) In exercising its discretionary authority respecting applications to appropriate water, including prescribing or modifying permit terms and conditions, the board may require releases of water diverted and stored *whenever such releases are determined by the board to be in the public interest* or are needed to protect public trust uses of water, *if such requirement is reasonable under Article X, Section 2 of the California Constitution*.
>
> [. . .]
>
> (c) Before requiring releases of water pursuant to subsection (a) of this section over the objection of the applicant or permittee, the board will hold a hearing and make findings with respect thereto. The hearing will be limited to a consideration of (1) the basis of any recommendation of the Department of Fish and Game pursuant to Water Code Section 1243; (2) *whether such releases are necessary to maintain or enhance beneficial uses or to meet water quality objectives in the relevant water quality control plan*; (3) the probable effect of releases upon the applicant's proposed project; (4) evidence to assist in the preparation of dry and critical year relief provisions related to releases; and (5) any other issues which may be relevant to the appropriateness of a release requirement.

(23 C.C.R. § 784, subd. (a), (c), italics added.)

"[I]n undertaking to allocate water rights, the Board performs an adjudicatory function." (*Racanelli Decision*, *supra*, 182 Cal.App.3d at p. 113.) An "adjudicative proceeding" means an "evidentiary hearing for determination of facts pursuant to which the State Board or a Regional

Board formulates and issues a decision." (23 C.C.R. § 648, subd. (a); Gov. Code § 11405.20.) All "adjudicative proceedings" before the State Water Board are governed by 23 C.C.R. 648 et seq., chapter 4.5 of the Administrative Procedure Act[24] (Gov. Code § 11400 et seq.), sections 801-805 of the Evidence Code, and section 11513 of the Government Code. (23 C.C.R. § 648, subd. (b).) Those regulations and statutory provisions provide procedural protections for the party or parties to whom the adjudicative proceeding is directed.

The State Water Board regulations state that "[t]he party or parties to an adjudicative proceeding before the Board shall include the person or persons to whom the agency action is directed" and in a water right proceeding, the party or parties shall include the water right application or petitioner . . .." (23 C.C.R. § 648.1(a), (b).) "Parties" must be "given a reasonable opportunity on request to refute officially noticed technical or scientific matters . . .." (23 C.C.R. § 648.2.) In addition, "[a]ny witnesses providing written testimony shall appear at the hearing and affirm that the written testimony is true and correct." (23 C.C.R. § 648.4(d).)

Chapter 4.5 of the Administrative Procedure Act ("APA") provides the administrative adjudication provisions of the APA. (Gov. Code, § 11400.) Chapter 4.5 of the APA "supplements the governing procedure by which an agency conducts an adjudicative proceeding." (Gov. Code, § 11415.10, subd. (b).) The APA defines an agency "decision" for the purposes of an administrative adjudication as "an agency action of specific application that determines a legal right, duty, privilege, immunity, or other legal interest of a particular person."[25] (Gov. Code, § 11405.50.) Article 6 of Chapter 4.5 of the APA provides the "administrative adjudication bill of rights." Under that Article, the procedure by which an agency conducts an adjudicative proceeding is subject to all of the following requirements:

> (1) The agency shall give the person to which the agency action is directed notice[26] and an opportunity to be heard, including *the opportunity to present and rebut evidence*.
>
> (2) The agency shall make available to the person to which the agency action is directed a copy of the governing procedure, including a statement whether Chapter 5 (commencing with Section 11500) is applicable to the proceeding.
>
> (3) The hearing shall be open to public observation as provided in Section 11425.20.
>
> (4) The adjudicative function shall be separated from the investigative, prosecutorial, and advocacy functions within the agency as provided in Section 11425.30.
>
> (5) The presiding officer is subject to disqualification for bias, prejudice, or interest as provided in Section 11425.40.
>
> (6) The decision shall be in writing, be based on the record, and include *a statement of the factual and legal basis of the decision* as provided in Section 11425.50.

(Gov. Code, § 11425.10, subd. (a), italics added.)

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[24] Certain portions of chapter 4.5 of the Administrative Procedure Act are not applicable to "adjudicative proceedings." (See 23 C.C.R. § 648(c) [listing inapplicable articles and sections].)

[25] The term "person" includes "an individual, partnership, corporation, governmental subdivision or unit of a governmental subdivision, or public or private organization or entity of any character." (Gov. Code, § 11405.70.)

[26] See Government Code section 11440.20 for notice requirements.

Government Code section 11513 provides the following additional procedural rights for the party or parties to an adjudicative proceeding, including:

> (a) Oral evidence shall be taken only on oath or affirmation.
> (b) Each party shall have these rights: to call and examine witnesses, to introduce exhibits; to cross-examine opposing witnesses on any matter relevant to the issues even though that matter was not covered in the direct examination; to impeach any witness regardless of which party first called him or her to testify; and to rebut the evidence against him or her. If respondent does not testify in his or her own behalf he or she may be called and examined as if under cross-examination.
> (c) The hearing need not be conducted according to technical rules relating to evidence and witnesses, except as [otherwise] provided [in Section 11513].

(Gov. Code, § 11513.)

Evidence Code sections 801 through 805 govern witness testimony in an adjudicative proceeding. Evidence Code section 801 provides:

> If a witness is testifying as an expert, his testimony in the form of an opinion is limited to such an opinion as is:
> (a) Related to a subject that is sufficiently beyond common experience that the opinion of an expert would assist the trier of fact; and
> (b) Based on matter (including his special knowledge, skill, experience, training, and education) perceived by or personally known to the witness or made known to him at or before the hearing, whether or not admissible, that is of a type that reasonably may be relied upon by an expert in forming an opinion upon the subject to which his testimony relates, unless an expert is precluded by law from using such matter as a basis for his opinion.

(Evid. Code § 801.) Evidence Code section 804, subd. (a) provides that "[i]f a witness testifying as an expert testifies that his opinion is based in whole or in part upon the opinion or statement of another person, such other person may be called and examined by any adverse party as if under cross-examination concerning the opinion or statement." (Evid. Code § 804, subd. (a).)

Attachment 5
(Discharges By Grasslands Bypass Project)

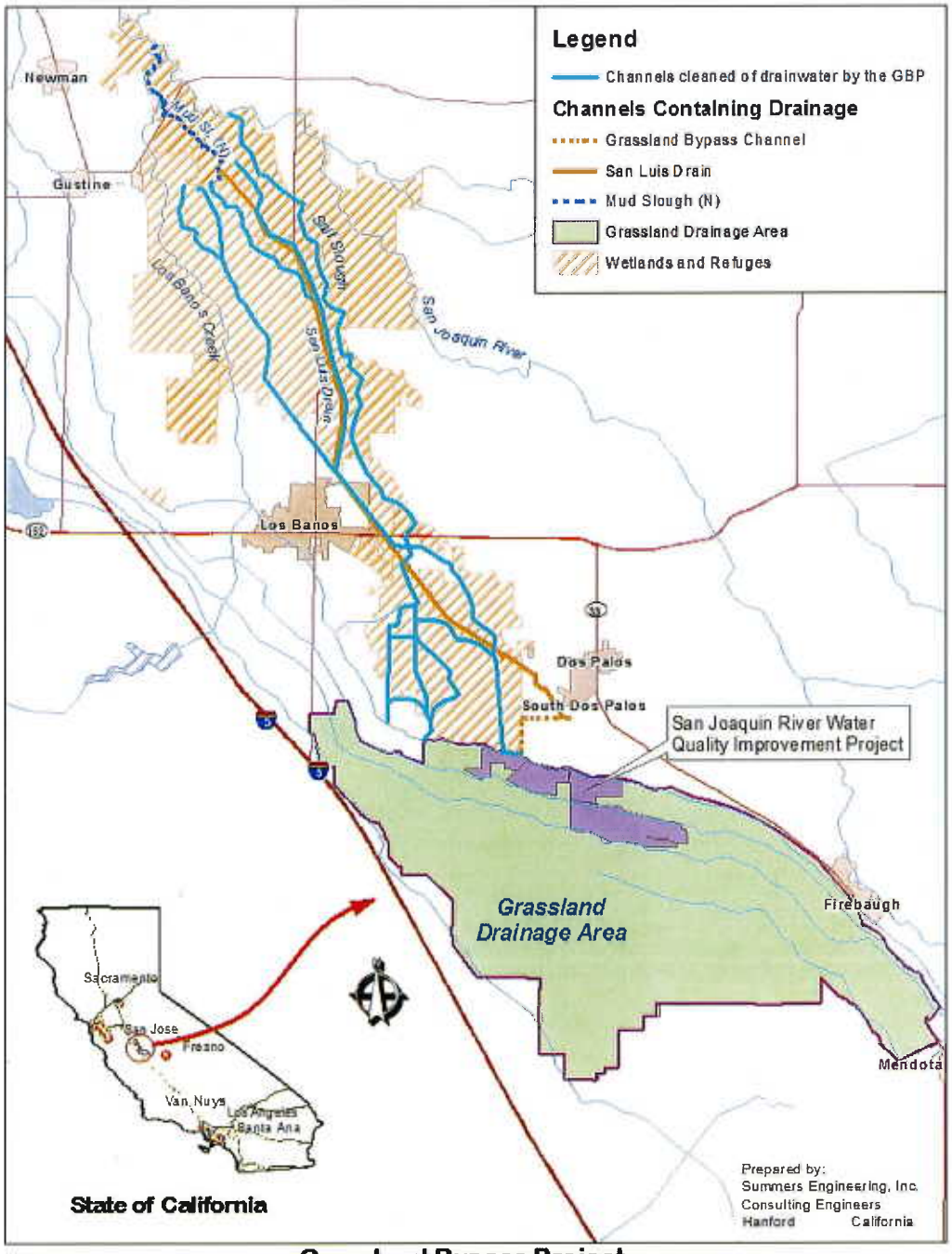
Table 1
Discharge Comparison from Grassland Drainage Area
Values October thru September

	WY 95	WY 96	WY 97	WY 98	WY 99	WY 00	WY 01	WY 02	WY 03
Volume (AF)	57,574	52,978	39,856	49,289	32,317	31,342	28,235	28,358	27,345
Se (lbs)	11,875	10,034	7,096	9,118	5,124	4,603	4,377	3,939	4,032
Salt (tons)	237,530	197,526	172,602	213,533	149,081	139,303	142,415	128,411	126,500
B (1,000 lbs)	868	723	753	983	630	619	423	544	554
Se (ppm)	0.076	0.070	0.066	0.068	0.058	0.054	0.057	0.051	0.054
Salt (µmhos/cm)	4,102	3,707	4,306	4,308	4,587	4,420	5,016	4,503	4,600
Boron (ppm)	5.5	5.0	7.0	7.3	7.2	7.3	5.5	7.1	7.5

	WY 04	WY 05	WY 06	WY 07	WY 08	WY 09	WY 10	WY 11	WY 12	Reduction from WY 95 to WY 12
Volume (AF)	27,640	29,957	25,995	18,531	15,665	13,166	14,529	18,513	10,486	82%
Se (lbs)	3,860	4,305	3,563	2,554	1,736	1,264	1,577	2,047	750	94%
Salt (tons)	121,138	138,908	119,646	79,094	66,254	55,556	67,661	87,537	38,400	84%
B (1,000 lbs)	530	585	539	278	269	233	315	419	234	73%
Se (ppm)	0.051	0.053	0.050	0.051	0.041	0.035	0.040	0.041	0.026	
Salt (µmhos/cm)	4,358	4,611	4,577	4,244	4,206	4,196	4,631	4,702	3,642	
Boron (ppm)	7.1	7.2	7.6	5.5	6.3	6.5	8.0	8.3	8.2	

Note: WY 97, 98, & 05 include discharges through Grasslands
Note: GAF quality data used where RWQCB data was missing or pending.

Figure 1



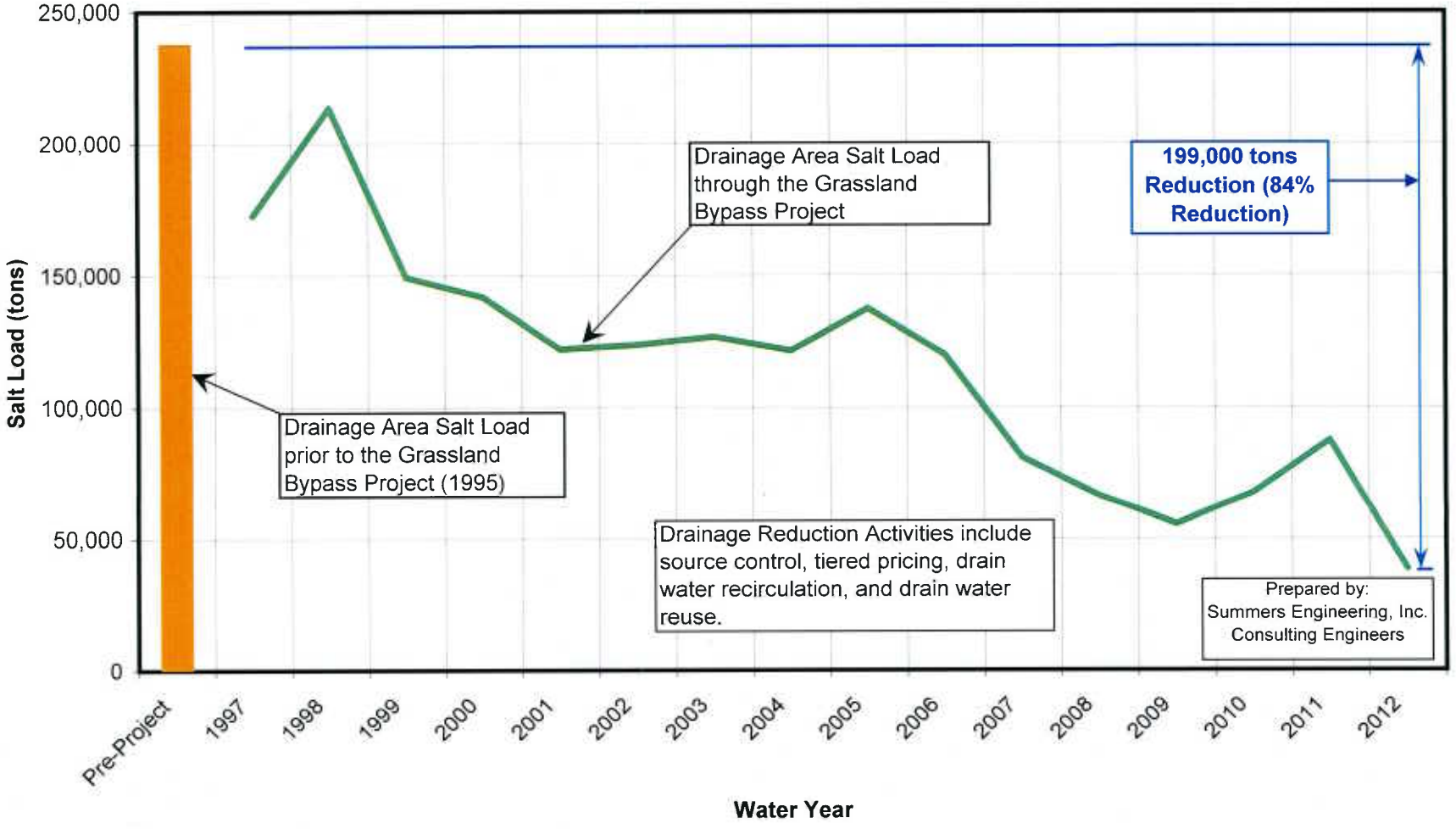
Grassland Bypass Project
Location Map

NW/SJDMA/Sta.Cru/Mis./2013/GDAN01

Figure 2

Grassland Drainage Area

Drainage Area Salt Load



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