California Sportfishing Protection Alliance

"An Advocate for Fisheries, Habitat and Water Quality"

6 December 2010

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Cal/EPA Headquarters
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Sent via email to commentletters@waterboards.ca.gov

Subject: SJR Technical Report Comments

Dear Ms. Townsend, and Board Members:

The California Sportfishing Protection Alliance (CSPA) and California Water Impact Network (C-WIN) have reviewed the State Water Resources Control Board's (Board) Draft San Joaquin River Technical Report (Technical Report) and appreciate the opportunity to submit comments. Our comments include a review of the Technical Report prepared for CSPA by fishery biologist Carl Mesick, PhD, and supporting documents, including:

Mesick, C. 2010. Comments on the Draft Technical report on the Scientific Basis for Alternative San Joaquin River Flow and South Delta Salinity Objectives, 3 December 2010. 5 pages.

> In his comments, Dr. Mesick states that the State Water Resources Control Board omits from the draft technical report the important role of managing instream flow releases for temperature protection of salmon smolts in San Joaquin River tributaries, the need for fall pulse flows to minimize straying by returning San Joaquin River tributaries' salmonid spawners to Sacramento River basin streams, and to address potential fish losses at the state and federal Delta pumping facilities given that both a physical head of Old River barrier is not an available option any longer, and the bio-acoustic fish fence performed poorly in 2010. The most important flows are in the late winter through early spring period, and if flows need to be reduced for alternatives development by the State Board, then it can be most safely done with respect to salmon outmigration in the months of May and June. In addition, in the fall, pulse flows and Delta export rates should be managed to protect salmon, particularly when escapement numbers are low. Dr. Mesick also recommends flow management procedures for dry and critically dry years when salmon escapement numbers are low, while also balancing base flow releases to provide minimally required habitat for spawning and egg incubation in all years for spring flows and fall pulse flows.

Mesick, C. 2010. The High Risk of Extinction for the Natural Fall-Run Chinook Salmon Population in the Lower Merced River due to Insufficient Instream Flow Releases, 30 November 2010, 110 pages.

Mesick, C. 2009. The High Risk of Extinction for the Natural Fall-Run Chinook Salmon Population in the Lower Tuolumne River due to Insufficient Instream Flow Releases, 4 September 2009, 43 pages.

> These two studies present Dr. Mesick's evaluation of the risk of extinction for natural fall-run Chinook salmon populations in the Tuolumne and the Merced rivers, based on well-established academic literature on fishery biology. His research finds that declines in escapement for the salmon populations on these rivers is due to inadequate minimum instream flow releases from La Grange and Crocker-Huffman dams in late winter and spring during non-flood years when daily maximum water temperatures exceed the USEPA temperature threshold of 59 degrees F for smoltification. Fish that fail to outmigrate typically die from warming waters and disease in these rivers. These studies include extensive supporting databases.

Mesick, C. 2010. Instream Flow Recommendations for the Stanislaus, Tuolumne, and Merced Rivers to Maintain the Viability of the Fall-Run Chinook Salmon Populations, 14 February 2010, 29 pages.

> This paper is CSPA Exhibit 11 from the State Water Resources Control Board's Delta flow criteria proceeding last winter, and is accessible at the Board's web page supporting the proceeding. The exhibit provides instream flow recommendations specific to the Stanislaus, Tuolumne, and Merced rivers by water year type as inflow to the mainstem San Joaquin River.

United States Environmental Protection Agency, Office of Water. 2003. EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards. EPA 910-B-03-002, April 2003, 57 pages.

> Dr. Mesick's recommendations and comments on the draft staff technical report point to Table 1 (page 16) as scientifically comprehensive guidance for managing instream flows to protect salmon smolts.

United States Fish and Wildlife Service. 2005. Recommended Streamflow Schedules to Meet the AFRP Doubling Goal in the San Joaquin River Basin, 27 September 2005, 31 pages.

> These recommended flow schedules were modeled and written by Dr. Mesick during his employment with the US Fish and Wildlife Service. It presents ten analyses used to justify and determine flow schedules for the Stanislaus, Tuolumne, and Merced Rivers that would be needed to achieve the Anadromous Fish Restoration Program's goal to double salmon and other fish populations relative to their 1967-1991 average population

levels, pursuant to the Central Valley Project Improvement Act of 1992. These flow recommendations span the February through May period, and cover wet, normal, and dry water year types for all four major rivers in the San Joaquin River Basin.

National Marine Fisheries Service. 2009. Endangered Species Act Section 7 Consultation. Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project. June 2009, 219 pages composed of excerpted sections 1 and 6.6.

These excerpts of the NMFS 2009 salmon biological opinion on the state and federal Operations Criteria and Plan (OCAP) are resubmitted as part of Dr. Mesick's and C-WIN and CSPA's comments because it still represents the best summarization of the endangered status of salmonids and anadromous fish (including steelhead and green sturgeon), as well as of Delta inflows by water year types, of Delta export rates by facility and water year type, and of fish entrainment operational dynamics and magnitudes based on modeling of Old and Middle River flows (using both particle tracking and CalSIM II). NMFS analyses provide much-needed context for Mesick's recommendations concerning the importance of timing pulse flows and temperature management to benefit smolt outmigration and survival through what is at present an exceedingly hostile and highly altered estuarine environment in the Delta.

National Marine Fisheries Service. 2010. Letter to USEPA: Comment on the State Water Resources Control Board's "Do Not List either the San Joaquin River or its tributaries, the Merced, the Tuolumne and the Stanislaus for Temperature, 15 November 2010, ten pages.

Lee, G. Fred. 2010. Comments on Water Quality Issues Associated with SWRCB's Developing Flow Criteria for Protection of the Public Trust Aquatic Life Resources of the Delta, 11 February 2010, 5 pages.

This paper is CSPA Exhibit 22 from the State Water Resources Control Board's Delta flow criteria proceeding last winter, and is accessible at the Board's web page supporting the proceeding. The exhibit is included to highlight the total absence of any discussion in the Technical Report regarding the effects of flow on the concentration and residence time of pollutants in the San Joaquin River and Delta estuary, with the exception of salt. Salt is a conservative constituent and cannot be employed as a surrogate for the universe of impairing and bioaccumulating pollutants.

Our comments, in addition to the above cited comments and attachments, are as follows:

Purpose and Use of the Report

The Introduction to the Technical Report states that the Board is reviewing the objectives and program of implementation for San Joaquin River flow and southern delta salinity contained in the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan) and will be considering amendments to the Bay-Delta Plan. The Board

will comply with CEQA by preparing a Substitute Environmental Document (SED). The purpose of the Technical Report is to serve as the information and tools to provide the Board with the scientific information and methodology necessary to establish San Joaquin River flow and southern Delta salinity objectives and a program of implementation to achieve the objectives.

The Technical Report is, however, unclear as to exactly how the Board will use it. Is it a scoping document pursuant to the California Environmental Quality Act? Is it intended to help provide a factual basis, in tandem with the eventual release of the SED for upcoming evidentiary hearings? Is it intended to support replacement for the Vernalis Adaptive Management Plan or new salinity standards in the Delta? How does it fit into the schedule leading up to the eventual adoption of a revised Bay-Delta Water Quality Control, scheduled for 2012? At what point does the State Board intend to finalize this report? The Technical Report needs to include more specific information regarding its purpose and the procedures and timelines involved in preparing and considering potential amendments to the Bay-Delta Plan.

Problem Statement

The Technical Report's problem statement concerning fisheries is inadequate and incomplete. There is little discussion of historical fisheries, a chronology of their decline or a river-by-river analysis regarding the effects that dams and diversions have had had on the hydrograph, water quality and fisheries. With respect to salinity, the problem statement is simply absent and should include a discussion of the sources, duration and magnitude of water quality standard exceedance and the historical failure to secure compliance with objectives.

Temperature

While the Technical Report identifies appropriate temperature needs of salmonids and provides a general discussion of temperature as a limiting factor to restoration of fisheries, it fails to specifically describe the spatial and temporal extent of water temperature problems in specific river reaches or address the specific sources of identified temperature impairment. This information needs to be included in any defensible Technical Report.

Upstream Flow Contributions

Omission of instream flow contributions from the upper San Joaquin River (the river upstream of its confluence with the Merced River) goes unexplained and unjustified. This omission augurs a repeat of the upper San Joaquin River's omission and implied exemption from contributing instream flows to the draft D-1630 water rights decision. The Technical Report must incorporate a full analysis of historical and potential instream flow contributions from the upper San Joaquin River. If not, a discussion of why the upper San Joaquin River is excluded from the analysis must be provided.

Range of Alternatives

The flow analysis in the Technical Report fails to offer or consider an adequate range of alternatives. While Figure 3-9 shows simple exceedence plots representing 100%, 60%, 40% and 20% of Vernalis unimpaired flows, only three of these plots represent alternatives that could actually be evaluated in the SED. The Board's report titled *Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem*, 3 August 2010, recommended 75% unimpaired flow for the Sacramento River (albeit for a different seasonal period than on the San Joaquin River). While staff initially recommended the same percentage for the San Joaquin River, the draft report, as released, only recommended a 60% criterion for San Joaquin River inflows. There was no discussion or justification for the difference. The Technical Report should address the discrepancy and include and analyze a 75% unimpaired inflow scenario for the San Joaquin River.

Salinity

The salinity analysis of the Technical Report assumes the reader grasps the conversation already under way about South Delta salinity. The salinity analysis needs to provide both a problem statement and a baseline of salinity trends in the South Delta. It needs to discuss the historic salinity condition of South Delta channels before major Delta export pumping and Westside irrigation return flows to the San Joaquin River occurred and describe, in some detail, present conditions. The Central Valley Regional Water Quality Control Board staff published an extensive evaluation of salinity problems in the Central Valley in 2006. We recommend staff consider building on this document to provide a more comprehensive analysis in this Technical Report.

A simple mass balance analysis was used to determine the relative contribution of urban salt loading as a percentage of salt loading entering the head of Old River. We disagree with Technical Report characterization of this percentage as "small." We believe a 5-13% load is significant considering that salinity standards are routinely violated and South Delta channels lack adequate circulation and experience significant null zones. The Technical Report should include a similar mass balance analysis for salt loading from the various upstream sources to provide appropriate context.

In justifying the use of monthly averages in the mass balance analyses to understand the relative importance of contributing factors, the Technical Report claims, "beneficial uses are affected more by longer term salinity averages…" (page 74). This claim requires further elaboration, as excessive salinity levels at critical periods may well have disproportionate impacts.

The centerpiece of the Technical Report's salinity effects evaluation is a 2010 report prepared by Dr. Glenn Hoffman entitled *Salt Tolerance of Crops in the Southern Sacramento-San Joaquin Delta*. This highly controversial report has not been peer-reviewed. It makes numerous assumptions in concluding that existing salinity levels in South Delta channels are suitable and suggesting that present water quality standards could be relaxed. However, it acknowledges that

additional modeling is needed and recommends further studies. While detailing at length Dr. Hoffman's conclusions and recommendations, the Technical Report ignores the considerable controverting evidence and comments presented by South Delta farmers and experts. The Technical Report should explicitly identify the additional needed modeling and studies that will be required before significant weight-of-evidence can be accorded to the Hoffman Report and should propose a formal peer-review of the Report.

Recent information suggests that high levels of salinity in the South Delta may have an effect on fish "homing" on fresh water flows. The Technical Report should discuss and analyze potential impacts of salinity on fish migration.

If the purpose of the salinity analysis in the Technical Report is to provide the technical basis and rationale to enable the Board to propose amendments to the Bay-Delta Plan regarding steps necessary to achieve compliance with existing salinity standards, it is an initial step in the right direction. If, however, it is intended to serve as the technical support and rationale for changing present salinity standards, it is seriously deficient. It should include any comprehensive antidegradation analysis that would be required if salinity standards were proposed to be relaxed.

Water Quality

The Technical Report inexplicably ignores the universe of chemical constituents other than salinity. Water quality and water quantity are flip sides of the same coin; increases or decreases in flow result in changes in constituent concentration and residence time, which in turn impacts beneficial uses.

Consequently, the Technical Report and SED must address the effects and consequences of altered flow regimes on the suite of constituents found in the San Joaquin River, its tributaries and the Delta. These evaluations must extent beyond the 303(d) List of Impaired Waterbodies and encompass increased or decreased additive/synergistic effects and chronic/sublethal impacts. They must include potential impacts caused by increase residence time on bioaccumulative pollutants and oxygen demanding constituents. The Technical Report should include the information necessary to support an antidegradation analysis for any proposed alternative that would increase concentration or residence time and lower water quality.

Water Supply Impact Analysis

We appreciate that the Technical Report seeks to coordinate fishery flows with flows that would help control salinity problems in the South Delta. We also acknowledge and appreciate that the flow analysis continues use by the State Water Resources Control Board of a percent of unimpaired flow approach that mimics the natural hydrograph in all its natural complexity. This approach received substantial scientific support during the Board's Delta flow criteria proceeding. However, this approach does not go far enough.

The Water Supply Impact Analysis states, "[t]his analysis compares flow output from a CALSIM II model run of current conditions in the San Joaquin watershed against estimates of flow needed to satisfy a particular set of SJR flow and southern Delta salinity objective alternatives, and calculates the amount of additional water needed to attain these objectives." Additional needed water will then be "compared against CALSIM II estimates of total diversions from the three eastside tributaries (Stanislaus, Tuolumne, and Merced Rivers) and the portion of the SJR between Vernalis and its confluence with the Merced River." It acknowledges that neither this analysis nor the SED will "address specifically from where the additional water will be provided within the SJR watershed" but serves only to "demonstrate that water is physically available within the watershed.

First, as previously noted, this analysis unacceptably ignores flows from the upper San Joaquin watershed and places an unreasonable burden on water users that depend upon the Stanislaus, Tuolumne and Merced Rivers. Second, this approach, while a necessary initial step, provides little of the information needed to develop a protective flow regime other than to estimate whether 20, 40, 60 or some greater percent of total unimpaired basin runoff is necessary to protect fisheries and water quality. What is critically missing is an evaluation of the specific:

1. requirements necessary to protect fish in each tributary, and
2. impacts to specific water users in specific tributaries from implementation of whatever flow regime is identified to be sufficiently protective.

We believe a more robust and appropriate approach would be to begin to answer these questions now and not wait until some future evidentiary hearing before the Board. While an evidentiary proceeding is the proper place to ultimately "balance" competing needs, resolving the "facts" is an appropriate goal for the Technical Report and SED.

Modeling and CalSim II

Models are complex simulations that, at their best, only represent an idealization of actual field conditions. They must be used with extreme caution to ensure that the underlying model assumptions hold for the site-specific situations being modeled. Subtle changes in coefficients, assumptions or input data can dramatically alter output. It is crucial that models be properly calibrated and verified. Since models only represent an idealization of reality, they're generally better at comparative analyses than absolute analysis: i.e., they're better able to produce a reasonably reliable estimate of relative change in outcome than generate a reliable absolute prediction. Unfortunately, defining where and when a particular constituent will comply with a numerical water quality standard requires reliable prediction.

A critical problem arises when decision makers attribute more precision to modeling results than is warranted and where a model's output is misused to make definitive predictions. As G.E. P. Box noted, "[a]ll models are wrong, but some are useful."

CalSim II is a highly complex simulation model of a complex system that requires significant expertise to run and understand. Consequently, only a few individuals concentrated in DWR,

USBR and several consulting firms understand the details and capabilities of CalSim II. State Water Board staff cannot run CalSim II.

The formal peer-review of CalSim II in 2003 (*Strategic Review of CALSIM II and its USE for Water Planning, Management, and Operations in Central California,* 4 December 2003) was highly critical and detailed numerous inadequacies in the model. Among these was the opinion that CalSim II "has not yet been calibrated or validated for making absolute predictions values" (page 9). The 2006 peer-review of the San Joaquin River module (*Review Panel Report San Joaquin River Valley CalSim II Model Review,* 12 January 2006) was even more critical and found that "large uncertainty remains in the new representation due to large unaccounted for flow and salt loads (closure terms) and bias in the salinity model," page 2. The review noted that the San Joaquin module, "retains significant gaps present in the old model, particularly the lack of groundwater representation" (page 9) and it "requires more data for mainstem inflows and diversions of water and salts than is currently available," (ibid). It pointed out that the new model, "systematically underestimates salinity," (ibid). It observed that, "present documentation and testing alone are not sufficient to provide users of the model or model results with a complete reasonable basis for understanding the general accuracy and limitations of CalSim II results. Many assumptions are made without adequate justification and without assessment of their impact on model results," (page 10). While acknowledging that the model is an improvement over its predecessor, the review states, "[m]odel developers also appear to agree that the current representation should be used preferably for comparative purposes and that model output *is not ideal to forecast an absolute condition*" page 48.

We note that Figure 5-2 (page 80) is presented as representing an adequate calibration of CalSim II for purposes of evaluating water supply impacts. Actually there are at least 11 different areas in the figure where CalSim II results vary dramatically in magnitude and occurrence from the observed Vernalis data. These discrepancies appeal to amount as much as 100-200 umho/cm. No explanation is offered in the draft technical report for these numerous and significant variances from actual data. Figure 5-2 is not a winning endorsement for CalSim II's modeling capability. We suspect that a similar calibration comparison focused on the Old River in the South Delta would reveal even greater discrepancy between predicted versus observed values (also applies to DSM2), which is why the Technical Report employees a regression analysis to model salinity impacts.

While a simple regression analysis of Vernalis data versus South Delta data many serve to evaluate water supply impacts, we question whether it is sufficiently accurate to predict compliance with specific water quality standards. We note that the regression analysis comparing salinity at Vernalis versus Old River at Tracy (Figure 4-2) is more scattered than the analysis of Vernalis/Brandt Bridge (Figure 4-4), perhaps because of the null zones in Old River. The Technical Report should discuss the lack of water circulation in the South Delta and the regression analyses should be subject to peer-review.

The CalSim II estimate of flow at Vernalis depicted in Figure 5-1 (page 79) indicates that the model can underestimate winter flow by as much as 150-250 TAF. Perhaps this difference can

be attributed to reservoir flood releases or spills but changes in reservoir operation might make this water available during other needed periods. We reiterate that focusing on Vernalis flows can only be an initial step and the Technical Report should extend its analyses to the specific tributaries, including the upper San Joaquin River.

To the extent that results from CalSim II modeling are relied upon by the Technical Report, it is important that the assumptions behind model runs and limitations of model output be made explicitly clear in layman's terms to all parties, especially as staff is unable to run the model. CalSim II should be employed for relative comparative analyses and not relied upon to predict specific results; i.e., whether a potential action will achieve water quality standards or ensure that specific temperature criteria are met. We recommend that all models and the actual modelers be made available for questions and that proposed alternatives to be modeled be discussed and agreed upon by interested parties.

Thank you for considering our comments, suggestions and recommendations. Our organizations look forward to participating actively in the upcoming January 2011 workshop on issues facing the San Joaquin River and South Delta river channels and sloughs.

Sincerely,

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