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2/8/2011

Kari Kyler
State Water Resources Control Board
P.O. Box 2000
Sacramento CA, 95812-2000

Subject: Draft Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives

Dear Ms. Kyler:

Contra Costa Water District (CCWD) appreciates the opportunity to comment on the Draft Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives (Draft Report). CCWD has previously submitted comments regarding the Draft Report (Attached) and the letter below presents additional concerns about southern Delta salinity objectives and comments regarding the metrics used for evaluating success in setting flow objectives.

Southern Delta Salinity Objectives

Contra Costa Water District (CCWD) does not support the relaxation of water quality standards in the southern Delta. The southern Delta salinity objectives were put in place to protect agricultural beneficial uses, but serve as ancillary protection for drinking water beneficial uses. This was recognized by the State Water Resources Control Board (Board) in the 1991 Water Quality Control Plan, regarding the 150 mg/L Cl standard at Rock Slough, and it is equally applicable to the southern Delta salinity objectives. CCWD relies on the south and central Delta as the drinking water supply for its 550,000 customers in eastern and central Contra Costa County. Relaxing water quality objectives will result in degraded water quality and is counter to the 2009 Delta Reform Act[1] and State and Federal anti-degradation policy.

CCWD's operations are based on the salinity at our intakes: when high quality, low salinity water is available at our Old River or Middle River Intake, it is put into storage in the Los Vaqueros Reservoir. When only lower quality, higher salinity water is available at our intakes, water from the reservoir is released to blend the intake water quality to levels acceptable to our customers. If south Delta water quality is degraded, more water must be released from the reservoir to meet CCWD's delivered water quality goal. At the same time, degraded water quality will limit opportunities to refill

[1] SBX7-1 Sect 85020 states: The policy of the State of California is to achieve the following objectives that the Legislature declares are inherent in the coequal goals for management of the Delta: **(e) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.**

the reservoir. When water quality is sufficient to refill the reservoir, more pumping will be needed to offset the increased releases, which in turn will increase energy costs and greenhouse gas emissions.

CCWD has recently completed a new intake along Victoria Canal in the southern Delta at a cost of approximately $100M. This new intake is used to fill Los Vaqueros Reservoir and deliver water directly to our treatment plants. Relaxing water quality standards in the southern Delta will reduce the benefits of this project as well as the entire Los Vaqueros Project, which was built in 1998 at a cost of $450M, equivalent to $690M in 2011 dollars. The primary purpose of both projects is to provide high quality water to CCWD's customers. The proposed change in water quality standards would increase reliance on reservoir blending such that it would reduce Los Vaqueros storage by 11 TAF on average and it would reduce the ability to use the new Victoria Canal Intake by 12%. These are serious impacts that must be avoided

The Draft Report does not adequately address impacts on municipal users as a result of poorer water quality. An analysis should be included in the Substitute Environmental Document of municipal impacts, with mitigation measures proposed where impacts cannot be avoided. Potential impacts of Delta water quality degradation on CCWD's operations include the following:

- Additional use of Los Vaqueros Reservoir for water quality control
- Increased energy use
- Increased greenhouse gas emissions
- Decreased water supply reliability
- Poorer water quality delivered to customers

One of the most important consequences of the proposed changes in southern Delta water quality standards would be decrease in water supply reliability. The Delta Reform Act of 2009 declares that the one of the basic goals of the state for the Delta are to provide a more reliable water supply for California[2]. Relaxing water quality standards will decrease CCWD's water supply reliability and is not consistent with the Delta Reform Act. Figure 1 demonstrates that the time needed for CCWD to recover from a drought is substantially longer if water quality standards are relaxed. In drought conditions, Delta water quality is degraded, and Contra Costa Water District must release more water from Los Vaqueros Reservoir to maintain the water quality delivered to our customers. Drought conditions also mean that the reservoir cannot be refilled as early or as often because of poor water quality. Figure 1 shows Los Vaqueros Reservoir storage level modeled[3] in response to the 1976-1977 drought. The blue line represents operations under existing water quality standards, 0.7 EC April – August and 1.0 EC the remainder of the year. With the existing south Delta water quality standards in place, the reservoir recovers by January

[2] SBX7-1 29702. The Legislature further finds and declares that the basic goals of the state for the Delta are the following: (a) **Achieve the two coequal goals of providing a more reliable water supply for California** and protecting, restoring, and enhancing the Delta ecosystem.

[3] CALSIM, DSM2, and a CALSIM-based CCWD operations model were used to simulate proposed water quality standards and CCWD operations.

1979; however, with water quality standards relaxed to 0.9 EC from April through August the reservoir does not recover until July 1980. Under the proposed change, CCWD would have reduced emergency storage in the event of an extended drought or an emergency such as a flood or earthquake.

Degraded water quality will also have impacts on CCWD customers, including industrial customers, who rely upon high quality water for their processes. If water quality is degraded, industrial customers are not able to recycle water to the same degree causing water use to increase. This in turn increases energy use and GHGs. CCWD has been working with one industrial customer to improve efficiency by 300 acre-feet per year; that project will reduce GHG production by 5000 metric tons per year, illustrating the potential for water quality degradation to have energy and GHG implications. These effects must be analyzed in the Substitute Environmental Document, and alternatives should be considered that avoid these impacts. Such alternatives will show substantial benefits to reduce water use, energy use and GHG production. If an alternative is chosen that creates impacts to water quality, adequate mitigation measures must be proposed.

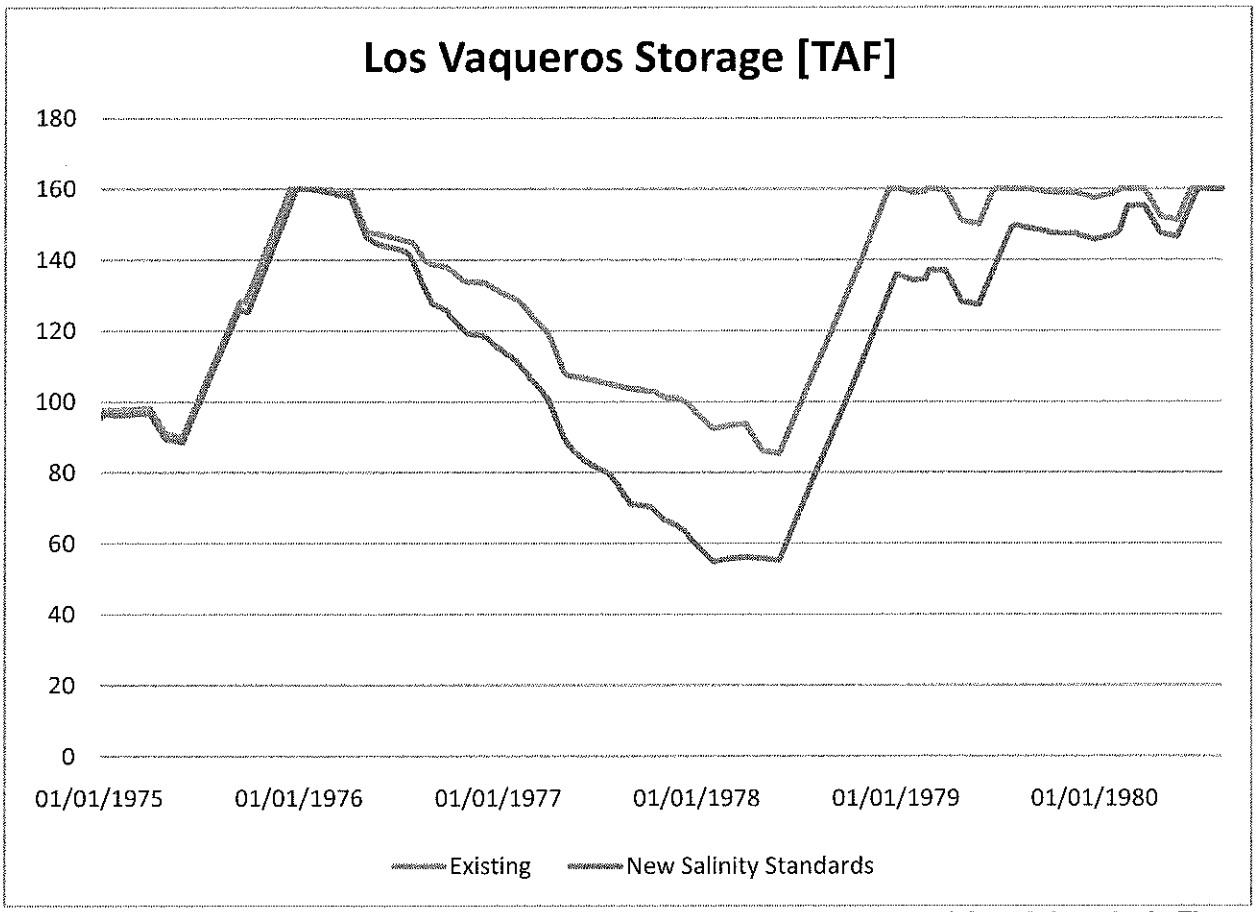

Figure 1 Los Vaqueros Storage under existing water quality standards compared to proposed degraded standards. The proposed standards (0.9 EC April – August) would extend drought conditions and increase amount of time need to recover from a drought. Increased recovery time leads to a decrease in water supply reliability.

The joint CV-SALTS effort by the State Water Resources Control Board (Board) and the Central Valley Regional Water Quality Control Board will reduce salinity loading to the San Joaquin River; this approach should be pursued in place of a relaxation of southern Delta water quality objectives.

San Joaquin Flow Objectives: Establishing Appropriate Metrics of Success

Given the cyclical nature of salmon populations, the Board should consider the metrics for success used to evaluate the proposed changes to San Joaquin River flows. It may be more appropriate to employ metrics that ensure that environmental conditions can sustain viable fish populations rather than fish population metrics. We suggest an approach below that would produce achievable goals and a healthy ecosystem.

In Figure 3-2 of the Draft Report (p. 42), it appears that the pattern of salmon escapement is cyclical (boom-bust) and not a persistent downward trend as the text suggests. The cyclical nature of the salmon populations has long been observed in the Pacific Northwest (Oregon

through Alaska) and has been correlated to fluctuations in ocean temperatures[4] and other ocean indicators including predator-prey interactions[5].

If proposed changes in flows were implemented in 2011, it is possible that there would be a rise in population and that the actions taken by the Board would be deemed a success. Conversely, when the population is declining during the 'bust' phase, the actions taken by the Board might be deemed a failure. Population trends are important but must be considered in the context of the boom-bust cycle. Goals could be established that are designed to improve ecosystem function through flow management. The following can be adjusted on annual basis in the adaptive management framework:

- Increased spring outmigration flows
- Increased fall attraction flows
- Adequate temperatures along the main stem and the tributaries
- Sufficient flow to mobilize fine sediment

We recognize the challenge before the Board in balancing the needs of the ecosystem and community of water users. We propose that the careful selection of appropriate metrics will help with this balance.

Please call me at 925-688-8083 or call Maureen Martin at 925-688-8323 if you have any questions.
Sincerely,

Leah Orloff
Contra Costa Water District
Water Resources Manager

[4] Mantua, Nathan J., Steven R. Hare, Yuan Zhang, John M. Wallace, Robert C. Francis, 1997: A Pacific Interdecadal Climate Oscillation with Impacts on Salmon Production. *Bull. Amer. Meteor. Soc.*, **78**, 1069–1079.
[5] http://www.nwfsc.noaa.gov/research/divisions/fed/oeip/ha-under-development.cfm

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January 5, 2011

Jeanine Townsend
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-2000

Subject: Draft Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives

Dear Ms. Townsend:

Contra Costa Water District (CCWD) appreciates the opportunity to comment on the Draft Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives. We recognize that the public comment period has passed, but given the comments and questions the State Water Resources Control Board (SWRCB) have received thus far, we feel it is essential to comment and clarify some of the misinformation that has been presented. There are two main points that must be clarified:

1) **There are municipal intakes in the Southern Delta.** The San Joaquin River Group Authority posed the question in their submitted panel questions, "Are there any municipal intakes in the Southern Delta? If there are "none", and none are anticipated, why should there be any objectives set for M&I water uses?" CCWD would like to remind the San Joaquin River Group Authority and the State Water Resources Control Board that CCWD has recently completed a new intake at Victoria Canal and that is a municipal intake in the Southern Delta. In addition, the Jones and Banks pumping plants provide drinking water to most of California's population and are also municipal and industrial intakes in the South Delta. The list of M&I intakes affected by conditions in the South Delta is not limited to these. It is imperative that water quality objectives be set and maintained protecting municipal and industrial beneficial uses in the Southern Delta.

2) **Contra Costa Water District pumping does not have a major effect on OMR flows.** The State Water Contractors and Delta Mendota Water Authority stated in their comment letter that CCWD has a 'major' effect on Old and Middle River (OMR) flows (page 5 line 10). Although it should be obvious by simple visual inspection of Figure 1 in the Attachment that CCWD does not have a major effect on OMR flows, CCWD has also provided a more thorough technical analysis of the OMR model submitted by the State Water Contractors and found that CCWD pumping is statistically insignificant in comparison to other factors. If each of the variables (San Joaquin River flow at Vernalis,

pumping at Banks, pumping at Tracy, pumping at CCWD's Old River intake, and the net channel depletion) is examined individually, it becomes clear that CCWD's contribution to Old and Middle River flows is insignificant. CCWD's maximum pumping is an order of magnitude smaller than export pumps and the San Joaquin River flow, and as such cannot be a major factor. The attachment also shows that variation in CCWD's pumping at Old River contributes less than 0.2% to the variation in reverse flows on Old and Middle River. By comparison, the variation in total export pumping contributes more than 96% to the variation in net reverse flows in Old and Middle River. Only in the unlikely case of San Joaquin River inflows less than 1000 cfs with no export pumping at all could CCWD's south Delta diversions be considered to have a "major" effect on OMR flows, and in even in this case CCWD's diversions would be small compared to daily net tidal fluctuations.

Please contact me if you have any questions or concerns at (925) 688-8100. CCWD will attend the workshop and look forward to continuing to provide input to the San Joaquin River Flow and Southern Delta salinity objectives.

Sincerely,

Greg Gartrell
Assistant General Manager

GG/MM:wec

Attachment

cc: Mark Gowdy, State Water Resources Control Board
Daniel Nelson, San Luis & Delta Mendota Water Authority
Terry Erlewine, State Water Contractors
Dennis W. Westcot, San Joaquin River Group

Attachment
Technical Analysis of Old and Middle River Flows

The State Water Contractors submitted Dr. Paul Hutton's 2008 report on calculating Old and Middle River flows. Although the report provides an in-depth method to calculate Old and Middle River flows, the findings of the work have been misinterpreted by the State Water Contractors. Contra Costa Water District (CCWD) pumping is included in Hutton's calculation of OMR but that does not mean it has a major or significant effect. CCWD pumping is within the error of the method proposed by Hutton. Figure 1 below shows measured Old and Middle River flows (USGS gages), CCWD pumping at Old River, and the residual (predicted minus observed) of Hutton's model. It is obvious that the magnitude of CCWD pumping is less than the uncertainty of Hutton's model.

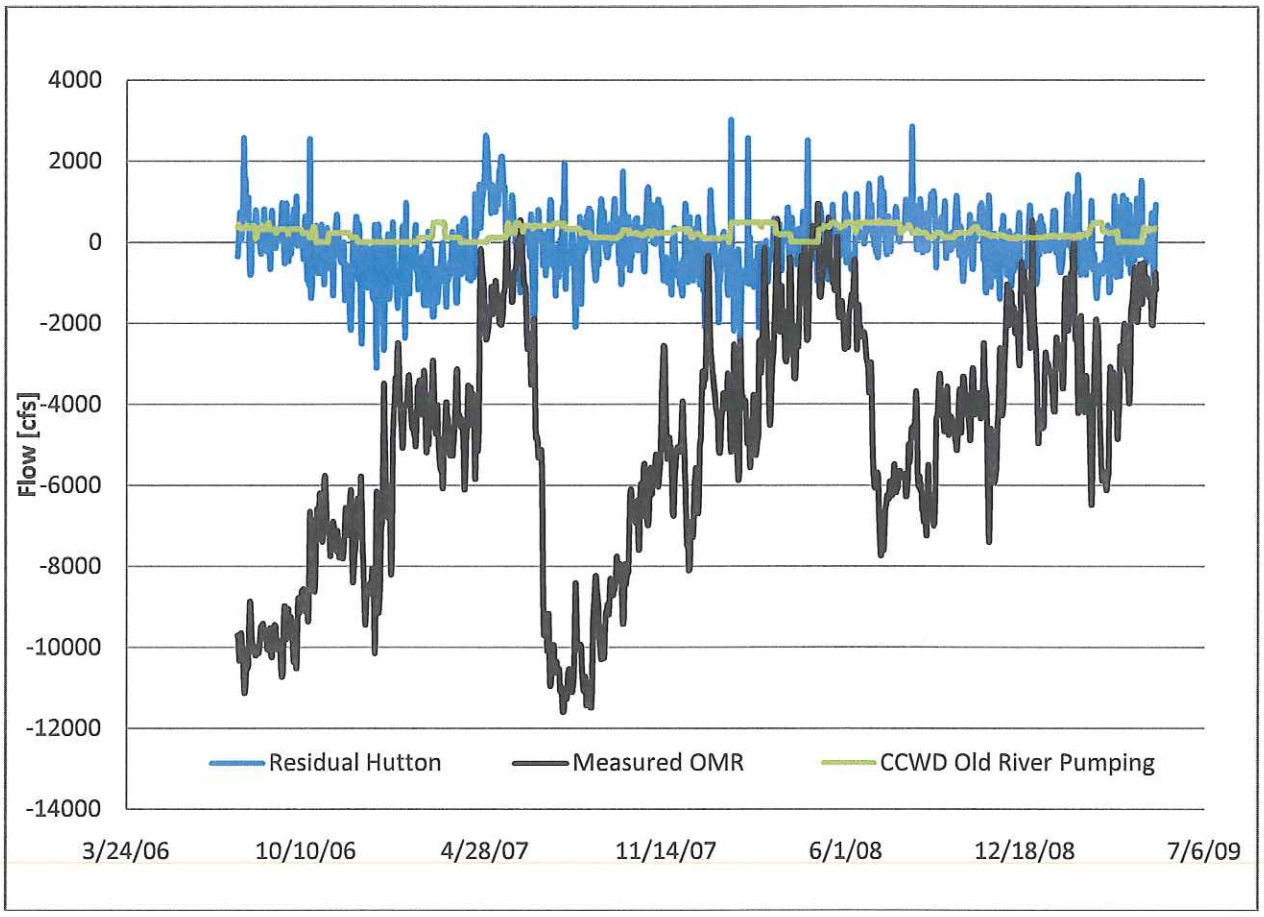

Figure 1 Comparison of measured OMR flows, CCWD pumping and the residual (predicted minus observed) of Hutton's model

Hutton used the following variables to predict OMR flows: San Joaquin River flow at Vernalis, pumping at Banks, pumping at Tracy, pumping at Old River and a net channel depletion term. Hutton combined the pumping and depletion terms and performed a linear regression to find coefficients for the following equation:

$$Q_{OMR} = A * Q_{Vernalis} + B * Q_{Diversion} + C$$

Hutton expanded the analysis to account for various conditions such as the temporary barriers and different San Joaquin River flow conditions. Hutton reported an R^2 of 0.99. CCWD performed the same linear regression for all recent data (7.26.2006 – 10.25.2010). San Joaquin flow was less than 16,000 cfs during that time and barrier installation was limited. Table 1 contains the coefficients found when the same regression was performed for recent data. Although the revisted results are not identical to the originally published, the results are very similar.

Table 1: Regression Coefficients for Hutton's OMR model

	Hutton Originally Published*		Hutton Revisted (2006 – 2010)	
	coefficient	p-value	coefficient	p-value
A	0.47	?	0.54	<2E-16
B	-0.91	?	-0.9	<2E-16
C	83	?	-122	0.04
R^2	0.99	?	0.94	

* for conditions where no barriers are in and flow at Vernalis is less than 16,000 cfs. These conditions applied for almost the entire duration of the period revisted.

If each of the diversion terms is examined individually, it is possible to distinguish the relative contribution of each of those terms to flow in Old and Middle River. Applying a linear regression to the following equation CCWD was able to find the coefficient for each individual variable.

$$Q_{OMR} = A_{Vernalis} + B1_{Banks} + B2_{Tracy} + B3_{CCWD} + B4_{NCD} + C$$

Table 2 presents the coefficients for each term and a p-value for each of the coefficients. The overall goodness-of-fit for this analysis is nearly identical to Hutton's originally proposed method, $R^2 = 0.95$. The CCWD term has the smallest coefficient (smallest magnitude) and **it is the only coefficient that is not statistically significant (p-value is larger than 0.05)**. If CCWD is removed from the regression entirely, the goodness-of-fit does not change and the remaining coefficients also change minimally. This indicates that compared to the other terms, CCWD pumping is insignificant.

Table 2: Regression Coefficients for Expanded OMR Variables

	Expanded Terms With CCWD		Expanded Terms Without CCWD	
	coefficient	p-value	coefficient	p-value
$A_{Vernalis}$	0.49	<2E-16	0.49	<2E-16
$B1_{Banks}$	-0.87	<2E-16	-0.87	<2E-16
$B2_{Tracy}$	-0.87	<2E-16	-0.87	<2E-16
$B3_{CCWD}$	-0.04	**0.79**	NA	NA
$B4_{NCD}$	-1.83	<2E-16	-1.84	<2E-16
C	-138	0.05	-144	0.02
R^2	**0.95**		**0.95**	

In order to assess the relative importance of the various variables in determining Old and Middle River flows, standard partial regression coefficients were calculated. A high absolute value of a standard partial regression coefficient indicates it has a high degree of influence on Old and Middle River flows. The standardized regression coefficients for the expanded regression equation are presented in Table 3. The magnitude of the coefficients indicates that CCWD is the least important of the variables contributing to OMR flows and that compared to the other variables, variation in CCWD pumping contributes less than 0.2% to the variation in reverse flows in Old and Middle River.

Table 3: Standardized Partial Regression Coefficients for Expanded OMR Variables

	Standardized Coefficients	p-value
$A_{Vernalis}$	0.16	<2E-16
$B1_{Banks}$	-0.6	<2E-16
$B2_{Tracy}$	-0.36	<2E-16
$B3_{CCWD}$	-0.002	0.79
$B4_{NCD}$	-0.2	<2E-16
C	-0.04	0.05
R^2	**0.95**	