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

United States Department of the Interior

Comments

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)

March 29, 2013

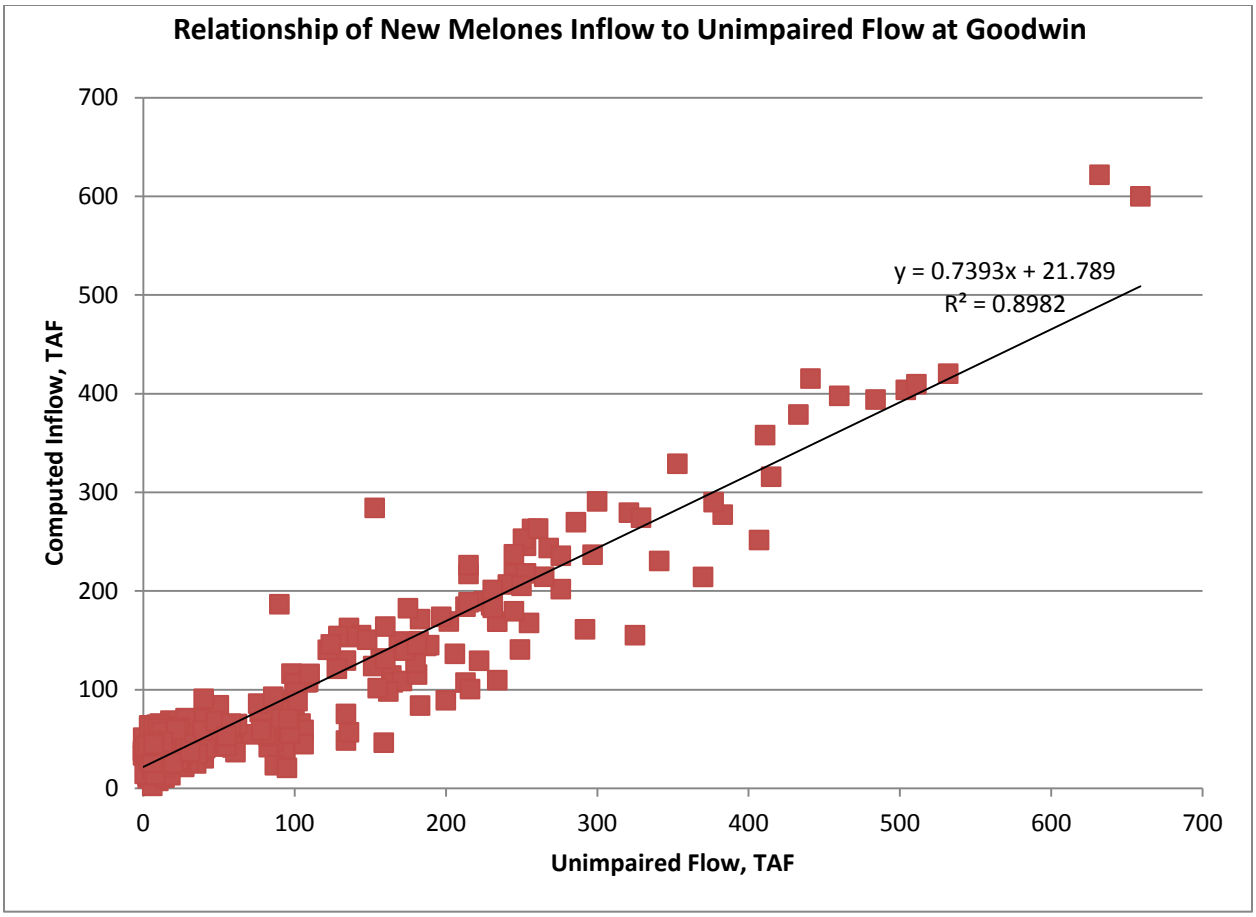
The U.S. Department of the Interior (Interior) submits these comments to the SED on behalf of the U.S. Bureau of Reclamation (Reclamation) and the U.S. Fish and Wildlife Service (FWS), pursuant to the State Water Resources Control Board (SWRCB or the Board) January 17, 2013 Notice of Extension of Public Comment Period. While Interior has significant concerns with the analyses presented in the SED and questions whether the SED is adequate for the Board to balance beneficial uses, we look forward to working cooperatively with the Board and other stakeholders on these important issues in the future.

I. RECLAMATION COMMENTS

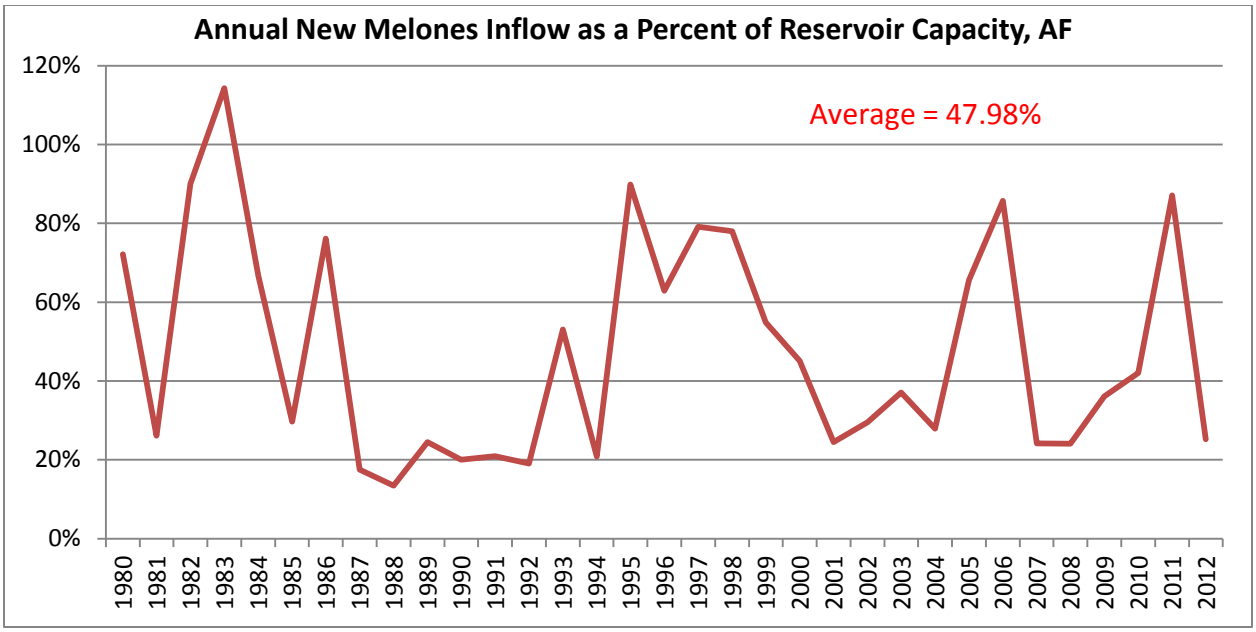
A. Water Rights and Diversions are Inadequately Described in the SED.

The SWRCB has made several critical errors in describing the water rights of diverters on the Stanislaus River. As the SWRCB administers these rights, it is unclear why the Board chose not to include an accurate description at this time. Leaving this description to a later phase has unnecessarily segmented the Board's analysis and served to minimize impacts on those diverters that would be most impacted if a standard based on unimpaired flow were implemented. Below is a description of the major flaws in the Board's analysis with regards to how New Melones Reservoir is operated based on actual diversion patterns and the quantity of water available to meet an unimpaired flow objective.

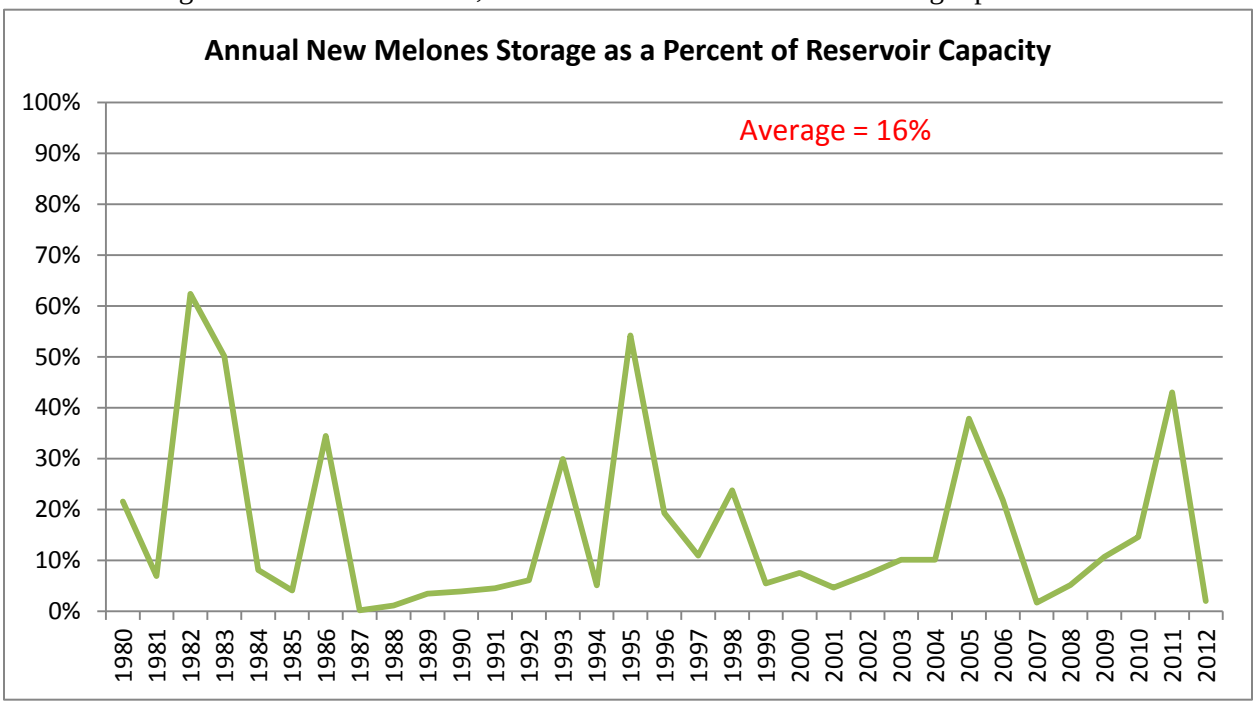
Computed inflow to New Melones is 26% less than Full Natural Flow. The SED focuses on unimpaired, or full natural, flow and does not evaluate the effect of upstream water rights and reservoirs on the major rim dams. A comparison of unimpaired flow at Goodwin on the Stanislaus River with calculated inflow at New Melones illustrates that actual inflow to the major rim dam is less than estimated unimpaired flow. This assumption implies that the Board is proposing to assign responsibility for meeting downstream flow objectives to the major rim dams, despite upstream diversions which also contribute to the deficit of unimpaired flow. Some of the water rights of upstream parties are junior to those of Reclamation.



New Melones' consumptive yield is 16% of its physical capacity. Reclamation conducted a water rights accounting analysis on the historic operations of New Melones Reservoir to understand how water is bypassed and stored and operated to meet existing water right permit conditions, using publicly available data. An examination of the consumptive storage and withdrawals illustrates the difference between yield and capacity at New Melones Reservoir. New Melones Reservoir was first proposed by the US Army Corps of Engineers as a flood control reservoir, and its physical capacity is a direct result of the infrequent but very large flood potential on the Stanislaus River. During the initial water rights hearings that resulted in Water Rights Decision 1422, the Board was shown that the average inflow into the reservoir is less than 50% of its physical capacity. This has remained true in the period following the Decision.

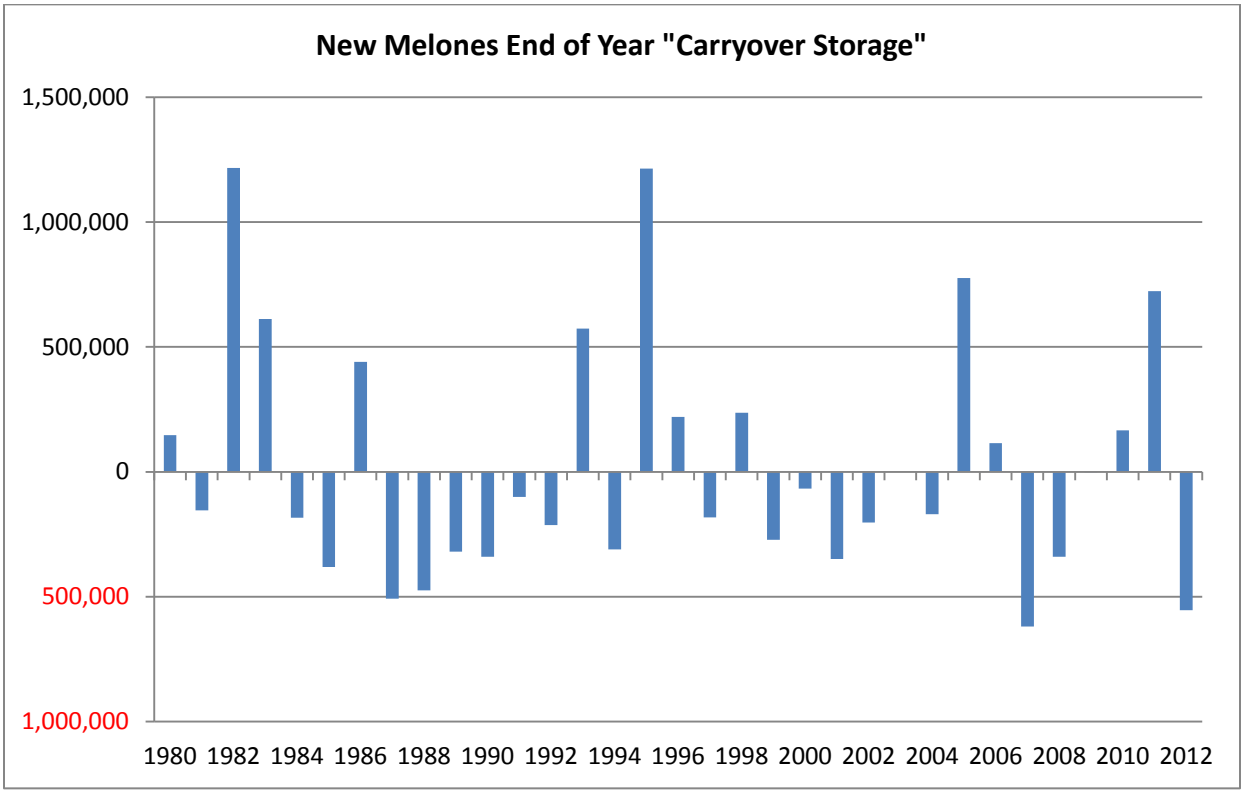


Furthermore, the actual consumptive storage, including water needed for instream and dilution flows, (New Melones has very infrequently been used to reregulate flood flows) is only 16% of the physical capacity of New Melones Reservoir, or an average of 387,209 acre-feet per annum and a maximum of 1,301,230 acre-feet per annum. This also highlights the difference between the term "storage" as used when describing CALSIM model results, versus the term when used in water right permits and licenses.

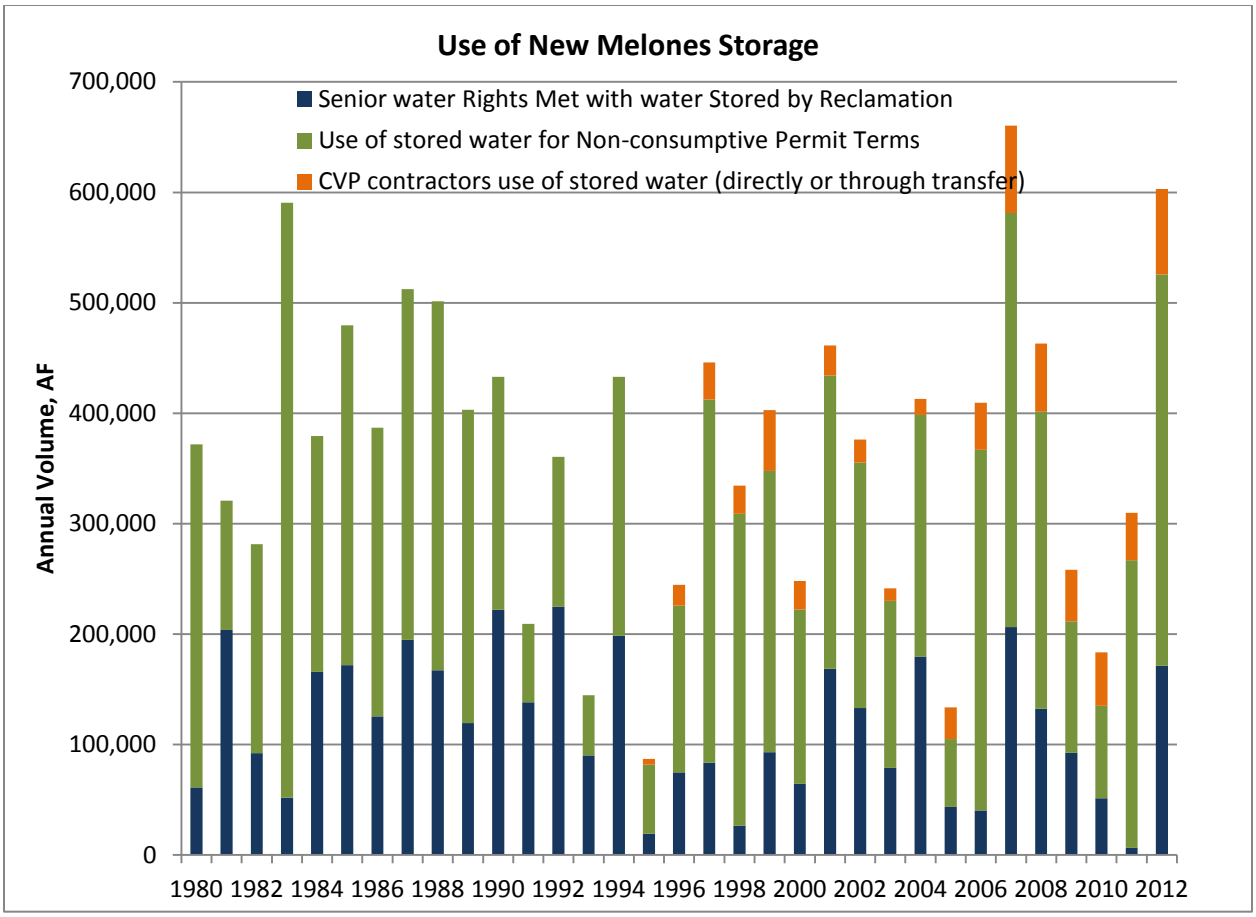


Actual Carryover Storage in New Melones occurs only 39% of the time. A graph of annual historic "carryover" or "deficit" storage between years illustrates that an average of 495,260 AF is carried over into a future year in only 39% of the years. The majority of this carryover storage is used to meet the various permit conditions on Reclamation's water rights, where an average of 287,190 AF of stored water

is needed in 61% of the years to meet senior and downstream water rights, fish and wildlife flows, existing Stanislaus and lower San Joaquin River water quality objectives, and an average of 44,195 AF of consumptive use yield. This is because inflow to New Melones is highly variable, ranging from 323,632 acre-feet to 2,742,542 acre-feet in calendar years 1980 to 2012. To meet the less variable demands of approximately 1.1 million acre-feet per year, annual storage and carryover storage is frequently used. The average carryover storage (over all years) in New Melones is 21,048 acre-feet per annum, or 0.88% of its physical capacity, and for carryover in years where storage is actually carried over the average is 20% of physical capacity. The size of the reservoir is not an indication of its potential to carryover storage, and, as with every reservoir, there are limitations to the volume that can be carried over in the wettest sequence of years (e.g. in the 1982-1983 high-inflow sequence, storage is limited in the second year by the capacity of the reservoir).



The majority of New Melones stored water is already used to meet senior water rights, fish and wildlife, and water quality requirements. Of the water stored in New Melones, an analysis of withdrawals from storage illustrates that most of it is used to meet permit conditions. A small portion supports consumptive use of contractors Stockton East Water District (SEWD) and Central San Joaquin Water Conservation District (CSJWCD).



The majority of senior water rights (OID/SSJID) are met through direct diversions. Reclamation holds rights to divert and store water at New Melones Reservoir, conditioned upon satisfying the senior water rights of OID and SSJID. The SED fails to appropriately describe water rights on the Stanislaus River. Water Rights Decision 1422, adopted April 4, 1973, provides a history of Reclamation's petitions to amend applications for consumptive use storage in the U.S. Army Corps of Engineers' New Melones Flood ControI Reservoir. Reclamation's petitions were protested based on injury to senior water rights holders, the Oakdale Irrigation District (OID) and South San Joaquin Irrigation District (SSJID). Water Rights Decision 1422 states that these senior rights had historically beneficially used between 204,000 acre-feet (1924) and 597,300 acre-feet (1962), "with an average annual diversion of 409,500 acre-feet." The New Melones reservoir also inundated a small reservoir owned by OID and SSJID. D-1422 states "Under the agreement providing for the dismissal of the districts' protests, the Bureau will deliver all of the inflow of the New Melones Reservoir up to 654,000 acre-feet in each year for rediversion at Goodwin Dam in satisfaction of the districts' prior rights." (D-1422 at pp. 8)

Other settled protests were with the Central Valley Regional Water Quality Control Board, over water quality in the Stanislaus River and lower San Joaquin River and resulting in the reservation of up to 70,000 AF of stored water annually to meet water quality objectives; and with the Department of Fish and Game, resulting in the reservation of up to 98,000 AF of stored water annually for fish and wildlife flows. At the time, "The Bureau's conclusion as to the extent that water in the Stanislaus River remains unappropriated is based upon its estimate of the unimpaired inflow to the New Melones site for a

hydrologic cycle equivalent to the period 1923 through 1953. After deducting the quantity of water necessary for the above- described demands the annual average surplus is an estimated 335,000 acre-feet and varies from zero which occurs in nine years of the period of study to 1,980,000 acre-feet." (D-1422 at pp. 9) For the initially approved 1,100,000 acre-fee of storage "450,000 acre-feet of the 1,100,000 acre-feet is required for flood control." (D-1422 at pp. 19)

Water Rights Order 80-20 reaffirmed the responsibility to senior water rights: "The Districts' total annual diversion from the Stanislaus River will now be limited to 654,000 acre-feet. Although the maximum annual-diversion to date has been less (636,000 acre-feet), no annual limit was imposed by the combination of rights held by the Districts prior to the Agreement and Stipulation, other than that of physical availability and the constitutional requirement that use be reasonable and not wasteful." (WRO 80-20 at pp. 6) Water Rights Order 83-03 summarizes the conditions of Reclamation's permits: "The project's conservation yield that the Bureau will have available to market is 180,000 acre-feet. The Bureau is already obligated to supply 98,000 acre-feet-for fish and wildlife enhancement, up to 70,000 acre-feet [1] for water quality control and at least 654,000 acre-feet for downstream prior rights." (WRO 83-03 at pp. 4-5)

Water Rights Decision 1616, adopted January 21, 1988, clearly identifies and describes the basis of the 1972 operational agreement to meet prior rights as required in adopting D-1422 and issuing permits to Reclamation:

> In October 1972, prior to issuance of the storage permits for New Melones Reservoir, the two Districts (jointly referred to herein as OSSJID) and the Bureau entered into an agreement intended to quantify the yield for consumptive purposes of the OSSJID water rights on the Stanislaus River. The agreement provided that, upon completion of New Melones Dam and Reservoir, the Bureau woul d provide OSSJID the following annual quantities of water in recognition of the Districts' rights .
>
> 1. 200,000 acre -feet from New Melones storage,
> 2. 36,000 acre-feet for storage in Woodward Reservoir,
> 3. That portion of the New Melones Reservoir inflow required to meet the Districts' direct diversion requirements but not to exceed 1,816.6 cubic feet per second.
>
> Subject to the following limitation: 'The maximum quantity of water delivered each year is limited to 654,000 acre-feet or the total quantity of New Melones Reservoir inflow during the water year (October 1 of one year through September 30 of the succeeding year), whichever is the smaller.' (USBR, 8.)

[1] In Revised Water Rights Decision 1641, the Board acknowledges that "In some years, water quality releases from New Melones have exceeded the 70 taf estimate by twofold. (USDI 4h.)" and "Under the Interim Operations Plan, the USBR plans to allocate 70-250 taf to water quality purposes. (R.T. p. 6294; USDI 2.) However, the USBR acknowledged that on occasion salinity objectives at Vernalis will not be met under its plan. (R.T. p. 6554; USDI 4.)" (Revised D-1641 at pp 79-80). In spite of this, Reclamation has met the Vernalis standard consistently since 1995.

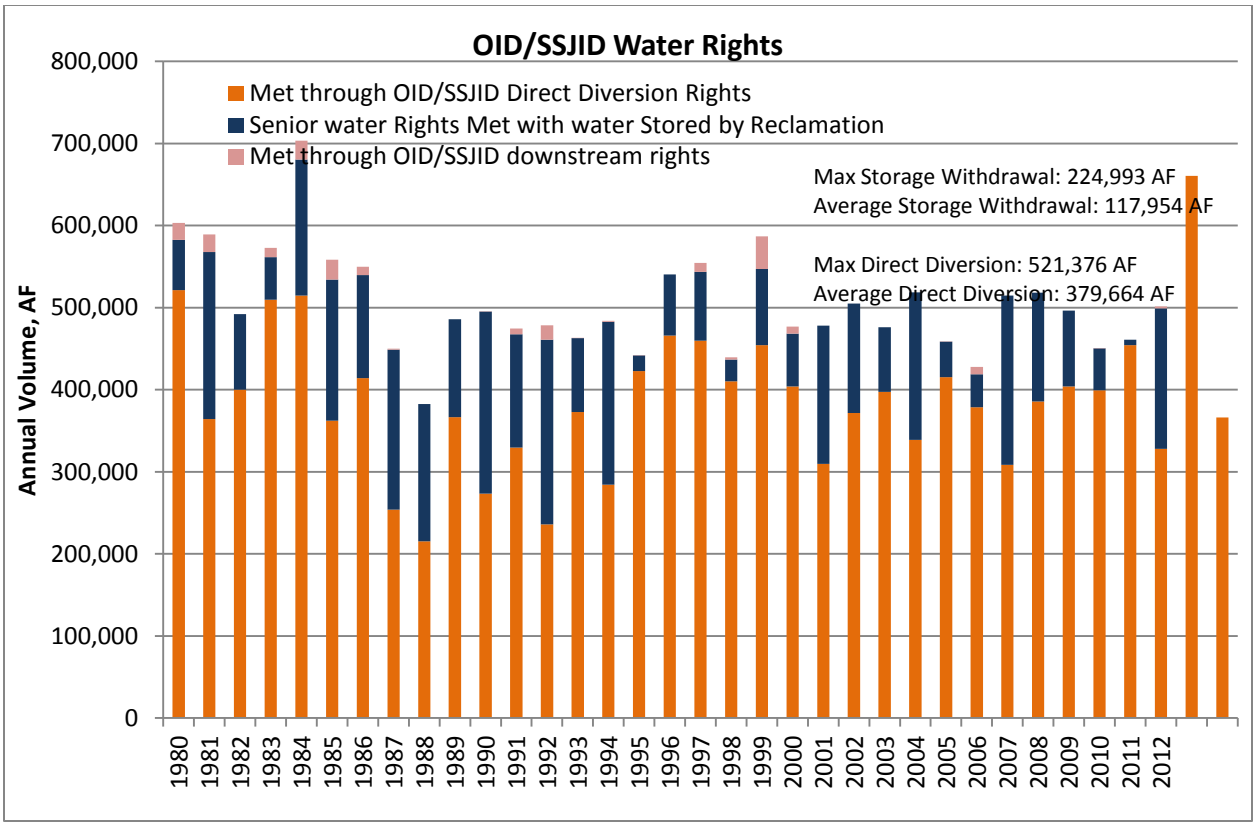
> The Bureau's position is that the above conditions of the agreement fully compensate OID and SSJID for its consumptive use water rights on the Stanislaus River. (T,29:29-30:7; 5,32:18-33:l.) (D-1616 at pp. 13-14)

However "[t]he 1972 agreement was intended to resolve a disagreement regarding the extent of the Districts' rights. Unfortunately, the parties to the agreement now disagree on its interpretation and the wording of the agreement itself is unclear. In the face of such ambiguity, the Board concludes that any permits issued for direct diversion from the Stanislaus River in this proceeding should be specifically subject to all existing water rights as determined by the Stanislaus River Adjudication (San Joaquin County, Superior Court No. 16873) as amended by all applicable supplemental decrees, provided that such adjudicated rights are maintained. If either party desires to obtain a judicial interpretation of the 1972 agreement, it may file an action in the appropriate court for such a determination." (D-1616 at pp. 18) D-1616 reaffirms the priority of senior rights: "Rights under this permit are, and shall be, specifically subject to existing rights determined by the Stanislaus River Adjudication, Superior Court, San Joaquin County dated November 14, 1929, Action No. 16873 with supplemental decrees dated February 24, 1930; March 8, 1934; May 8, 1935; and November 29, 1960, insofar as said adjudicated rights are maintained." (D-1616 at pp. 28)

In 1988, Reclamation, OID, and SSJID adopted a new operational agreement ("the 1988 Agreement" in the SED) that defines how Reclamation ensures senior water rights are not injured by operations at New Melones. Water Rights Order 95-06 further emphasizes "Nothing in the USBR's water right permits requires the USBR to contract with a particular water user within these counties beyond that needed to protect prior water rights." (emphasis added, at pp. 40) This is perhaps the only other location where the Board refers to the operational agreement as a contract, which Reclamation assumes is due solely to the Board's unfamiliarity with federal water contracts.

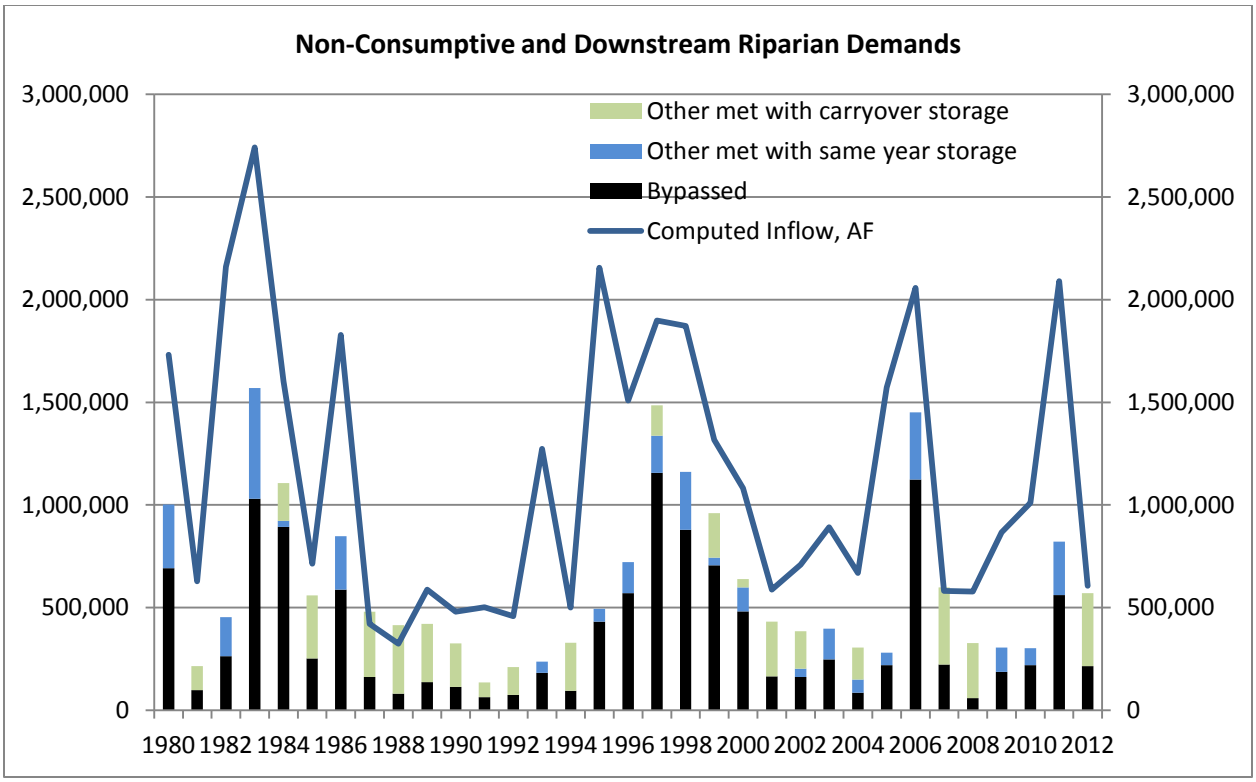
Throughout the adoption of water rights decisions and orders on the Stanislaus River, the Board has identified that OID and SSJID hold rights separate from Reclamation and has accepted that the parties may enter into operational agreements to satisfy these rights that at the same time does not change the legal description of these rights. Despite this substantial record, the Board, in the SED, inaccurately characterizes OID and SSJID as New Melones "contractors" (SED at pp. 2-22, 2-23, 5-26, 5-57, 5-58, 5-63, 13-5, 15-3, 15-9, D-7, D-14). As a result of this mischaracterization, the Board subjects OID and SSJID, in-basin pre-1914 water right holders, to the permit conditions ascribed to Reclamation. This is a significant flaw in the impact analysis, as in the No Project Alternative, for example, additional D-1641 requirements are likely beyond the water supply available under Reclamation's rights.

Reclamation's water rights analysis shows that, with the 1972 and then the 1988 Operations Agreement and Stipulation in place, the majority of OID/SSJID's demand has historically been met through direct diversions within their adjudicated rights. This does not account for OID/SSJID's additional rights to store water in Tulloch and Goodwin reservoirs, but demonstrates the limited role of Reclamation's storage rights in satisfying senior rights (117,954 AFA on average). The majority of storage use occurs within the same year it is collected.



Existing use of Stanislaus River. Reclamation also examined the historic allocation of computed inflow between the various permit terms, for the February through June months. February through June represents a significant portion (62.5%) of Reclamation's season of diversion at New Melones, and 58% of its volume of diversion to storage. In the February through June period, Reclamation diverts on average 29.6% of the inflow, much of which is released later in the same year. The average volume of diversions to storage in Feb-Jun plus direct diversion to consumptive use in Feb-June is 279,791 AFA. Since 1995, Reclamation has bypassed or released stored water to meet the Vernalis salinity objective and Table 3 base flows (to the degree possible).

For illustration purposes, use categories are grouped and compared to the computed inflow at New Melones. The greatest portion of inflow has been bypassed to meet existing permit terms (or before 1988 due to the limited storage permitted in New Melones). Previously stored water is also released to meet permit terms and conditions. The next greatest portion of inflow is bypassed or released from storage to satisfy water rights senior to Reclamation (as required by permits), and satisfied through the 1988 Agreement and Stipulation. The remaining water is what is available to Reclamation for storage and its New Melones contracts (here shown as a demand met either through a transfer from OID/SSJID or through direct delivery by Reclamation, but not to the full volume of contract.)


Non-Consumptive and Downstream Riparian Demands
Other met with carryover storage
Other met with same year storage
Bypassed
Computed Inflow, AF
3,000,000
2,500,000
2,000,000
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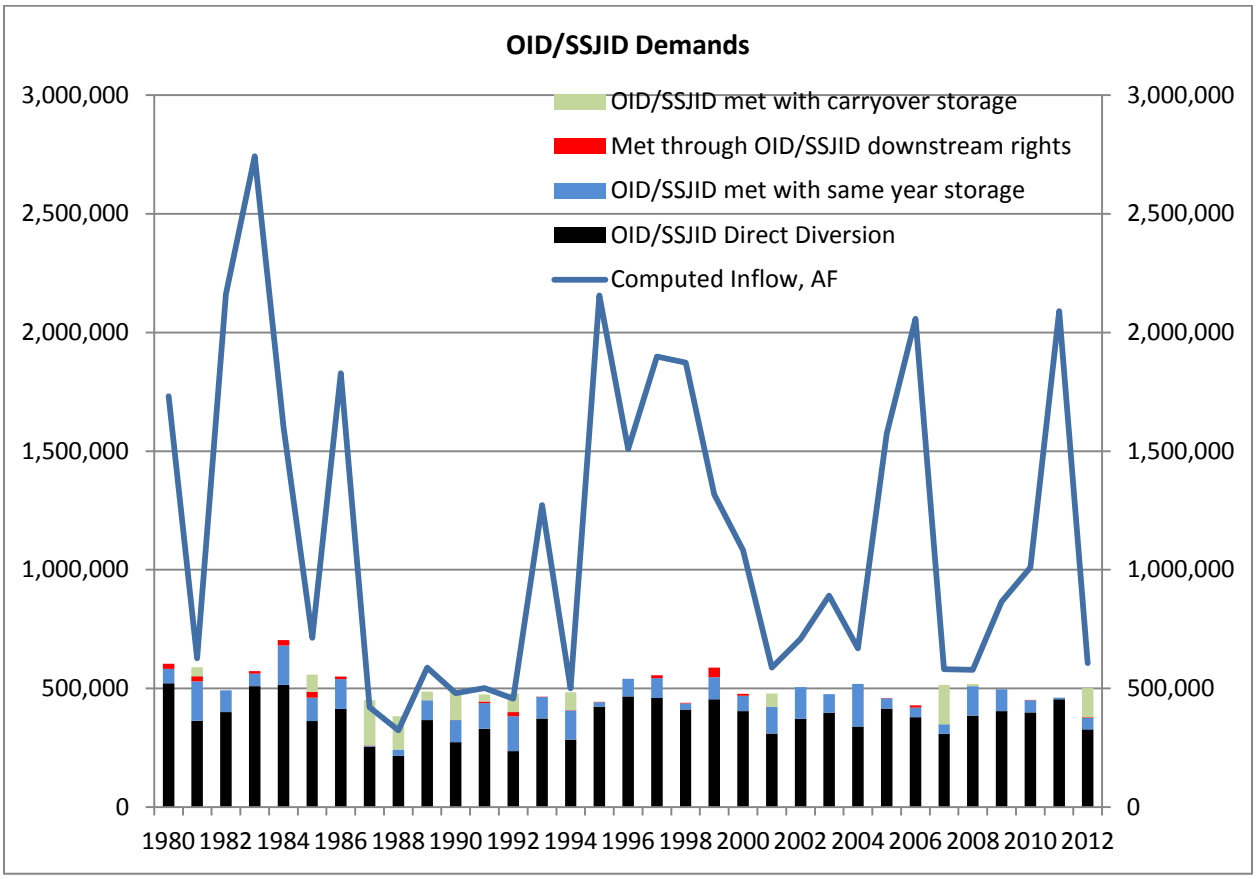
1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012


OID/SSJID Demands
OID/SSJID met with carryover storage
Met through OID/SSJID downstream rights
OID/SSJID met with same year storage
OID/SSJID Direct Diversion
Computed Inflow, AF
3,000,000
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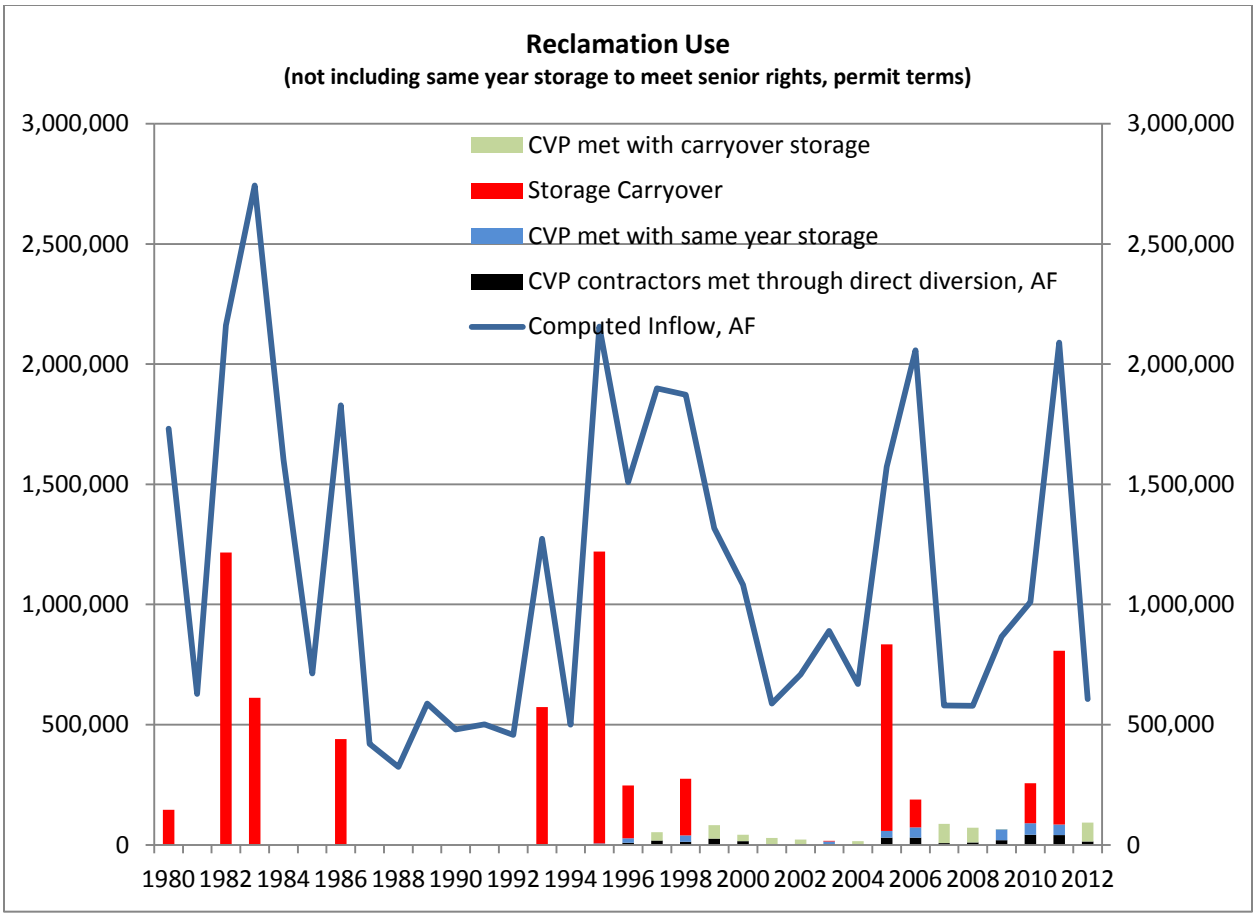
1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012



Reclamation meets its water right and ESA obligations through the water available to it. For the most part, this is stored water. It is contradictory to existing water rights law to assume Reclamation can store water in priority to rights senior to Reclamation. This is a major flaw in all of the analyses presented in the SED. This oversimplification of the water available to Reclamation in New Melones Reservoir leads to a plan of implementation so general in its characterization that impacts are assumed to be spread across a wide range of water uses and users. In reality, if the Board was to analyze the distribution of senior and junior water rights, it is clear that impacts would be concentrated on a minority of users, and those impacts would be much greater in magnitude. The Board fails to provide an adequate accounting of the water necessary to implement the proposed plan amendment in the SED and fails to adequately describe the impacts to all resources from implementing a flow standard based on unimpaired flow.

Given that the Board is proposing a new bypass standard, it is unclear how the Board would propose to use stored water to meet such a requirement. The Board should analyze the impacts according to the law of water rights in California. As stated by the Board in WR 2001-22:

> A water right holder's seniority over the Projects does not allow diversions when the Projects are not diverting natural and abandoned flows for additional appropriations. Nor does seniority over the Projects entitle a water right holder to make use of stored water which the Projects diverted to storage when natural flows were sufficient to divert water

> under the Projects' priorities, either by taking that water from Project reservoirs or by requiring the Projects to release additional stored water to meet water quality objectives.

This principle was recognized by the California courts in *El Dorado Irrigation District v. SWRCB*, 142 Cal. App. 4th 937; Cal. Rptr. 3d 468 (September 8, 2006), in which the court stated, "Of course, the rule of priority applies only to the use of natural or abandoned flows in a watercourse." *Id*. at 962, and "… no appropriator has a right to take water that was previously stored or imported by another upstream and then released into the watercourse …" either actually or constructively. *Id.* at 968. In other words, water right holders with direct diversion rights and water right holders with rights to divert to storage are both diverters of natural flow. It is the diversion of natural flow which is administered on a priority bases. Junior storage right holders can be made to divert less to storage to satisfy senior water rights, but are not required to deplete previously stored waters before the natural flow diversions of senior water rights are decreased.

B. Flawed Modeling Assumptions Mask Impacts of Alternatives

As a result of not analyzing direct impacts to senior water right holders, over simplifying diversion rights as controllable by Reclamation, and flawed assumptions on existing federal regulations, the Board has integrated assumptions into the CALSIM and WSE modeling that avoid analyzing the impacts associated with the Proposed Project. These assumptions include:

1. Baseline and no project alternative are not reflective of current operations
2. Static reservoir operations.
3. Inaccurate description of existing water rights.
4. Application of a single-purpose reservoir rule-curve.
5. An inconsistent application of existing ESA requirements.
6. Incorrect description of water operations
7. Reduced deliveries to Stockton East Water District.
8. Extreme drought planning.

Baseline and no project alternative are not reflective of current operations. Board staff has informed Reclamation that the Baseline modeling is required under CEQA to represent conditions when the NOI was issued, i.e. February 2009. If CEQA provides no latitude to the definition of the baseline then Reclamation recommends comparing the alternatives to a properly defined No Project Alternative.

Following is an itemization of changes needed to the Board's Baseline and No Project Alternatives to match current operations. Baseline study assumptions which are inconsistent with current operations include:

- Reclamation is currently operating to NMFS Biological Opinion Reasonable and Prudent Alternative (RPA) action IV.2.1 Phase II, not Phase I as indicated in the baseline, which was an interim operation for 2010-11;

- The modeling is inconsistent with the 1988 New Melones Stipulation Agreement. The senior water right holders' (Oakdale and South San Joaquin Irrigation Districts (OID-SSJID)) deliveries are reduced below allowable deliveries under that agreement when the New Melones Index is less than 940 thousand acre-feet (TAF), to 400 TAF annually.

- Deliveries to CVP contractors, i.e. Stockton East Water District (SEWD) and Central San Joaquin Water Conservation District (CSJWCD), are limited to a maximum of 90 TAF per year. Reclamation is obligated to operate according to the ruling in Stockton East Water Dist. v. United States, 583 F.3d 1344 (Fed. Cir. 2009), and make available SEWD's and CSJWCD's full contract quantities, unless shortages due to hydrologic conditions are in effect.

- Pulse period releases to meet Vernalis Adaptive Management Program (VAMP) target flows (as implemented through the San Joaquin River Agreement (SJRA)) are in the baseline assumptions, even though that agreement has expired. Reclamation is currently operating to a single-step VAMP flow target with water purchased from Merced Irrigation District.

- The SWRCB's CALSIM modeling includes a sale of water from OID-SSJID to SEWD, which no longer occurs.

- The baseline assumes a prolonged drought relaxation for flows required under the 2009 National Marine Fisheries Service (NMFS) Biological Opinion (BiOp) on the Stanislaus. While the BiOp provides for exception procedures, we do not believe the SED assumptions are consistent with the NMFS analysis of the excpetions. The SED assumption is also used in the sensitivity analysis conducted for Appendix L and presumably in the No Project Alternative as well.

Following are the No Project Alternative assumptions which are inconsistent with current operations:

- Reclamation takes issue with the Board's model that shows New Melones as the sole provider of 2006 Water Quality Control Plan Table 3 spring pulse flows. Reclamation's own modeling shows that New Melones cannot be the sole provider of Table 3 flows because the water required to meet these flows is not available to Reclamation under its water rights. A permit condition which cannot be met with water appropriated under the permit, and must, therefore, rely on purchases of water from other diverters, is not reasonable. Reclamation has stated in numerous venues that it cannot operate New Melones in a sustainable manner and meet Table 3 flows. In fact, the Board's own modeling confirms the unsustainable nature of these operations, but simply rectifies the situation by shorting water deliveries from New Melones. This modeling represents a fatal flaw because Reclamation cannot unilaterally short the senior water right holders in this manner. However, Reclamation has voluntarily agreed to continue some limited purchases to assist the Board in implementing its 2006 Water Quality Control Plan Table 3 objectives during this interim period. Sole reliance on New Melones, however, especially over the long run, is unreasonable and leaves those objectives largely unimplemented. Therefore, single-step VAMP target flows, as are currently met through the implementation of Reclamation Spring Pulse Flow Agreement with Merced ID, is the appropriate Vernalis spring pulse flow target to model.

- Reclamation does not make specific releases from New Melones to achieve southern Delta interior salinity objectives. Southern Delta salinity objectives are not implemented through dilution flows.

- In addition, the modeling does not check whether the dissolved oxygen requirement on the Stanislaus is met; consequently, this requirement is not met a number of times during the

simulation. This is a problem not only for the No Project Alternative but for all of the alternatives.

Static reservoir operations. The Board's approach to reservoir modeling allows the Board to avoid analyzing the impacts associated with changes in reservoir volumes. The Board states it has developed the WSE model to "determine the effects on reservoir operations" (p F.1-14) yet it then negates this purpose by designing rule curves for the alternatives "such that the carryover storage in the reservoirs were not worse than the baseline conditions," (p F.1-27) while still maximizing diversions. This inevitably results in storages patterns that are very similar to the baseline. Fixing storage patterns to the baseline biases the analysis and shifts all impacts onto deliveries, but the SED fails to analyze how such an operation could be implemented while still meeting existing water right requirements. . This modeling technique effectively eliminates the operation of reservoirs from the impact analysis in the SED.

Modeling New Melones Reservoir operations in this way does not allow Reclamation to comply with the terms of the 1988 Stipulation Agreement. As discussed under the *Water Rights and Diversions are Inadequately Described in the SED* Section of our comments, the 1988 Stipulation Agreement is the agreement which allows Reclamation to satisfy the rights of the senior water right holders (OID/SSJID) on the Stanislaus River. The Board's modeling to keep reservoir elevations relatively constant between the baseline and the alternatives results in a violation of the rights of these senior water right holders. In particular, total Stanislaus deliveries in the WSE model are less than 1988 Agreement amounts during the droughts in the preferred alternative.

Inaccurate description of existing water rights. The Board ignores the existing water rights priority law in describing the Stanislaus River diversion and storage relationships by describing senior water rights holders as "contractors" to Reclamation, implying they are supplied under Reclamation water rights. The Board does not disclose whether it is assuming a water rights change so that junior storage water rights can be exercised in priority to senior direct diversion rights. In fact, because the WSE model used for the alternatives lumps all Stanislaus deliveries together into one aggregate delivery, no distinction is made between junior and senior water rights, and it is impossible to discern how water rights might be affected by the proposed standard. The maximum delivery on the Stanislaus is 750 taf (Appendix F) or 755 taf (Appendix D) in the WSE model, which reflects the sum of OID/SSJID and CVP contractor maximum amounts. However, OID/SSJID rarely divert 600 TAF (CALSIM estimates those diversions as between 381 - 600 TAF). In addition, CVP contractors do not use their full contract supply. This oversimplification of water rights leads to a regionalization of the impacts when those impacts would be localized, and significant to the affected right holders and contractors. It also leads to an unrealistic pattern of annual deliveries, since the 755 taf maximum delivery will be too high in wetter years and drought deliveries will be too low since the 1988 Agreement is not complied with.

Application of a single-purpose reservoir rule-curve. The WSE model attempts to illustrate reservoir management principles of water conservation through the use of a user-defined rule curve between end-of-January reservoir storage and water diversion consumptive use. This rule curve is utilized to force a conclusion between a singular beneficial use (diversion-consumptive use) and to hold reservoir storage patterns to those modeled by CALSIM in the baseline. Use of such a rule curve ignores the role that inflow forecasts play in water supply allocations throughout the San Joaquin Basin, where most allocations are based on a combination of storage and inflow. Allocations in CALSIM are designed to

manage trade-offs between multiple beneficial uses in order to maximize the efficiency of water supplies through all years and especially through extended droughts (typically limited to the 1928-1934 drought period), and reservoirs are not operated to meet end-of-September volume goals. While according to exceedance plots the behavior of the WSE model may be similar to CalSim (Figures F.1-1 to F.1-3), this obscures the fact that the year to year deliveries would not always correlate closely in the alternatives, due to differences in allocation strategies. Trade-offs between deliveries in wet and dry years will affect the long-term average deliveries used in the impact analysis (for more on this see the section on Extreme Drought Planning below).

The following quote from the Board's SED acknowledges the lack of inflows in water supply allocations: "However, actual reservoir operations would likely include runoff forecasts, which are not reflected in the WSE modeling,that could increase the annual diversion allocations if the forecast runoff was high." (pp. 5-58) But while this might be true for an individual year, it implies that the WSE modeling could understate long-term average deliveries. This is unlikely, because even if high runoff was not used in determining current year deliveries, it will increase storage in subsequent years, which could increase deliveries at that time.

An inconsistent application of existing ESA requirements. "The NMFS BO flows on the Stanislaus River are included in the baseline. However, these flows are not included in the WSE modeling of the LSJR alternatives." "…. because the State Water Board's plan amendment would not directly result in any changes to the NMFS BO flow requirements on the Stanislaus River, actual reductions in flows below the NMFS BO flows would be unlikely as a result of the alternativesThe SED indicates that a conservative assessment of potential impacts on the Stanislaus River that captures a range of flow- related impacts was performed. Flows under the NMFS BO fall within this range. In addition, a sensitivity analysis showing the effects of the alternatives on flows with the NMFS BO in effect is presented in Appendix L, Sensitivity Analyses." (pp 5-58) If "actual reductions in flows below the NMFS BO flows would be unlikely as a result of the alternatives" it is unclear as to why the SED excludes the NMFS BO RPA flows from the alternatives descriptions. The use of the term "conservative assessment" is very confusing in this context, as in the analysis of impacts to agriculture and water service providers a conservative assessment would be to include the RPA flow requirements.

The SED fails to describe the interaction between the proposed flow objectives and the NMFS BiOP RPA flow and temperature requirements on the Stanislaus River. The CALSIM model does not estimate the flows needed to meet the NMFS BiOp RPA temperature requirements. (WQ-3, Figure 20-3) The SED also fails to consider how the proposed flow objectives interact with existing DFG, AFRP, and RPA requirements for flow and quality (whether it will result in additional or lower flow requirements due to changes in reservoir volumes). It is also unclear whether the SED assumes the current exception procedure for the Stanislaus River temperature RPA is still in place.

The SED baseline also assumes that the interim 60 day pulse flow NMFS RPA action IV.2.1 Phase I is in place and is met with unlimited releases from New Melones (i.e. no annual release cap). This was an interim standard that was only required for 2010-11.

Incorrect description of water operations. There are several incorrect statements on this topic, many relating to the New Melones Index (NMI):

1. “CALSIM calculates annual Stanislaus River diversions using the end-of-February storage plus actual March to September reservoir inflow." (pp. 5-57) "The annual water supplies, flows, and salinity control releases are allocated based on the NMI value each year." (pp. D-8) "The CALSIM model used the NMI to reduce the deliveries when the combination of New Melones Reservoir storage and projected runoff was reduced." (pp. D-19) These statements are incorrect. While SEWD-CSJWCD deliveries are based on the NMI, OID/SSJID deliveries are based on annual New Melones inflow as required under the 1988 Stipulation Agreement. There is also asmaller diversion on the Stanislaus that is not based on NMI (e.g. the 20 taf annual diversion at Ripon).

2. "The diversions and releases from the Tuolumne and Merced Rivers are estimated from the annual runoff." (pp. 5-57) This is not true. The primary deliveries on the Tuolumne use March storage +Apr-Jul inflows as their index. The primary deliveries on the Merced uses March storage + Apr-Sept inflows as their index. There are also other smaller diversions on both rivers that are not based on runoff or these indexes.

3. "However, CALSIM did not fully meet the NMFS BO in all years because the CALSIM model sometimes ‘ran out’ of allocated water in January and February and also reduced the pulse flows in March and in May of a few years." (pp. D-8) This needs clarification, as this description does not make sense in terms of how CALSIM allocates water to the RPA. The CALSIM model used here reduces the NMFS BO annual allocation to 98.9 taf or less when NMI is < 1400. This off-ramp is not in the App E schedule in the BO, but was added to some versions of CALSIM to reduce instances of New Melones going to dead pool. Clarification is needed as to the role and rationale for this assumption.

4. "Because the NMI is dependent on the end-of-January reservoir storage," (pp. D-16.) The NMI uses end of Feb storage.

5. “The Vernalis EC for baseline in April–August were also less than the EC objective in all years except for one year in August [11]." (pp. 5-93) Footnote 11 states “This was a CALSIM error where New Melones Reservoir storage was 0 TAF and Stanislaus River flow was 0 cfs." This is not a CALSIM error. If the EC objective was not met in this month, it is probably because the reservoir was at minimum pool and there was no more water to be released to improve water quality.

Reduced allocations to Stockton East Water District. Under Stockton East Water Dist. v. United States, 583 F.3d 1344 (Fed. Cir. 2009), Reclamation must make the full contract amount available (155 TAF) unless the water is unavailable due to hydrologic conditions. The baseline must include this as an assumption in order to fully assess impacts of alternatives. The CALSIM model also includes a sale of water from OID-SSJID to SEWD, which no longer occurs. This is another example of an incorrect modeling assumption in the baseline study.

Extreme drought planning. The hydrologic dataset utilized in the SED analysis is a modified hydrologic trace of historical conditions (1922-2003). This set of hydrologic information contains two very severe drought periods; the 1930’s drought and the 1990’s drought. Because drought planning principles will affect reservoir operations throughout the entire period of analysis, it is imperative that the SED clearly

articulate the drought planning assumptions in the baseline and the alternatives, and describe the impacts that occur during the drought planning horizon. Basin plans, in order to accurately depict and analyze impacts to reservoirs, should acknowledge a reasonable drought planning horizon, because stored water availability is most important during periods of extended droughts. Generally, in California, that drought planning horizon of context has been the 1930s drought. So if a drought of significantly worse severity occurs, water will not be available to fully meet all beneficial uses. The severity of the 1990s drought must be disclosed and contrasted with the 1930s drought, in order for the Board to properly assess the new objectives and the balancing of multiple beneficial uses.

Two examples of how drought management principles could affect the results of this analysis are described here. First, is that the average annual deliveries used in the impact analysis in the SED can vary depending on how deliveries are maintained in droughts, versus other years. This is because the operational principle of conserving storage in non-drought years so that it will be available during droughts has a tendency to reduce average annual deliveries. An operation that sacrifices deliveries in droughts will have higher average annual deliveries. The SED should analyze the potential for these effects, by analyzing patterns during different water year types. Below Normal Years, especially within drought sequences, can experience the widest range of impacts and it may be more critical to consider the balance of beneficial use needs in this year type.

Second, while under most analyses the 1990s drought is considered to be more severe than the 1930s drought in the San Joaquin Basin, changes in the structure of fish flow requirements could change this fact and also the relative impacts of drought on other beneficial uses. Specifying fish flow requirements based on percent of unimpaired inflow versus the New Melones Index has the potential to have this effect. Which drought is more severe for a given regulatory structure will affect reservoir operations throughout the period being analyzed. In conclusion, in order to properly assess impacts, the analysis in the SED needs to include explicit consideration of drought planning principles, such as which drought the system can operate through, and if it will ever be necessary to off-ramp either fish flow releases or deliveries during certain extreme drought situations. For more on these principles, see past comments of Interior, which more fully discuss the importance of the drought planning horizon and drought management principles.

C. Impacts Not Disclosed by the SED

Reclamation performed two CALSIM studies, a Baseline/No Project Alternative and the Preferred Alternative study using more realistic assumptions than those in the SED in order to identify impacts that were not disclosed by SED modeling. The following table compares the assumptions in Reclamation's studies with those in the Board's studies (primarily for Stanislaus operations):

Key Assumptions	SWRCB's Modeling			Reclamation's Modeling	
	Baseline	No Project-LSJR	Preferred LSJR Alternative	No Project – LSJR/Baseline	Preferred LSJR Alternative
Vernalis Spring Pulse Flow Target	VAMP according to SJRA	D-1641, Table 3	Release of 35% Unimpaired Inflows, Feb-June	VAMP-like met with Merced ID Agreement	Release of 35% Unimpaired Inflows, Feb-June
Stanislaus flow RPA	Yes, with drought relaxation	Yes, with drought relaxation	No	Yes	Yes
Vernalis 60-day pulse RPA	Yes	No	No	No	No
CVP Contractor Allocation	Max 90 taf	Lumped with other Stanislaus deliveries in WSE model	Lumped with other Stanislaus deliveries in WSE model	Max 155 taf	Max 155 taf
OID/SSJID Allocation	1988 Stipulation Agreement, except 400 taf when NMI < 940 taf	Lumped with other Stanislaus deliveries in WSE model	Lumped with other Stanislaus deliveries in WSE model	1988 Stipulation Agreement	1988 Stipulation Agreement
DO Check	Yes	No	No	Yes	Yes

Reclamation's modeling identified additional impacts from implementing the proposed action that require analysis in the SED. Additional impacts include:

- Impacts to cold water pool, temperature, dissolved oxygen (Chapter 7) due to reduced annual storage and carryover storage in reservoirs, which are not specifically modeled in CALSIM but require additional tools ("the end-of-September storage is generally an indicator of potential effects to stream temperature" at pp. F.1-27);

- Impacts to existing Bay-Delta objectives and water supply (Chapter 5) due to reduced annual storage and carryover storage in reservoirs, which would inform the Board's balancing responsibility;
- Impacts to service providers and agriculture (Chapters 11 and 13) due to reduced water supply and dilution flows due to reduced annual storage and carryover storage in reservoirs, which would inform the Board's balancing responsibility; and
- Impacts to hydropower generation (Chapter 14, Appendix J) due to reduced year round reservoir elevations, which would inform the Board's balancing responsibility.

The results of Reclamation's modeling simulations illustrate in more detail the major impacts to water supply, reservoir operations, cold water storage, power supply and recreation, as described below and shown on the accompanying graphs and tables:

- WATER SUPPLY: Water deliveries to Central Valley Project (CVP) contractors during drought periods are significantly impacted; average deliveries are reduced from 36.8 TAF to 23.9 TAF under baseline and with proposed standard conditions, respectively. This means that SEWD/CSJWCD would only receive 15% of their contracted water supply during a drought period. It is unreasonable to assume that CVP contractors would not augment their water supply with increased groundwater pumping under these circumstances. Given the critical overdraft of that groundwater basin, this analysis serve to illustrate the kind of localized impacts that would occur as a result of implementing the proposed standard.

  It is for this reason that the Board must clearly identify whose rights they intend to modify now, rather than simply forgo any meaningful analysis of the impacts until after they have adopted the standards and foreclosed the opportunity to look at alternatives that would lessen the impacts.

All data in taf	All Deliveries (annual avg)	OID-SSJID Deliveries (annual avg)	Total OID-SSJID shortages in droughts (when hitting minimum pool)	CVP Contractor Allocations (annual avg)	Total CVP Contractor shortages in droughts (when below power pool)
BASELINE	649	514	414	115	42
SWRCB 35% RPA	625	505	1133	100	96

- RESERVOIR OPERATIONS: Operations of the New Melones Reservoir are unsustainable under current water rights, permit conditions, and other requirements, and implementation of the proposed alternative will worsen this situation. This is shown by the data in the previous and

following tables. The table below shows that in CalSim New Melones is at minimum pool in 18 months during the baseline (during both the 1930s and 1990s droughts), a condition that worsens to 40 months in the preferred alternative. The table above shows the deliveries to OID-SSJID and CVP contractors that are impossible to make during these periods when the reservoir is at minimum pool. Shortages to OID-SSJID in particular increase drastically (from 414 taf total to 1.133 maf total). When the reservoir is at dead pool in the model, required releases for other permit conditions such as salinity releases, the RPA, and the 35% standard will also be missed (not shown). The bottom line is that this modeling shows that the aggregate demands on New Melones are greater than available inflow even under baseline conditions, and the preferred alternative would worsen this situation. These facts need to be incorporated into the analysis in the SED to properly evaluate the impacts of the preferred alternative.

	Avg New Melones EOSept storage (taf)	Months at minimum pool (80 taf)	Months below minimum power pool (300 taf)
BASELINE	1233	18	54
SWRCB 35% RPA	1016	40	124

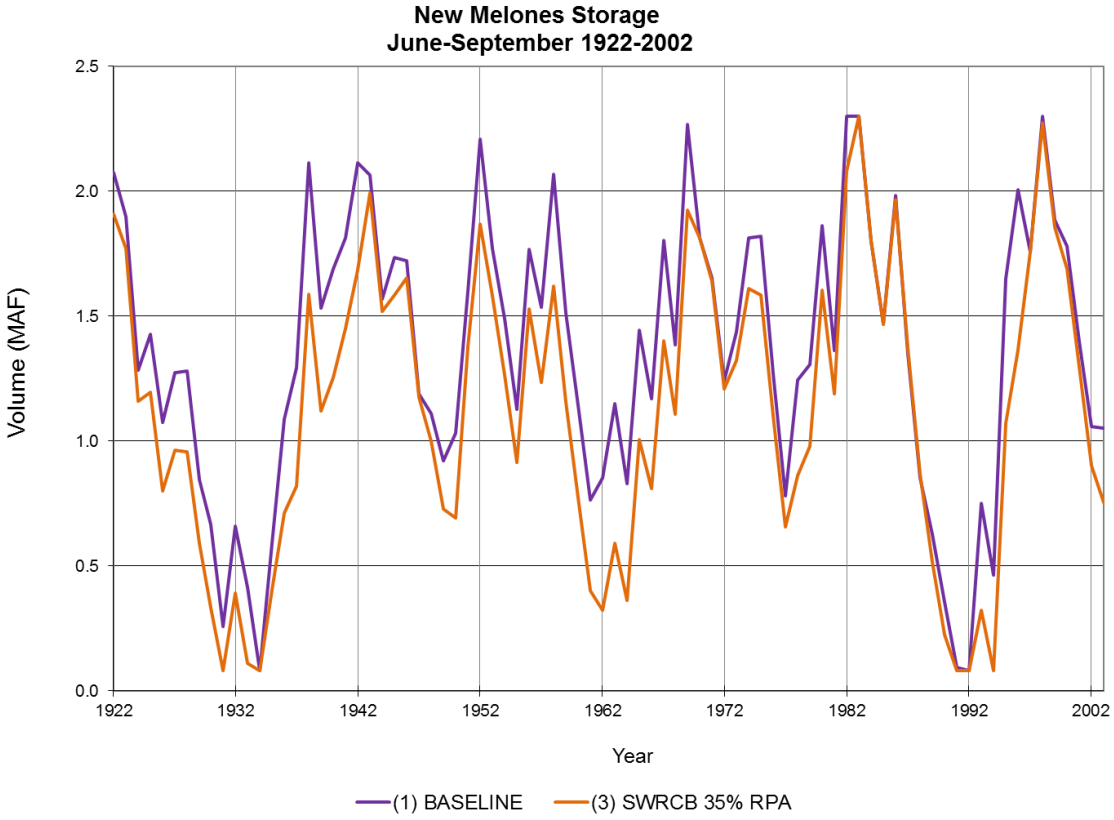
- POWER SUPPLY: Neither Chapter 14 nor Appendix J include an evaluation of the potential impacts of the alternatives, including the preferred alternative, on California's resource adequacy. Following the Western Electricity Crisis of 2001, California and the entities responsible for power system reliability, i.e. the North American Electric Reliability Corporation (NERC) and the Western Electricity Coordinating Council (WECC), became concerned that the deregulated electricity markets do not provide timely incentives for the construction of sufficient generation resources to reliably meet electric load. As indicated on NERC's website, "NERC defines the reliability of the interconnected bulk power system in terms of two basic and functional aspects:
    - Adequacy — The ability of the bulk power system to supply the aggregate electrical demand and energy requirements of the customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements.
    - Security — The ability of the bulk power system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements from credible contingencies."

  Both NERC and WECC assess the resource adequacy of the bulk power system and Western Interconnection, respectively, on an annual basis.

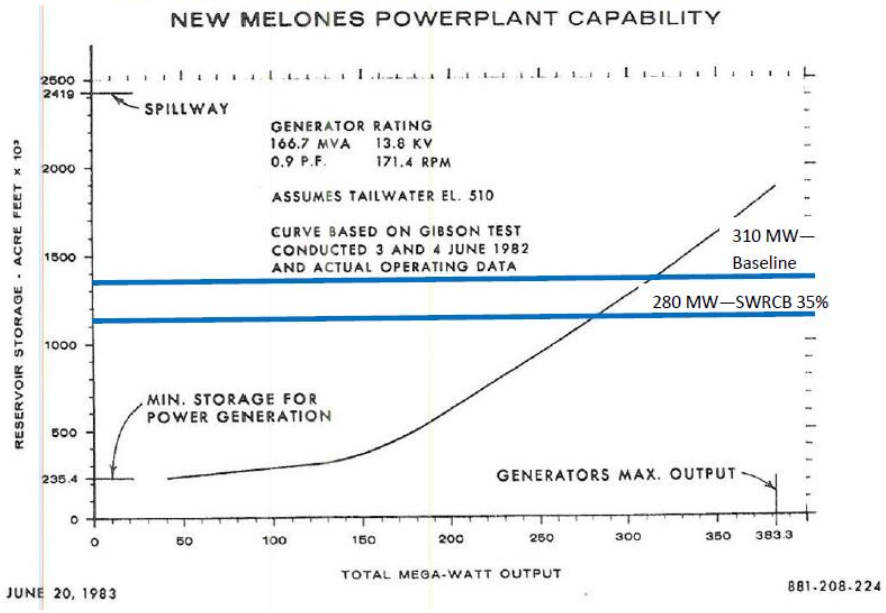
  With the passage of Assembly Bill (AB) 57, which was signed by Governor Davis on September 24, 2002, California instituted a resource adequacy mandate, which has progressively been applied to all load serving entities (LSEs) in the state. That mandate calls for 115% to 117% of generation in excess of forecasted peak load to be in place a year before each peak load period, which typically occurs in July or August.

  The preferred alternative has a potentially significant impact on resource adequacy. As shown on the following graph, New Melones storage is significantly impacted in all years under the

preferred alternative. The other major rim reservoirs would likely be impacted in a similar manner. This impact not only reduces summertime generation, but also summertime capacity, i.e. the ability to generate at a certain megawatt (MW) output as shown on the second graph below. On average summer capacity would be reduced from 310 MW to 280 MW at New Melones power plant. As previously stated, the Board's assumption that groundwater pumping would not increase is likely incorrect. So, not only would generation capacity decrease, but load would increase resulting in a potentially significant impact to resource adequacy.

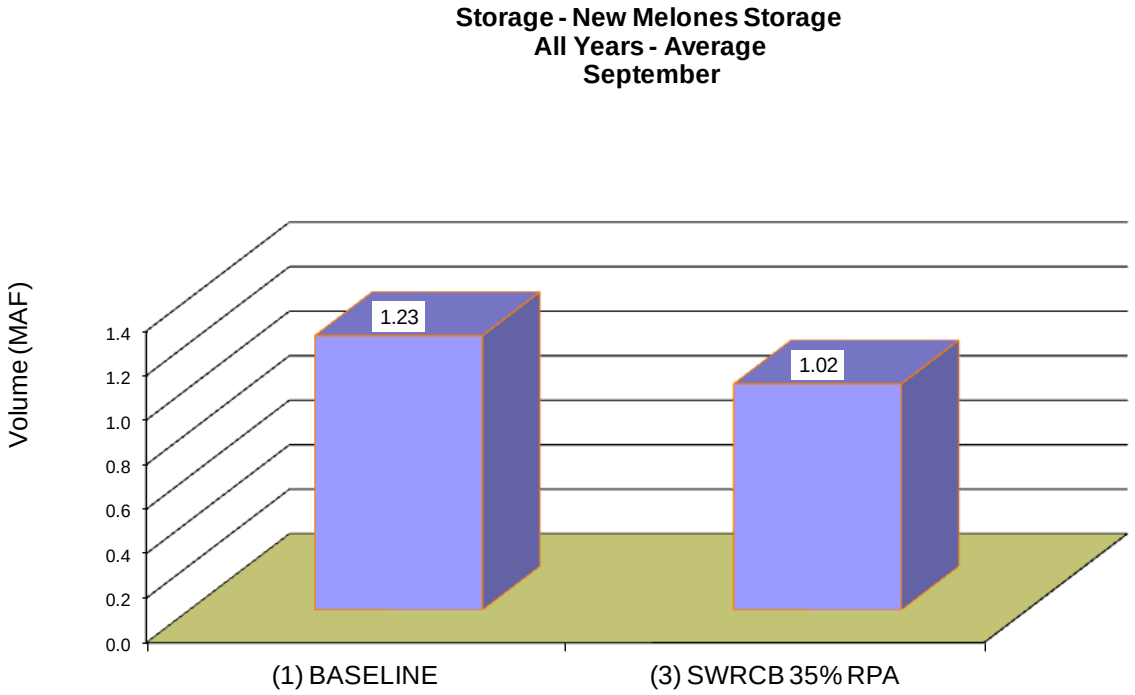


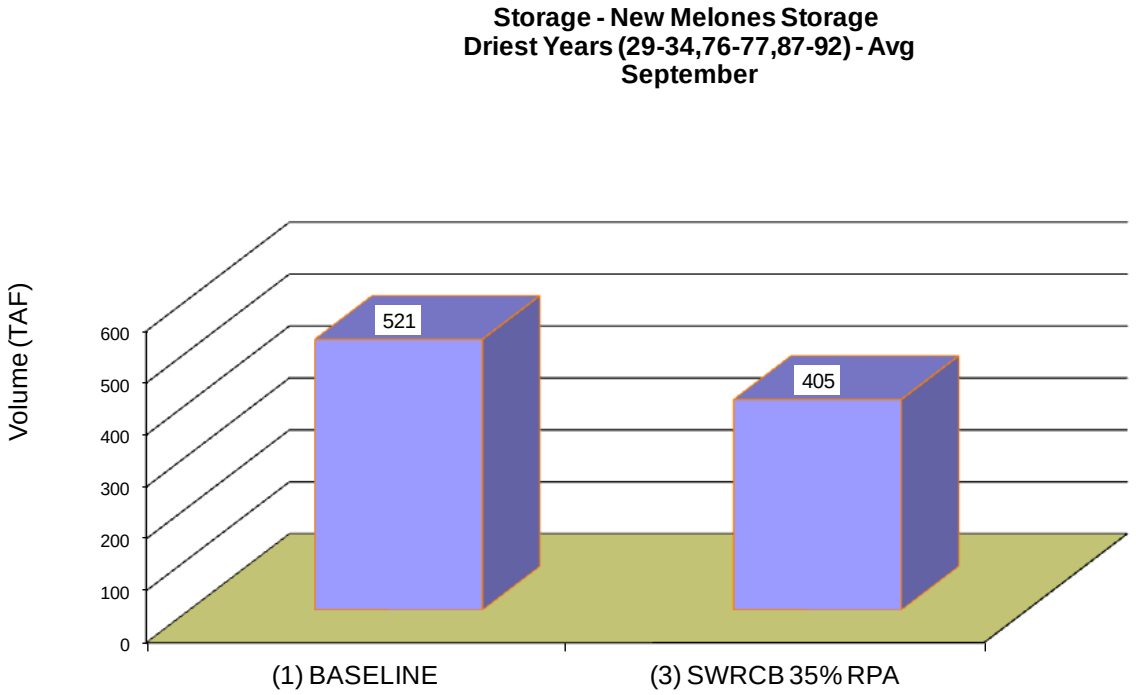
Comparison of Average July New Melones Power Plant Capacity for Baseline and Preferred Alternative



Compared to baseline operations, storage averaged over all months and all years is reduced by 16%. Because the proposed standard tends to shift releases to the spring months, storage in July and August, typically the two months of highest power demand in California, is reduced 17%. From the LTGEN model, which was run using CalSim results, New Melones power generation is reduced 10 gigawatthours (gwh) on average over these two months at the time of year power generation is needed most. During the 1930s and 1990s droughts, generation is reduced on average by 18 gwh.

COLD WATER STORAGE: The impact to the September cold water pool, which is important for fall pulse flow operations is also potentially significant. The following two graphs show the impact to September storage averaged over all years and during droughts. The first graph shows a 17% reduction in storage averaged over all years. As shown in the second graph, September end-of-month storage is reduced by 22% under the proposed standard as compared to baseline operations. This exacerbates Reclamation's ability to manage New Melones to satisfy fishery temperature targets in the fall.


Storage - New Melones Storage
All Years - Average
September
Volume (MAF)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1.23
1.02
(1) BASELINE
(3) SWRCB 35% RPA



- RECREATION: The preferred alternative results in potentially significant impacts to boating and aesthetics at New Melones Reservoir. At elevation 975 ft. (1.25 MAF storage), the Angels Creek Boat Ramp becomes unusable. Below elevation 900 ft. (0.72 MAF storage), most of the boat ramps become unusable.

D. Comments on the South Delta Water Quality Objectives

There are several problems with the SED as it describes the South Delta salinity objectives. First, the objective of the reevaluation of salinity objectives is not "elevated salinity in the Delta" (pp. 3-25), but to "review water quality objectives for the protection of southern delta agricultural beneficial uses" (December 2012 SJR Flow and Southern Delta Salinity Technical Report page 1-1) due to updated technical information (Salt Tolerance of Crops in the Southern Sacramento-San Joaquin Delta). In the past, the Board has carefully followed Clean Water Act requirements to develop and review objectives in light of science related to the beneficial use being protected. In this case, the Board states it is addressing "elevated salinity", but really it is making new findings that crops in the southern Delta are not as impacted by salt as it previously thought. The second problem in the SED relating to the South Delta salinity objectives is the Board's pre-determinations made with respect to allocation of responsibility for their implementation. The Board's 1995 Environmental Report, Appendix 1 to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary summarizes the Board's past findings:

> The SWRCB determined that, because the Delta SWP and CVP facilities had no apparent direct impact on water quality conditions in the southern Delta, requiring the projects to meet southern Delta agricultural objectives could not be justified. Water Right Decision 1422 (SWRCB 1973), adopted for the New Melones Project in 1973, already required releases of water from New Melones Reservoir for the purpose of maintaining a mean monthly total dissolved solids concentration no greater than 500 parts per million (ppm) in the San Joaquin River at Vernalis. (1995 Environmental Report at pp. III-1)

> The underlying principle of the 1978 Delta Plan and D-1485 standards is that water quality in the Delta should be at least as good as those levels which would have been available had the State and federal water projects not been constructed (i.e., without project conditions), as limited by the constitutional mandate of reasonable use. The standards include adjustments in the levels of protection to reflect changes in hydrologic conditions experienced under different water year types. (pp. III-1)

WRO 95-06, which approved a Reclamation/DWR plan to partially implement the 1995 Bay-Delta Plan, stated the reasons why more flow at Vernalis is an inappropriate solution to south Delta salinity:

> Objectives to protect the beneficial uses in the southern Delta previously have been implemented largely through releases of fresh water from New Melones Reservoir. The fresh water releases help compensate for diversions of fresh water that have left mainly salty return flows in the San Joaquin River. While fresh water releases from New Melones Reservoir should continue, they do not prevent salts from entering the river. Return flows and drainage from agricultural operations add salts to the San Joaquin River. Also, there has not been enough fresh water available in every year to meet the water quality objectives. Therefore, future actions will be needed to reduce the amounts of salts in the San Joaquin River during periods when higher levels of salt would violate the objectives. (SWRCB 3b, Appendix I, p. IX-2.) Such actions already have been initiated. (WRO 95-06 at pp. 41-42).

This is also indicative of the future of salinity control in the San Joaquin valley, which will be focused on recycling, reducing drainage to the river, and treatment as opposed to increases in dilution by fresh water sources such as from water stored in New Melones.

Reclamation's petition to change the salinity standard at Vernalis in 1995 was also based on the Board's establishment of a science-based salinity objective to protect a beneficial use. Now the Board has reevaluated this science, which concludes that the same protection can be provided with a higher level of salinity. But the SED does not examine a change in the Vernalis standard, in spite of the new science supporting the change (even as an alternative). This assumption suggests that the Board now believes that Reclamation is responsibile for more than the salt load in the San Joaquin River, which is counter to the existing record. The SED offers no justification for this assumption, other than that the assumption clearly limits the responsibility of the Board in its impact and antidegradation analysis. The SED offers us no view of south Delta salinity with a different Vernalis objective, or an alternative with equal standards (with some allocation of responsibility down the road), and so no ability to determine whether the Board is providing reasonable protection or wasting water through a much stricter standard on the lower San Joaquin River. In reality, because the standard is held constant for Vernalis, there are no meaningful alterntives provided in the SED. The Board simply changes the interior standard, then compares that standard to the current condition without any analysis of the need for adjusting the standard at Vernalis to match the Beneficial use. While this approach lacks adequate alternatives analysis pursuant to CEQA, it also drastically changes the Boards own pilicies with regards to the beneficial use of water for providing dilution flows in excess of that required to meet the standard.The SED does not provide any additional information that would support the apparent change in the Board's position on the role of exports or Vernalis salinity in the implementation of south Delta objectives. The SED does not present any additional information on factors previously identified as contributing to south Delta salinity, but not addressed through regulation ("Water quality in the southern Delta downstream of Vernalis is influenced by San Joaquin River inflow; tidal action; diversions of water by the SWP, CVP, and local water users; agricultural return flows; and channel capacity" in D-1641 at pp. 86-87). Reclamation is unaware of any conditions that would prevent the Board from working with the Central Valley Regional Water Quality Control Board to explore and address these factors.

Until Water Rights Decision 1641, project responsibility for the southern Delta salinity objectives were limited to maintaining San Joaquin River water quality. In D-1641, the Board assigned responsibility equivalent (but no more) to the project's Delta export effects, based on the finding that "[d]iversions in the Delta can cause hydrodynamic changes that affect water quality. During periods of high exports and peak irrigation, higher quality water is drawn into the southern Delta from the Delta cross-channel, the Mokelumne River, and Georgiana Slough. These waters mix with and improve the quality of San Joaquin flow. (DWR 37, p. 8.) However, export pumping by the SWP and the CVP and in-Delta diversions in the southern Delta also cause null zones, areas with little or no circulation. These zones have little assimilative capacity for locally discharged salts. The lack of circulation prevents better quality water that is otherwise available from the main channels from freshening the water in these channels. (R.T. pp. 3816-3818; DWR 37, p. 9; SDWA 48; SDWA 34A; SDWA 27; SDWA39; SDWA 51.)" (Revised D-1641 at pp. 86-87) In its environmental analysis, the Board limited its review to permanent or temporary barriers, primarily because of an expectation to resolve the issue through barriers. The Board did not analyze the impacts of implementing the southern Delta objectives through dilution flows, because, as it found in D-1641"[t]he benefits of the barriers could be achieved by other means, such as increased flows

through the southern Delta and export restrictions, but these measures could result in an unreasonable use of water and a significant reduction in water supplies south and west of the Delta." (Revised D-1641 at pp. 10). For all practical purposes, this has taken implementing the interior south Delta salinity objectives with dilution flow off the table.

The 1999 Final Environmental Impact Report for the Bay-Delta Plan implementation further clarifies the limitations of the evaluated alternatives in this way:

> Therefore, the program of implementation for this objective will rely, in part, on construction and operation of the barriers proposed in the ISDP. This EIR will document the effect of barrier operation on flows in the southern Delta, salinity, and minimum water levels. Environmental effects of barrier construction and operation are analyzed in the DWR's draft EIR for the ISDP and are summarized in this report. Because the program of implementation for these objectives depends on construction of a project by another agency that is independently complying with CEQA, the analysis in this EIR is programmatic. (emphasis added, pp. II-39)
>
> a. Southern Delta Salinity Alternative 1 (No Project). The SWP and the CVP are responsible for meeting D-1485 flow objectives. Existing temporary barriers in the southern Delta are installed and operated to improve salinity conditions in the south Delta. No further action is taken to implement the south Delta salinity objectives.
>
> b. Southern Delta Salinity Alternative 2. The Bay/Delta Plan flow objectives are met by implementation of one of the flow objective alternatives. Existing temporary barriers in the southern Delta are installed and operated by the SWP and the CVP to improve salinity conditions in the southern Delta. No further action is taken to implement the southern Delta salinity objectives.
>
> c. Southern Delta Salinity Alternative 3. The Bay/Delta Plan flow objectives are met by implementation of one of the flow objective alternatives. The barriers proposed in the ISDP are constructed and operated by the SWP and the CVP to achieve the southern Delta salinity objectives to the extent feasible. (emphasis added ,pp. II-40)

For these reasons, the Board assigned some, but not all, of responsibility to the Projects:

> The construction of permanent barriers alone is not expected to result in attainment of the water quality objectives. (R.T. pp. 3672, 3710, 3787-3788; DWR 37, p. 15; SWRCB 1e, pp. [IX 30]-[IX-41].) The objectives can be met consistently only by providing more dilution or by treatment. (R.T. p. 3737.) The modeling studies indicate that even when the barriers do not result in attainment of the standards, water quality generally improves as a result of the permanent barriers. The exception is at Brandt Bridge where water quality may worsen slightly at times due to barrier operation. (R.T. p. 3677; DWR 37, p. 18; SWRCB 1e, Figures [IX-19]-[IX-26].) Barriers may result in slightly worse water quality in the mainstem of the San Joaquin River in the Delta, but the more saline water is quickly diluted. (DWR 37.) Modeling shows that construction and operation of the temporary barriers should achieve water quality of 1.0 mmhos/cm at the interior stations under most hydrologic conditions.
>
> The DWR and the USBR are partially responsible for salinity problems in the southern Delta because of hydrologic changes that are caused by export pumping. Therefore, this order amends the export permits of the DWR and of the USBR to require the projects to take actions that will achieve the benefits of the permanent barriers in the southern Delta to help meet the 1995 Bay-Delta Plan's interior Delta salinity objectives by April 1, 2005. Until then, the DWR and the USBR will be required to meet a salinity requirement of 1.0 mmhos/cm. If, after actions are taken to achieve the

> benefits of barriers, it is determined that it is not feasible to fully implement the objectives, the SWRCB will consider revising the interior Delta salinity objectives when it reviews the 1995 Bay-Delta Plan. The USBR and the DWR will be responsible to take any actions required by CEQA, NEPA, and the federal and State ESA prior to constructing the barriers." (emphasis added, Revised D-1641 at pp. 87-88)

This passage also illustrates another purpose of the Board's review, which is that the permanent barriers appear to not be implementable, thus warranting a rigorous review of the objectives and plan of implementation. Embedded in the history described throughout water rights decisions and past Bay-Delta Plans is the lack of enough unimpaired flow to meet the existing water rights in the San Joaquin Basin and Delta, which is the primary cause of current exceedances of south Delta salinity standards. Decision 1641 is fairly explicit in its findings that the south Delta salinity objectives could not be met all the time due to natural hydrology and senior and riparian rights in the San Joaquin Basin (and in encouraging parties to seek stored water to supplement existing supplies):

> 6.3.4.2.4 Protection of Salinity in the Southern Delta. Notwithstanding the unavailability of water to satisfy existing water rights in the southern Delta during certain periods, the SWRCB has determined that protection of agriculture in the southern Delta is in the public interest. Water quality objectives have been set for this purpose, and the USBR is responsible for meeting the Vernalis salinity objective. The months in which the southern Delta water users' needs exceed their rights to water under riparian claims are the same months in which water quality violations tend to occur. Consequently, the southern Delta agricultural uses should not be deprived of water of useable quality as a result of this decision. However, the SWRCB urges the SDWA to seek water supply contracts to fill its water supply needs during water shortages. These shortages occur relatively frequently because of natural changes in the water supply. (pp 35-36)

The 1999 Environmental Impact Report analysis of alternative implementations of the 1995 Bay-Delta Plan determined that an alternative assigning all responsibility to the Projects would result in exceedances of the south Delta objectives. Recent salinity conditions at these locations are similar to these modeled estimates.

Figure IX-23
Percent Probability of Exceedance
of Plan Salinity Objectives at Brandt Bridge on SJR
For April - August

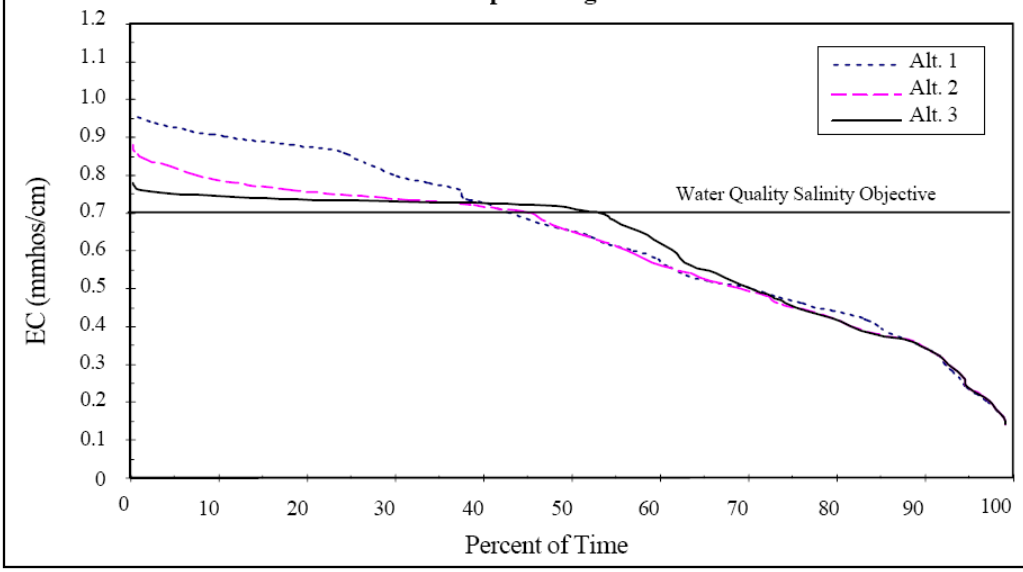
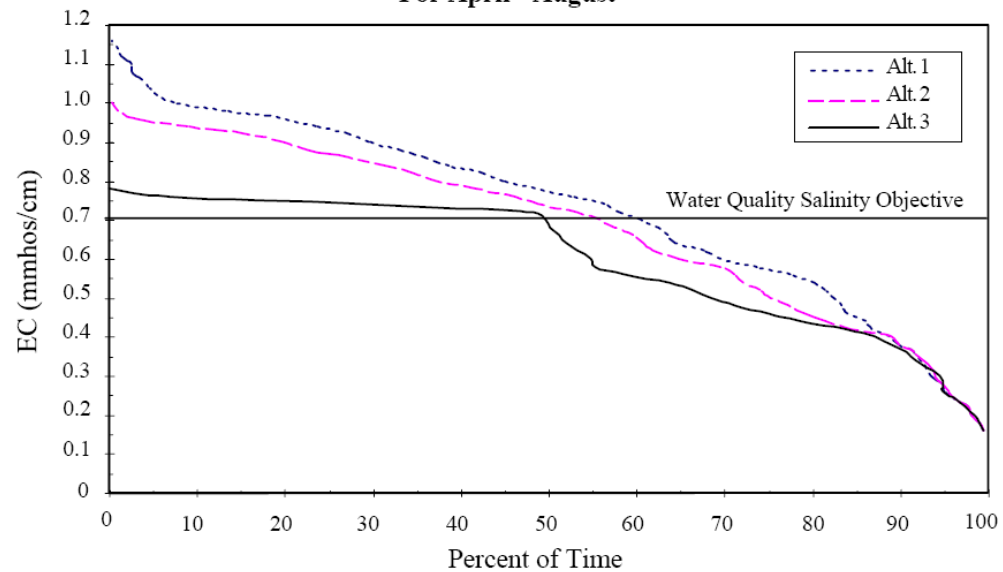


Figure IX-25
Percent Probability of Exceedance
of Plan Salinity Objectives at Old River at Tracy Road Bridge
For April - August



For these reasons, Reclamation and DWR's permits are currently conditioned in a way that recognizes the limitation of their responsibility ("If Permittee exceeds the objectives at stations C-6, C-8, or P-12, Permittee shall prepare a report for the Executive Director. The Executive Director will evaluate the report and make a recommendation to the SWRCB as to whether enforcement action is appropriate or the noncompliance is the result of actions beyond the control of the Permittee." Revised D-1641, pp. 159-

163) To date the reports have been submitted, and the Executive Director has yet to determine that noncompliances is the result of actions within the control of the Permittee. DWR submitted a study demonstrating the effects of discharges and diversions in areas of low circulation, which has the most impact to the Old River at Tracy Road Bridge and is the reason projects's potential actions have limited effect under certain hydrologic conditions. Given the substantial documentation on exceedances that are beyond the control of project, it is unclear why the Board would now assume that Reclamation would make additional releases at New Melones to meet south Delta salinity objectives. Instead, the Board should assume the existent operations would continue under the No Project alternative, and occasional exceedances of a 0.7/1.0 objective would continue to occur.

The third problem with the SED is that there are no alternatives presented or analyzed, because the SED holds the Vernalis location to the same objective and assumes no changes to any activity downstream. The Board should evaluate an alternative that applies the same objective to Vernalis and the South Delta in order to compare water costs and effectiveness with the baseline, as well as to inform balancing considerations and reasonable protection. The Board should also revisit the alternatives it previously rejected, and consider alternatives that relocate the monitoring stations outside of drainage mixing zones or that relocate drains or intakes.

The fourth problem is that the SED explores only one venue of implementation: dilution flow. The SED underestimates water costs by assuming perfect foresight in its analysis of water costs of a south Delta objective. If the Board intends to apply a Vernalis surrogate for the south Delta objectives (which the SED approach implies), the water costs can be quite significant, as estimated by Reclamation under requirement of the Board (and referenced in Appendix F.2). The SED seeks to reduce these costs by assuming a relationship that cannot be practically applied in real time (for example, it does not account for the lag time between a Stanislaus River release and the objective location, because monthly averages are used as the basis of the correlation). In the experience of Reclamation with the various salinity objectives in its water rights, practical surrogates and buffers are necessary elements in ensuring regulatory compliance, especially considering that a violation at the end of the month would result in 30-days of violation under the current objective. CALSIM employs a buffer to more accurately represent the real cost of salinity management.

There is also a fundamental legal issue with what the Board is proposing. By setting forth a specific water right action in a basin plan's plan of implementation, a legislative document, the Board is pre-judging and determining a future quasi-judicial action. This is the admonition of United States v. State Water Resources Control Bd., 182 Cal. App. 3d 82 (Cal. App. 1st Dist. 1986) ("the Racanelli decision"), that the Board should not collapse its legislative and quasi-judicial procedures in setting and implementing water quality objectives. Here, the statutory and due process requirements for adopting a legislative document do not meet the statutory and due process requirements for adopting a water right action. Reclamation, therefore, vigorously objects and opposes any attempt by the Board to regulate CVP water rights through a basin plan.

As the court made clear in State Water Resources Control Bd. Cases, 136 Cal. App. 4th 674 (Cal. App. 3d Dist. 2006) ("the Robie decision"), the Board must implement its plan. Therefore an implementation plan which pre-determines specific future water right actions is an unlawful trap for water right holders, because the Board could not take any action inconsistent with the plan. However, we can think of no

reasonable rationale which can be used to hold Reclamation to a stricter objective in its water rights than is called for under the basin plan. This is especially true given the Board's finding that the agricultural beneficial uses are sufficiently protected by the less restrictive objective, and has not shown that such implementation plan would not result in an unreasonable use of water by imposing substantially increased water costs and dilution demands on New Melones. Instead, Reclamation is owed an opportunity for a quasi-judicial hearing on the matter of its factual responsibility for degraded salinity in the southern Delta before the Board can lawfully make any determination on whether, or how much, responsibility will be assigned to the CVP. In addition, Reclamation is owed an opportunity for a quasi-judicial hearing on the matter of appropriate mitigation, if any, and whether any proposed mitigation is commensurate with its factual responsibility. This is also the case with respect to any calls in the proposed basin plan amendment for Reclamation to perform studies on this issue.

E. Conclusions

In summary, Reclamation requests the Board to consider the following main points as it proceeds to develop new San Joaquin River flow and southern Delta Salinity standards:

- The senior water right holders (OID-SSJID) have first rights to the majority of the inflow in most years on the Stanislaus River. Reclamation as the junior storage right holder is required to divert less to storage to satisfy senior water rights, but Reclamation is not required to deplete previously stored waters before the natural flow diversions of senior water rights are decreased. Any flow standard for the Stanislaus River needs to recognize these water rights.
- The flawed modeling assumptions and the insufficient water rights analyses serve to mask especially the localized impacts to water supply, power, cold water storage and recreation. The Board does not have sufficient information to balance beneficial uses and should consider revising their analyses and developing implementation alternatives to fully inform their deliberations on balancing beneficial uses in the development of the San Joaquin River flow objectives.
- A major flaw related to the Board's proposed Southern Delta Salinity objective is that the Board makes a pre-determination with respect to allocation of responsibility in their proposed implementation plan. By setting forth a specific water right action in a basin plan's plan of implementation, a legislative document, the Board is pre-judging and determining a future quasi-judicial action. This denies Reclamation due process. Reclamation, therefore, vigorously objects and opposes any attempt by the Board to regulate CVP water rights through a basin plan.

II. FWS COMMENTS

A. Key Points

- The narrative objective in the Substitute Environmental Document (SED) of supporting and maintaining natural production of viable native fish populations is not specific or measurable and so it is difficult to determine whether the SED has fully evaluated the effects of the alternatives on fish populations.
- Similarly, the SED does not provide specific, measurable objectives for other goals and beneficial uses, such as reservoir storage or habitat restoration. In the absence of these additional objectives and subsequent analysis of the effects of alternatives on the objectives, it is impossible to evaluate the trade-offs between competing uses or design an informative adaptive management plan.
- The Service has recommended the Board examine an alternative that targets flows necessary for AFRP doubling. This alternative was not carried forward. It is unclear why Board staff chose not to analyze the Service's proposed alternative for effects on fish and other objectives.
- In order to be consistent with the Board's approach for use of unimpaired flow, the Service recommends that a modification of the Service alternative be analyzed that would express the AFRP doubling goal as a percent of unimpaired flow from each tributary, paired with a protective baseflow during low-flow periods and floodplain inundation flows during juvenile rearing periods.
- The analysis in the SED is not sufficient to determine how 35% of unimpaired flow, along with other actions, will achieve the narrative objective for fish. Trade-offs between flow, habitat restoration, and other actions should be analyzed, and quantitative targets for other actions (e.g., acres of additional floodplain habitat by tributary) should be developed.
- It is not clear from the analysis in the SED how flow standards in the San Joaquin tributaries (Stanislaus, Tuolumne, and Merced rivers) would interact with lower San Joaquin (Vernalis) flows and Delta inflow and outflow standards set during Phase II. The analysis should evaluate the effects of protecting the flows at the mouth of each tributary, at Vernalis, through the Delta, and to the ocean.
- The lack of an explicit adaptive management framework calls into question the SED's analysis regarding the relationships between flow and ecological response. It is unclear from the document how such analyses would be conducted in the future and how the outcomes of those would be incorporated into decision making, and improve management decisions to benefit fish populations. This framework should be added to the SED.
- The Service recommends that the Board consider a broader range of flow in implementing adaptive management to gain information useful to decision making. It is likely that the proposed range of 25% to 45% of unimpaired flow is not broad enough to show a detectable response in naturally fluctuating fish populations. The Board's 2010 staff report states that 60% of unimpaired flow is necessary for healthy fish populations. While the Service recognizes the 2010 report was looking at flow for fish and wildlife needs only, it is a valuable benchmark for analysis. It is likely that an adaptive management range that encompassed 60% of unimpaired flow would elucidate a clear relationship between percent unimpaired flow and fish population

response. No analysis is included in the SED to support the adaptive management range of 25% to 45% or to exclude a broader range.

- The Service will participate on the Coordinated Operations Group (COG) and the Implementation Workgroup (IW) established by the Board with the expectation that those groups will work to improve flows and salmonid habitat to achieve the narrative fish objective in the San Joaquin River and its tributaries (consistent with the AFRP Final Restoration Plan), and to successfully implement the adaptive management process.

B. Narrative objective

The stated purpose of the 2006 Bay-Delta Plan is to designate beneficial uses of water, establish water quality objectives for reasonable protection of those beneficial uses, and outline a program of implementation for achieving the water quality objectives. The purpose for the plan amendments is (1) to establish flow objectives during the February-June period and a program of implementation for the reasonable protection of fish and wildlife beneficial uses in the three eastside, salmon bearing tributaries (the Stanislaus, Tuolumne, and Merced Rivers) and the LSJR and (2) to establish southern Delta water quality objectives for the reasonable protection of southern Delta agricultural beneficial uses and a program of implementation to achieve the objectives.

The stated purpose of this Substitute Environmental Document (SED) is to document the State Water Resources Control Board's (Board) analysis of the need for, and effects of, potential changes to the 2006 Bay-Delta Plan to establish new lower San Joaquin River (LSJR) flow and south delta water quality (SDWQ) objectives and a program of implementation for those objectives. In particular, the goals stated in the SED related to the LSJR flow objectives and associated program of implementation include:

- To provide flow conditions in the LSJR and its three eastside tributaries and take other reasonably controllable measures sufficient to support and maintain the natural production of viable native fish populations migrating through the Delta, including flows that mimic the natural hydrographic conditions to which native fish species are adapted.
- To consider relevant factors in establishing the objectives, such as factors identified in Water Code Section 13241, those contained in other applicable laws (e.g., the past, present, and probable future beneficial uses of water), and economic factors.
- To provide for adaptive management of flows in order to respond to evolving scientific understanding and changing environmental conditions while minimizing water supply costs.
- To provide for development and implementation of an appropriate monitoring and evaluation program to inform adaptive management of LSJR flows and future changes to the Bay-Delta Plan.
- To provide for and encourage coordination and integration of existing and future regulatory processes related to LSJR flows.

Based on the above, the Service understands that the purpose of the SED analysis for LSJR flows is to explore alternatives that would support natural production of viable native fish populations. It is difficult

to ascertain if the analysis is sufficient for that stated purpose without more specificity of what is meant by "viable". Additional specificity should be added in the form of explicit, measurable objectives.

Although we support the objective of natural production of viable populations as stated in the SED, we are concerned that this new objective does not provide a measurable, quantitative outcome for what is considered "viable", and thus is somewhat subjective and open to interpretation. It is difficult to assess whether the analysis in the SED is accurately and fully presenting the effects of the alternatives without a specific and quantitative narrative objective. More specificity in the narrative objective would help to frame the subsequent analysis and understand trade-offs between fish and other beneficial uses.

One example of a quantitative fish objective is the doubling goal described in the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary: "Water quality conditions shall be maintained, together with other measures in the watershed, sufficient to achieve a doubling of natural production of chinook salmon from the average production of 1967-1991, consistent with the provisions of State and federal law.". The doubling goal is consistent with Interior's doubling goal pursuant to the Central Valley Project Improvement Act and with the goals and objectives of various plans and programs that are being implemented through the State and Federal resource agencies (i.e. Final Restoration Plan for the Anadromous Fish Restoration Program, CALFED ERP Draft Stage 1 Implementation Plan, and the CALFED Multi-Species Conservation Strategy). These programs are documenting and tracking progress towards achieving the doubling goal narrative objective.

In the absence of these additional objectives and subsequent analysis of the effects of alternatives on the objectives, it is impossible to evaluate how the various alternatives perform in terms of trade-offs between competing uses.

C. Alternatives Description (Chapter 3)

Interior has presented flows calculated by AFRP that are necessary to achieve Interior's CVPIA doubling goal ,shown inTable 1 below, in previous submissions to the Board. Although the SED states that the AFRP doubling flows are generally encompassed by the alternatives that were analyzed, there are some important differences between the Service's suggested alternative, as expressed in unimpaired flow, and those analyzed in the SED. It is important that the Board's SED evaluate the Service's alternative in order to encompass the full range of strategies that can help achieve the Board's stated objective of natural production of viable native fish populations.

On page 3-19 the Board states: "Comparison of the exceedance plots for flow at Vernalis in Figure 3-6 indicates that LSJR Alternatives 2, 3 and 4 encompass the USFWS/USBR salmon population doubling flow recommendations for above-normal, below-normal, and dry water year types." However, Figure 3-6 clearly shows that Alternative 2 (20%) fails to achieve the doubling goals except in the wettest 18% of years. Assessing the number of data points which fall at or above the doubling flow recommendation finds that Alternative 2 meets or exceeds 14% of the time, Alternative 3 meets or exceeds 44% of the time, and Alternative 4 meets or exceeds 91% of the time. Analysis of the other exceedance plots (Figures 3-1, 3-2, 3-3, 3-4, 3-6, 3-7) show similar trends. Given that the recommended 35% of

unimpaired flow is less than that provided in Alternative 3, under the preferred alternative modeled doubling flows are met in less than 44% of years.

Given that doubling flows are not met in the driest years under all alternatives analyzed in the SED, we recommend analysis of an alternative that is consistent with the AFRP doubling flows and is based mostly, but not solely, on percent of unimpaired flow. The Service's suggested modification to the alternative not carried forward is to adopt an integrated approach to fish protection. This approach should: (1) establish minimum instream flows (base flows) not directly linked to UIF standards based primarily on life-stage specific needs of species of concern (e.g., summer base flows above % UIF for water temperature related effects on Central Valley steelhead), (2) establish seasonal and/or annual flow volumes, based on watershed specific forecasts of UIF, that can be manipulated in time and/or space to enhance conditions and ecological functions during key life history stages of salmonids (e.g., floodplain inundation flows February-May which may require flows above the identified % UIF for rearing and emigrating fall-run Chinook salmon), and (3) establish and model near real-time UIF schedules based on measured (or estimated) UIF with seasonally variable reservoir release lag times (e.g., a 3-day lag period during winter/spring inflow events to better capture peak runoff events and interannual variability, and a 7-day lag during summer months when inflows are relatively stable). The above alternative should be evaluated as part of the SED to examine the effects on fish populations and other beneficial uses.

Percent of unimpaired flow (UIF) is a useful approach for regulating instream flows on the mainstem San Joaquin River at Vernalis and its three primary tributaries, the Stanislaus, Tuolumne, and Merced Rivers, to provide the appropriate quality, quantity, and timing of flows for the freshwater portions of the salmonid lifecycle (USDOI 2011). Flows that mimic the general seasonality, magnitude, duration, and frequency of the natural hydrograph in each of the tributaries and at Vernalis should be modeled and evaluated for the effects on salmonids of increasing seasonal floodplain habitat conducive to juvenile salmonid rearing and growth, and the potential for improved survival of emigrating salmonid smolts through the tributaries, the Delta, and to the ocean. However, relatively low percentages of unimpaired flow will not adequately protect species during dry periods nor provide adequate floodplain inundation. Thus, the Service's proposed alternative should be evaluated as a potentially more protective approach and in order to encompass the full range of strategies that can help achieve the Board's stated objective of natural production of viable native fish populations.

In order to fully evaluate the effects of all the alternatives (those described in the SED as well as the alternative described above), the objective to maintain viable native fish populations should be made more specific and include biological criteria for salmonid and other species. While the proposed indicators of viability are listed in the SED, specific, measurable viability criteria are not explicitly stated. Without measurable biological criteria to monitor population status the effects of the alternatives on fish populations cannot be properly evaluated.

Table 1. The total annual volume of water (acre-feet) and percentage of unimpaired flows required to increase Chinook production by an average of 53% and 100% (doubling) in the Stanislaus, Tuolumne, and Merced rivers (from AFRP 2005). The preferred alternative of 35% of unimpaired flow would never provide a total annual volume of water sufficient to achieve doubling under any year type.

	WET	ABOVE NORMAL	BELOW NORMAL	DRY	CRITICAL
53% Increase					
Stanislaus	604,286	487,578	422,911	384,882	334,899
	33%	*38%*	*48%*	*60%*	*73%*
Tuolumne	877,247	673,275	549,579	510,996	435,634
	29%	*32%*	*37%*	*44%*	*50%*
Merced	513,068	394,518	340,966	279,861	241,566
	32%	*38%*	*47%*	*52%*	*61%*
Doubling					
Stanislaus	1,006,557	785,985	614,584	525,231	445,016
	55%	*62%*	*70%*	*82%*	*97%*
Tuolumne	1,530,914	1,169,192	885,659	783,854	653,656
	51%	*55%*	*59%*	*68%*	*76%*
Merced	869,671	624,749	503,572	404,055	343,591
	54%	*59%*	*69%*	*75%*	*86%*

D. Effects analysis for aquatic resources (Chapter 7)

Our main concerns with the effects analysis for aquatic resources include: (1) The analysis in the SED is not sufficient to determine how the alternatives, including the preferred alternative of 35% of unimpaired flow, along with other actions, will achieve the narrative objective for fish, and (2) the baseline used for evaluation of the alternatives on fish populations is not appropriate for a species with naturally variable populations.

Given the lack of specific, measurable objectives for fish populations and other beneficial uses, it is unclear whether 35% of unimpaired flow, together with other actions such as habitat restoration, is expected to meet the narrative objective for fish, or alternatively, the preferred alternative is meant to balance beneficial uses and is expected to achieve some lesser outcome for fish populations. We cannot determine whether the analysis in the SED has fully described the effects on fish populations. The SED preferred alternative is less in magnitude when compared to the baseline flows prescribed in the NMFS 2009 OCAP Biological Opinion for the Stanislaus River. However, these flows are predicated on avoiding jeopardy for Central Valley steelhead (*Oncorhynchus mykiss*), and are likely insufficient to (1) meet the narrative LSJR Fish and Wildlife Objective, (2) significantly improve conditions for salmonids or (3) double natural production of anadromous fish, including Chinook salmon and steelhead in the San Joaquin basin. The Board concludes that its actions alone will not be sufficient to meet the LSJR Fish and Wildlife Flow Objective of protecting viable native LSJR populations, but the SED is unclear on how it was determined that 35% of the unimpaired flow, together with other reasonably controllable measures,

will be sufficient to support and maintain the natural production of viable native LSJR fish populations migrating through the Delta, even if phasing is in place to achieve full compliance by 2020. More information is needed on the conceptual model that was used by Board staff to support this conclusion. Salmonid population levels have been declining and are historically low at the baseline (2009); thus, a goal of maintaining existing LSJR populations will not result in significant improvement of these populations or increase their long-term viability, as defined as increased abundance, spatial extent or distribution, genetic and life history diversity, migratory pathways, and productivity.

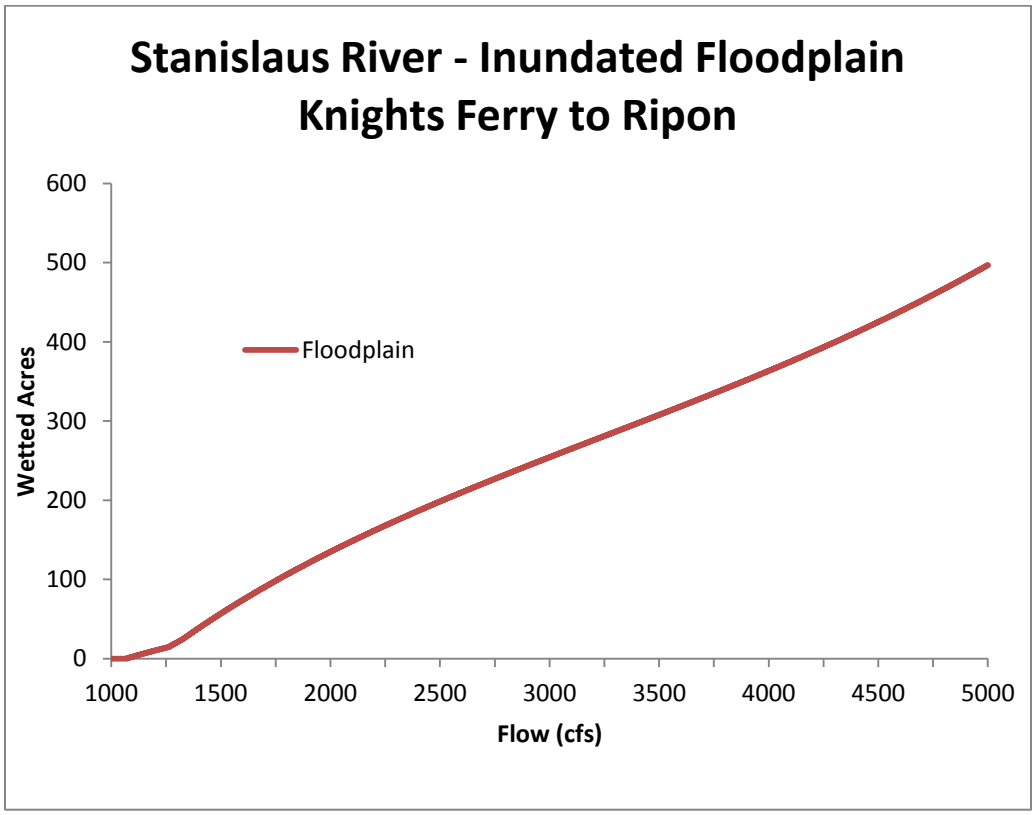
The Board staff's 2010 report to the legislature identified that 60% of the unimpaired flow was needed to protect and insure viable LSJR native fish populations. While the Service recognizes this report was only considering flow needs for fish and wildlife and not balancing other uses, the SED is unclear on how it was determined that 35% and other reasonably controllable measures in the basin could meet the goal by 2020. Present conditions for fall run Chinook salmon do not assure continued sustainability of the population. Exhibits provided to the Board (including the Service's AFRP 2005 report) have identified the need for flows much more substantial in magnitude to achieve the Board's objective for viable native fish populations. During the last 20 years, numerous gravel augmentation, riparian revegetation, and channel and floodplain restoration projects have taken place in the San Joaquin, Stanislaus, Tuolumne, and Merced rivers. Even assuming that these kinds of projects will continue (or increase in frequency) in the future, achieving sufficient benefits from non-flow measures without significant improvements to instream flows in the near future is unlikely, and at the very least, should be evaluated. The Board does not analyze the effects of non-flow measures, and does not explain why they think the non-flow measures (without improvements to instream flows) will provide significant benefits to native fish populations. The SED should better explain the disconnect between the recommendations of the 2010 flow report and the flow standard included in the preferred alternative. Further, the SED should fully analyze an alternative that addresses the needs of the species with the existing habitat and a higher flow (i.e., higher than 35% of unimpaired), and then evaluate the potential to adaptively manage flows downward once relevant populations have increased and habitat restoration goals have been identified and met.

To fully evaluate the effects of the alternatives on viable native fish populations, trade-offs between flow, habitat restoration, and other actions should be analyzed, and quantitative targets for other actions (e.g., acres of additional floodplain habitat by tributary) should be developed. Quantitative targets for habitat restoration can be analyzed using existing data, such as models currently being developed for the Stanislaus River that examine inundated rearing habitat as a function of flow (Mark Gard, USFWS, unpublished data). Acres of inundated floodplain under different flow scenarios can be calculated and used to set restoration targets that, combined with increased flow, are expected to achieve the Board's objectives for fish.

The analysis that is currently underway by the Fish and Wildlife Service aims to develop the relationship between available floodplain and discharge. We modeled wetted area at flows between 250 and 5,000 cfs using a SRH-2D model to assess available rearing habitat for juvenile fall-run Chinook salmon (*Oncorhynchus tschawytscha*). We have completed modeling of three reaches (Knights Ferry to Orange Blossom Bridge, Orange Blossom Bridge to Jacob Meyer Park, and Jacob Meyer Park to Ripon), with a final reach (Ripon to the confluence with the San Joaquin River) currently being modeled. Our analysis of the three completed reaches illustrates that floodplain begins to inundate these areas at 1,072 cfs discharge (Figure 1) and that nearly 500 acres of floodplain are available at flows of 5,000 cfs. As was stated in the

SWRCB Workshop on March 20, 2013, the Service is happy to share the results of our modeling directly with Board Staff.

Figure 1. Relationship between discharge and Flow for three reaches of the Stanislaus River.



The alternatives in the SED should be evaluated for their ability to achieve the narrative objective for fish, or preferably, a more specific, measurable fish objective. However, in this chapter the alternatives are evaluated for their impact on 2009 populations. Considering that 2009 fish populations were at historically low levels and continuing to decline over time (within the context of natural fluctuations), it is unclear how an analysis of the effects of alternatives relative to 2009 populations is useful in any context. In addition, a one-year snapshot in time is never a useful baseline or indicator of performance for any naturally variable population. The baseline for fish populations should be averaged over a longer time period, such as the historical baseline for CVPIA (natural production averaged over the 1967 - 1991 time period).

Additional specific comments on the effects analysis for aquatic resources include:

- At the top of page 7-32, Sacramento pikeminnow are described as nonnative. This is incorrect, pikeminnow are native.
- On page 7-42, Tubifex worms are not pathogens, though they act as host for the described pathogen (*Ceratomyxa shasta*).

- Section 7.3.1. The Central Valley Project Improvement Act is left out of the "Relevant federal programs, policies, plans, or regulations".
- The SDWQ alternatives do not evaluate impacts to the operation of the DCC to improve winter run survival and/or proposed actions to close the DCC in October to reduce adult Chinook salmon straying (See USBR 2012: http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=11310).
- Impacts of changes in water temperatures on Chinook salmon and Central Valley steelhead were evaluated using the San Joaquin River Basin-Wide Water Temperature Model (USACE HEC-5Q simulation model). All results were based on the frequency of modeled daily maximum water temperatures derived from the modeling results. The potential for significant impacts was determined through application of a daily water temperature model to LSJR Alternatives 2,3, and 4 and quantitative assessment of changes in the exceedance frequency of the USEPA (2003) temperature criteria for protection of salmonid designated uses [7-day average of the daily maximum temperatures]. The Service agrees with this analysis in determining the frequency of daily maximum water temperatures exceeding these thresholds to determine the significance of impacts under AQUA-4. The results from this analysis in Chapter 7 should be presented in the impact analysis for AQUA-4 in Chapter 20. The impact analysis on page 20-15 erroneously uses average monthly temperatures compared to baseline to evaluate the level of significant impact to changes in exposure of fish to stressful water temperatures resulting from changes in reservoir storage and releases. Consequently, the SED determination is "less than significant" at the Preferred Alternative of 35% unimpaired flow while temperature impacts have been shown to be "significant and unavoidable" and the streams in question are currently listed as "impaired" for temperature under Section 303d of the Clean Water Act.

E. Proposed implementation (App. K)

The Service supports maintaining a flexible implementation framework that utilizes adaptive management as a key decision making component of the process. However, in such a complex system with a multitude of disparate stakeholders the implementation details are critical to the success of the management approach, and the SED is lacking specificity in several places.

The roles of the Implementation Workgroup (IW) and the Coordinated Operations Group (COG) and the interface between these groups are unclear. The Service would like to see a more thorough description of the COG and IW, and clearly defined roles, responsibilities, and authorities. In addition, mechanisms for decision making for the COG and IW should be clearly defined (majority rule, unanimity, etc.), as well as specific criteria and triggers for management actions. These triggers should be developed in the context of an adaptive management framework (see comments on adaptive management, below). Some of our more specific comments and questions on implementation include:

- Who will be responsible for providing the additional 28 TAF for the fall pulse/attraction flow? Will it be based on the tributaries relative contribution to the entire basin UIF? What will happen to the pulse/attraction flow needs between adoption of this WQCP update and the next periodic review?
- More detail is needed on the plan for "phasing" the implementation of the narrative flow objective. What will happen in the interim?

- The SED states that the Board will take water right and other actions to assure that flows are used for their intended purpose and not rediverted for other purposes. What is proposed for the interim enforcement of these measures?
- The SED does not contain an analysis that indicates what the acceptable carryover storage requirements are for each major rim dam and the expected cold water pool impacts of meeting a specified % UIF. Objectives for these beneficial uses should be clearly articulated (see discussion on the narrative objective, above). The Board should develop a framework that describes how tradeoff decisions would be made between competing beneficial uses.
- Is the USACE engaged in the WQCP review process? What are the current channel capacities of the three main SJ tributaries, how were those capacities defined, and where is the current physical data to support those channel capacity constraints? The maximum flow limits/caps in the SED should be more clearly articulated, including justification for why these caps were chosen and implications for available inundated rearing habitat during high flow periods.
- It is not clear from the analysis in the SED how flow standards in the San Joaquin tributaries (Stanislaus, Tuolumne, and Merced rivers) would interact with lower San Joaquin (Vernalis) flows and Delta inflow and outflow standards set during Phase II.

While the Service applauds the Board's efforts to reassess the Feb-June LSJR flow requirements, salmonids in the SJ Basin and Delta have year round flow and habitat needs, and the Board already has flow requirements for other times of the year at various SJ Basin and Delta locations. The Service urges the Board to expedite the review of flow requirements in the Nov-Jan and July-Oct periods and ensure that year-round flow requirements developed are complementary to salmonid life history. The revised Feb-June standards may help contribute towards the narrative objective of maintaining the natural production of viable native SJR watershed fish populations, but only a portion, albeit a critical portion, of the native salmonid lifecycle occurs during the proposed time period. The Board must consider the temporal and spatial needs of all life stages of salmonids to address the narrative objective of viable native fish populations.

In 2008, an Independent Science Panel reviewed the CVPIA Fisheries Program (http://www.usbr.gov/mp/cvpia/docs_reports/indep_review/FisheriesReport12_12_08.pdf) and identified a fundamental problem in that water released for fish benefits upstream is later diverted out of the system, thus not being fully protective of all life stages of fish from headwaters storage though the Delta The SED should evaluate the benefits to both riverine and estuarine aquatic species and their habitat of flow protections at the mouth of each tributary, the San Joaquin River to Vernalis, reaches downstream of Vernalis through the Delta, and to the ocean.

Many of the current problems facing anadromous salmonids in the San Joaquin Basin are greatly exacerbated by the overuse of groundwater pumping. Groundwater overdraft reduces instream flows and increases water temperatures. Interactions between groundwater pumping during dry periods and potential groundwater recharge during wet periods with instream flow should be evaluated to have a full evaluation of the alternatives on instream hydrology. For a review of groundwater issues please see (http://californiawaterblog.com/2013/01/30/californias-groundwater-problems-and-prospects/). The Board should consider options to coordinate management of surface and groundwater accordingly.

F. Proposed annual and long-term adaptive management (App. K)

The terms of annual adaptive management and long-term adaptive management create confusion, as they are very different processes, but yet are both called adaptive management. It would be better to use another term for the annual manipulation of flow timing to avoid the confusion. As described in Appendix K, "Annual Adaptive Management" would annually manage the timing of flows within the February through June period and potentially reduce the flows to less than 35% of unimpaired levels to reduce water supply impacts and/or increase flows to greater than 35% of unimpaired to achieve specific ecosystem functions, such as floodplain inundation. However, flows would average 35% of unimpaired over the February through June period within one year.

In contrast, the long-term adaptive management component of the plan aims to identify the flow levels required to meet the narrative LSJR flow objective within the 25 to 45% range of unimpaired flow. If annual flows are required to average 35% of unimpaired, it is unclear what mechanisms and triggers would allow flows of up to 45% of unimpaired to be evaluated for long-term adaptive management. An explicit adaptive management plan should be developed that includes an experimental design for evaluating alternative flow levels in the adaptive management range, including triggers to determine when each specific management action should be evaluated.

Overall, we are concerned that the necessary framework has not been developed to insure the success of adaptive management, either annual or long-term. Adaptive management of instream flows will only be successful if there are (1) clearly defined and measurable objectives (for fish and other beneficial uses) to be addressed by an adaptive management plan, and (2) a set of testable hypotheses and a model or models being used to determine how best to meet the two separate components of the LSJR Fish and Wildlife Flow objective: the timing of flows needed to meet the objective (within a year), and the magnitude of unimpaired flows needed to meet the objective (over the long term). In an adaptive management process, testable hypotheses and models should be used to evaluate the proposed actions and determine which one is most likely to meet the goal. Development of hypotheses and a model linking proposed actions to ecological responses was not included in the SED.

In addition to the lack of an adaptive management framework in the SED, given the uncertainty inherent in the relationship between flow and fish populations, and the natural variability in fish abundance, the Service is concerned that the adaptive management range is too narrow to detect a response between flow and fish populations. it would be beneficial to evaluate a broader range of unimpaired flow in the adaptive management plan, up to 60% unimpaired flow or greater. Dr. Julian Olden, in his peer review of Appendix C of the SED (Olden 2011), stated "the decision to illustrate only <60% of unimpaired flows is puzzling because the 2005 report *Recommended Streamflow Schedules to Meet the AFRP Doubling Goal in the San Joaquin River Basin* indicates that "estimates of flows needed on each tributary to double salmon production range from 51 to 97 percent of unimpaired flow" (p. 3-47). Given the choice of scenarios to report (20-60% of unimpaired flow) is based on TBI/NRDC analysis suggesting 5,000 cfs threshold for salmon survival (p. 3-48) and that >50% is estimated to be needed to achieve doubling of salmon production, implies that the Technical Report is only considering potential flow schedules that may lead to salmon survival at current low levels and not salmon recovery into the future. Therefore, the

rationale for examining 20-60% of unimpaired flow as the only scenarios is questionable, and it needlessly limits a full investigation of the flows required to achieve fish and wildlife beneficial use." If 60% of unimpaired flow or greater would be necessary for salmon recovery, it is likely that evaluation of flows in this range would be necessary to detect a fish population response through adaptive management.

Some additional questions and concerns are listed below. This list contains elements that would be required in an adaptive management plan for the approach to be successful.

- The Board needs to develop a model or decision-support tool to assess whether the preferred alternative will meet the stated goal of the plan, the narrative objective for fish, and any additional objectives for other beneficial uses. This model should be developed as the basis for an adaptive management plan and included in the SED.
- This tool needs to be developed so that it can be modified and updated using annual monitoring information to improve decision making over time
- The specific and measurable objectives that the Board is attempting to achieve on an annual basis from annual adaptive management need to be articulated. Useful annual goals may include habitat-based metrics related to key life history stages of salmonid populations, such as "inundate XX acres of floodplain habitat on each tributary for at least 4 weeks during the March-May time period to provide rearing habitat".
- The specific and measurable objectives that the Board is attempting to achieve on a long-term basis from long-term adaptive management need to be articulated, The narrative objective is to achieve viable fish populations on the LSJR, with help from others by 2020, but without a specific biological goal and structured study design for management actions, it is not clear how an adaptive management plan will be formulated and used.
- The expected or desired level of improvement in the viability indices measured on an annual or long-term basis need to be articulated. The model (described above) should be used to assess expected improvement in viability indices. Performance metrics should be defined, as well as the degree of improvement in performance metrics that would result in concluding the actions were a success. Information on how, specifically, indices of viability will be measured on an annual basis, such that it would result in changes to the annual implementation plan for the following year, needs to be included.
- The adaptive management plan needs to evaluate how scientific rigor, through replication, can be obtained when management actions are changed on an annual basis. Analysis needs to be included on how annual information will help to inform the long-term adaptive management for sustaining and maintaining viable LSJR native fish populations.
- A discussion needs to be included about expectations of who fund the different types of monitoring needed to implement both adaptive management processes.

G. Proposed actions by other agencies needed to protect fish and wildlife (App. K)

A significant amount of habitat restoration, including levee set backs to increase floodplain and riparian habitat, fish passage above the rim dams to provide access to historical cold water habitat, and screening water diversions to prevent fish loss, will need to be incorporated into an implementation program to ensure that the narrative fish objective is achieved. However, it is unclear from the SED if an analysis has been completed to determine trade-offs between other actions and flow, and how much restoration would be necessary to off-set the difference between the preferred alternative of 35% UIF and AFRP-recommended flows in order to achieve viable native fish populations. Efforts are currently underway to quantify the relationship between flow and inundated floodplain habitat for juvenile salmonid rearing in the Stanislaus River (Mark Gard, unpublished data). These data, along with data that exist for the Merced and Tuolumne, should be used to develop (1) inundated floodplain rearing habitat under current flow conditions, (2) inundated floodplain rearing habitat under proposed new flow conditions, and (3) targets for additional floodplain rearing habitat that would have to be restored and/or constructed to achieve the narrative objective for fish under the proposed new flow objectives. Similar analyses should be conducted for other proposed actions to develop quantitative targets that, when combined with proposed flow standards, would be expected to meet the Board's narrative objective. These analyses should be completed and included in the SED to fully disclose the effects of the alternatives on the narrative fish objective.

Additional comments on proposed actions by other agencies are listed below:

Improve the Quantity, Quality and Access to Suitable Riparian and Floodplain Habitat for the Benefit of Native Fish and Wildlife: It is not clear from the analysis in the SED how the Board intends to improve the quality, quantity and access to floodplain habitat in the LSJR and its major salmon bearing tributaries without either (1) significantly higher flows to inundate the floodplain or (2) extensive restoration projects to provide habitat at lower flows. It is also unclear how the Board intends to ensure that these habitat actions are implemented.

Improve Riparian Habitat: An additional action to improve riparian habitat would be to work with the USACOE to protect riparian habitat on levees. Removing riparian habitat will likely increase water temperatures due to solar radiation. Such an increase in water temperature, in combination with that predicted from climate change, will potentially result in temperatures that exceed optimum levels for salmonids, thus reducing the available habitat for rearing salmonids and stressing migrating individuals.

Maximize Gravel Replacement and Maintenance Programs for Salmonid Spawning and Rearing Habitat: The SED should provide more specificity on how gravel programs are intended to benefit both spawning and rearing habitat, as well as quantitative targets for each habitat type.

Reduce predator habitat: Flow is a critical component of riverine habitat. As long as flows mimic reservoir habitat rather than river and estuarine habitat, non-native predators in and through the Delta will be present. Changing habitat by significantly increasing flows during the spring would potentially reduce the production of non-native predators. The SED should analyze how predation can be reduced without significantly increasing spring flows or changing the underlying habitat in the Delta that has resulted in an increase in non-native predators. We are concerned that predator reduction can, at best, only hope to

reduce predation in some localized areas. The SED should evaluate whether localized predator reductions will result in significant improvements in native fish viability.

Reduce impacts of Introduced Species on Native Species in the Bay-Delta Estuary: The SED should evaluate the potential to reduce the impacts of introduced species on native species in the Bay-Delta Estuary through alternatives that substantially improve flows and habitat to contribute to a healthy ecosystem that is supportive of fish and other native species. The analysis in the SED is not clear as to how proposed actions will reduce impacts of introduced species in the absence of significant increases in flow.

Develop and Implement Improvements to Barrier Programs: Results from the VAMP in 2011 suggest survival may sometimes be higher in Old River than in the San Joaquin River. Instead of recommending further assessment of the physical and non-physical barrier, the Board should require additional survival monitoring in the two main migratory routes to determine which route has higher survival and why, to determine how best to increase salmon smolt survival through the Delta for juvenile salmon originating from the San Joaquin basin.

Evaluate Entrainment of Fish Species by the SWP and CVP in the Bay-Delta Estuary: The 2010 and 2011 VAMP data suggest juvenile salmon mortality through Clifton Court Forebay and the SWP is significantly higher than that through the CVP. Another option, not listed as a suggested action, would be to preferentially export water through the CVP during the salmon smolt outmigration to reduce entrainment losses through CCFB and SWP.

Complete a Working Salmonid Life-Cycle model for the LSJR Basin: More data are needed to develop a useful life-cycle model for the LSJR basin that would predict population level responses to changes in ecological conditions with reasonable accuracy. A long-term, structured study design is needed to develop, test, and modify such a model to achieve and maintain its accuracy. California Department of Fish and Wildlife is currently developing a new updated version of the SalSim model for the San Joaquin basin. This model should be evaluated to determine if it achieves this objective and can be used to improve the analysis of the effects of flow alternatives on the narrative fish objective.

Once complete, the SalSim model could be used as a tool to evaluate trade-offs between flow and other actions, if the model has the ability to quantify the consequences of flow changes, spawning and rearing habitat improvements, reductions in predator habitat, and other actions on annual estimates of redds, outmigrants, and returning adult Chinook and *O. mykiss*. If SalSim cannot analyze all the proposed actions, it should be used as part of a larger decision-support tool to evaluate hypothesized benefits of habitat restoration and other actions relative to flow. Such a tool needs to be developed prior to implementation of adaptive management.

LSJR fish and wildlife Flow Objectives: What is meant by "real time adaptive management"? Is that the same as the annual adaptive management described previously? Who is to fund the development of the San Joaquin River Monitoring and Evaluation Program (SJRMEP) and the monitoring contained within the SJRMEP? Who will do the monitoring? At what level of precision does the Board want to achieve or detect changes in the components of viability of native LSJR fish species?

Although evaluating the relationship between flow conditions and the viability of native San Joaquin River watershed fish populations may seem straightforward, in practice it may be extremely difficult. Assessing a multitude of different flow alternatives for the various seasons on the viability of dozens of native species in the basin may be very difficult to achieve given the other uncontrollable factors in the environment. In addition, the noise to signal ratio in the natural environment is such that large sample sizes and frequent replication are necessary to obtain the precision needed to detect differences among alternatives. More information on specific biological indicators and the levels of change the Board wants to detect are needed to help focus and prioritize necessary monitoring. It is also necessary to consider the level of resources sufficient to achieve the monitoring goal at the precision level desired, where those resources are expected to come from, and whether they are available. Without further information on these specifics it is uncertain whether the monitoring plan will be adequate for use in adaptive management.

H. Proposed monitoring and special studies program (App. K)

There does not appear to be enough specificity on the details of the proposed monitoring program to determine if it will be sufficient to inform decision making for adaptive management. More specifics from the Implementation Workgroup (IW) and the Coordinated Operations Group (COG) are needed to make this assessment.

As stated above, It is not clear what conceptual model was used to determine that 35% of the unimpaired flow, in combination with actions by others, would be sufficient to meet the narrative fish and wildlife objective by 2020. Such a model is necessary to specify performance metrics and link the hypothesized response of performance metrics to management actions. The model should provide the framework for (1) deciding what should be monitored, (2) incorporating monitoring data into decision making to improve decisions over time, and (3) specifying triggers that would cause a change in a management action based on monitoring results.

I. Conclusions

- The narrative objective in the Substitute Environmental Document (SED) is not specific or measurable and so it is difficult to determine whether the SED has fully evaluated the effects of the alternatives on fish populations. Measurable objectives should also be developed for other beneficial uses to adequately examine trade-offs and develop a successful adaptive management plan.
- The SED fails to analyze the Service's alternative of AFRP doubling flows expressed as a percent of unimpaired flow paired with protective baseflows and floodplain inundation flows during rearing periods for juvenile salmonids.
- The Board should consider a broader adaptive management range, encompassing at least the 60% of unimpaired flow identified in the 2010 Board staff report (SWRCB 2010). The Board's caps/limits on high flows should also be evaluated to determine the limitations they would likely

impose on floodplain inundation during rearing periods for juvenile salmonids. The Board should also quantify targets for habitat restoration that would be expected to achieve fishery benefits in the absence of sufficient flow. All of these approaches should be evaluated in an adaptive management plan.

- It is unclear from the current analysis how 35% of unimpaired flow, along with other actions (yet to be defined and evaluated), will achieve the narrative objective of natural production of viable native fish populations.
- A tool is needed to evaluate trade-offs between flow and other actions and provide a framework to effectively implement adaptive management. This tool could take the form of a life-cycle model (such as SalSim, or SalSim within the context of a broader decision-support tool) with relevant detail for each tributary that can quantify the consequences of flow changes, spawning and rearing habitat improvements, reductions in predator habitat, and other actions on annual estimates of redds, outmigrants, and returning adult Chinook and *O. mykiss*. This tool needs to be developed prior to implementation of adaptive management.
- Such a tool should be used to evaluate hypothesized benefits of habitat restoration and other actions relative to flow, and should be regularly updated and modified as new research and monitoring data become available. This tool should become the basis for the adaptive management process and quantifying an adequate flow standard.
- Before such a tool is constructed, it should not be assumed that actions other than flow will be sufficient to achieve the narrative objective for fish.
- The Service will participate on the Coordinated Operations Group (COG) and the Implementation Workgroup (IW) established by the Board with the expectation that those groups will help achieve improved flows and salmonid habitat that contribute toward the doubling of salmonids in the San Joaquin River and its tributaries and to successfully implement the adaptive management process.

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