Attachment 1: Regional Board Staff Comments on Material Presented to State Board During the Periodic Review Workshops for the 1995 Bay-Delta Water Quality Control Plan, 3 June 2005

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1 Introduction

Numerous parties submitted comments and exhibits regarding flow, salinity, and drinking water quality objectives in the San Joaquin River (SJR) and Delta during the public workshops held to solicit input on the State Water Resources Control Board's review of the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento- San Joaquin Delta Estuary (referred to hereafter as Bay-Delta plan). The purpose of this report is to support Regional Board staff recommendations to the State Water Resources Control Board (State Board) made in a 3 June 2005 comment letter regarding these comments and exhibits. The quantity of information presented here reflects the strong relationship of the State Board's 1995 Bay-Delta Plan with several on-going Regional Board programs. The report is organized into seven sections:

Section 1: Introduction
Section 2: Background and Status of Regional Board Programs
Section 3: Flow objectives
Section 4: Salinity objectives
Section 5: Drinking water objectives
Section 6: Summary recommendations
Section 7: References

Section 2 provides background on Regional Board programs as they relate to comments and exhibits submitted to the State Board. Sections 3, 4, and 5 provide responses to specific comments and exhibits submitted regarding, flow, salinity, and drinking water objectives, respectively. Section 6 provides a summary of Regional Board staff recommendations. Parenthetical reference is provided to specific exhibits submitted during the State Board's periodic review process. Footnotes are provided for other information cited in the comments with references listed in Section 7.

2 Background and Status of Regional Board Programs

2.1 Salt and Boron TMDL for the San Joaquin River

The State Board, in Water Right Decision 1641 (D-1641), stated:

> *"The Central Valley RWQCB is hereby directed promptly to develop and adopt salinity objectives and a program of implementation plan for the main stem of the San Joaquin River upstream of Vernalis. As part of its implementation plan for the salinity objectives, the Central Valley RWQCB should evaluate a program to regulate the timing of agricultural discharges to the San Joaquin River."* [1]

In response to this direction and to fulfill its obligations under the Clean Water Act (CWA), the Regional Board developed a Total Maximum Daily Load (TMDL) and Control Program for salt and boron discharges into the lower SJR for the salinity

[1] SWRCB, 2000, p. 85

impairment in the SJR (Salinity Control Program). The Regional Board, in September 2004, adopted an amendment to the Water Quality Control Plan for the Sacramento and San Joaquin River Basins (CRWQCB, 2004), which included this TMDL and Control Program. This amendment, when approved by the State Board, will result in establishment of:

- Fixed load allocations applicable to nonpoint source dischargers regulated under waste discharge requirements
- A method for calculating real-time assimilative capacity and associated real-time salt load limits (available load) based on real-time flow conditions (applicable to dischargers regulated under a waiver of waste discharge requirements or, as appropriate, under new or existing waste discharge requirements when these waste discharge requirements are otherwise required)
- A method for apportioning load allocations to nonpoint source dischargers
- A method for calculating waste load allocations for point source dischargers
- Prioritization, by subarea, for implementing load allocations
- A time schedule, prioritized by subarea, for achieving compliance with waste load allocations and load allocations
- A method for calculating load allocations for salt imported to the lower SJR basin by the Delta Mendota Canal of the Central Valley Project
- A time schedule for establishing upstream salinity water quality objectives, and a TMDL and program of implementation to achieve these objectives

The TMDL is phased to allow for implementation of the existing salinity water quality objectives in the SJR near Vernalis, while providing the framework and timeline for implementing upstream salinity water quality objectives. The first phase establishes load allocations to achieve the existing State Board Vernalis salinity objectives.

On 11 May 2005, Regional Board staff held a California Environmental Quality Act (CEQA) scoping meeting for the project to establish salt and boron water quality objectives in the SJR from Mendota Dam to Vernalis. This Basin Plan Amendment project will also include establishment of a TMDL and program of implementation to achieve the new objectives. Staff intends to complete a draft Basin Plan Amendment staff report by Fall 2005, with a final draft staff report for Regional Board consideration by June 2006. Preliminary assessment of the appropriate salinity objectives to protect the beneficial use suggests values in the range of 700 to 1,600 μS/cm.

2.2 Dissolved Oxygen TMDL for the Stockton Deep Water Ship Channel

In 1998, the State Board adopted a 303(d) list that identified the Stockton Deep Water Ship Channel (DWSC) as impaired due to low dissolved oxygen conditions. Per the federal CWA and the State's Porter-Cologne Water Quality Control Act, this required the Regional Board to prepare a TMDL and an implementation plan to address the impairment. Also, in D-1641, the State Board directed the Regional Board to implement a TMDL to address loads contributing to this impairment before they would take water rights actions to address the contribution of reduced flow. In January 2005, the CVRWQCB adopted a TMDL and implementation plan. The associated Basin Plan

amendment and the *Control Program for Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel* (RWQCB, 2005) contained therein have the following elements:

- TMDL, which apportions responsibility to the three causative factors (loads of oxygen demanding substances, DWSC geometry, and reduced DWSC flows) and outlines allocations of load to sources of oxygen demanding substances and their precursors
- Requirements for completion of scientific studies needed to identify and quantify the impact of sources of oxygen demanding substances and their precursors
- Recommendations to agencies responsible for reduced DWSC flow and DWSC geometry to address the impact of existing and future projects on the dissolved oxygen impairment
- Conditional prohibition of discharge

Implementation of the TMDL is phased to allow time for: i) control measures to be implemented to address the impacts of DWSC geometry and reduced DWSC flow, and ii) studies to be conducted to better understand the sources and linkages of oxygen demanding substances and their precursors to the dissolved oxygen impairment. This Basin Plan Amendment includes a conditional prohibition of discharge for oxygen demanding substances and their precursors, effective December 2011, to address any remaining impairment. Based on the outcome of control measures and studies, however, the Regional Board will reconsider the terms of this prohibition and control program by December 2009.

2.3 Dissolved Oxygen Impairments in Old and Middle Rivers in the South Delta

In 2002, Old and Middle Rivers in the South Delta were added to the State Board 303(d) list as impaired due to low dissolved oxygen conditions. The Regional Board will be required to prepare TMDLs and implementation plans to address these impairments. There is no schedule at this time for when those TMDLs will be performed.

2.4 Drinking Water

Current policies and plans lack water quality objectives for several known drinking water constituents of concern, such as disinfection by-product precursors and pathogens, and do not include implementation strategies to provide effective source water protection. The August 2000 CALFED Record of Decision (ROD) committed the Regional Board to develop a comprehensive drinking water policy for the Delta and upstream tributaries by December 2004. In addition, during the 1998 and 2002 basin plan triennial reviews, the Regional Board identified the drinking water policy as high priority. Finally, recognizing that a policy could not be developed by the ROD deadline, in July 2004 the Regional Board adopted a resolution in support of developing the drinking water policy.

A broad-based stakeholder workgroup, the Central Valley Drinking Water Policy Workgroup, was formed to develop and implement a work plan designed to provide the technical information the Regional Board needs to develop a drinking water policy.

Work plan tasks include water quality monitoring, pollutant load evaluations, and evaluation of potential control strategies to identify those that are reasonably attainable and cost effective.

To date, the Workgroup has compiled a comprehensive database for data on drinking water constituents in the Delta and upstream tributaries, prioritized drinking water constituents, and initiated development of conceptual models for the high priority constituents: salt, nutrients, pathogens, organic carbon, and bromide. The California Urban Water Agencies, Sacramento County Regional Sanitation District, US EPA Region 9, and the California Bay-Delta Authority Drinking Water Quality Program have contributed funding to implement these tasks.

The technical studies are scheduled for completion by mid-2007, at which time Regional Board staff will develop a policy recommendation. It is expected that the effort will culminate in a Basin Plan amendment sometime in 2009.

3 Flow Objectives

Numerous parties submitted comments and exhibits regarding the Vernalis Adaptive Management Program (VAMP) and flow objectives at Vernalis. Much of the testimony regarding changes to flow objectives at Vernalis was focused on fisheries impacts. No Regional Board staff comments are provided here regarding the effect that potential changes of flow would have on fisheries. Flow changes will, however, also potentially affects water quality and water quality control programs being implemented by the Regional Board. Information and response to specific comments is therefore provided on:

- Effects of flow changes on the dissolved oxygen impairment in the DWSC portion of the SJR
- San Joaquin River Flow Modeling and Salinity Impairment

3.1 San Joaquin River Deep Water Ship Channel Dissolved Oxygen Impairment

Comments and exhibits related to flow and their effect on the SJR DWSC Dissolved Oxygen Impairment are organized in the following categories:

- Establishment of Minimum Flow Objectives
- South Delta Improvements Project / Head of Old River Barrier
- Reduced Vernalis flows

3.1.1 Establishment of Minimum Flow Objectives

Bay Institute comments and exhibits (BAY – EXH - 08) recommend that compliance with the Bay-Delta Plan dissolved oxygen objectives is important. They also recommend the State Board consider requiring the release of additional flows to the level sufficient to meet the dissolved oxygen objective during periods when the dissolved oxygen objectives are not met, particularly when Chinook salmon and Central Valley steelhead may be present. The Central Delta Water Agency submitted comments suggesting that the flow objectives for the SJR should be set at Stockton, either as a replacement or in

addition to objectives at Vernalis (CDWA - EXH - 01). The San Joaquin River Group Authority (SJRGA) also proposed a 1,500 cfs flow objective in the SJR at Stockton (SJRG - EXH – 10).

The dissolved oxygen TMDL for the DWSC identifies reduced flow in the DWSC as a major contributing factor to the dissolved oxygen impairment. Increasing flow through the DWSC at critical times can improve dissolved oxygen conditions. Regional Board staff, however, does not have a specific suggestion at this time on how an objective or other actions could be implemented to address this concern. Flow objectives or other actions would need to take into consideration the effects of factors other than reduced DWSC flow (i.e. loads of oxygen demanding substances and the DWSC geometry), which also contribute to the dissolved oxygen impairment. The Regional Board also expressed a willingness to consider alternate measures if these measures adequately address the impact and do not degrade water quality in any other way.

More study is required to determine the relative responsibility and quantify the impacts of the different contributing factors. The dissolved oxygen TMDL is phased to allow an opportunity for the required studies to be performed.

3.1.2 South Delta Improvements Project / Head of Old River Barrier

Comments included in exhibits submitted by DeltaKeeper (DK - EXH - 02 & 10) raise a number of concerns about how export pumping rates and the South Delta Improvements Project (SDIP) could have an impact on water quality in the central and south Delta and in the SJR through the Stockton DWSC . The South Delta Water Agency (SDWA - EXH - 01 & 02) commented that at times when dissolved oxygen in the DWSC is at risk and exports are affecting flow in the mainstem of the SJR, an export objective should apply. Also, if exports cause null zones where there is no net flow, one would expect that dissolved oxygen would drop. Similarly, water levels in Middle River have, at times, been less than one inch. This must have an adverse effect on fish and wildlife.

As required by CEQA, a comprehensive analysis of the impacts on flow caused by the proposed SDIP must be performed and mitigation measures to address any potential negative impacts should be developed. In particular, the manner in which the Head of Old River structure is operated will determine how much of the SJR is diverted down Old River to the State and federal export pumps, thereby reducing flow that continues in the SJR through the DWSC. The dissolved oxygen TMDL for the Stockton DWSC identified reduced DWSC flow as a major contributing factor to the dissolved oxygen impairment.

As part of the Basin Plan language for the dissolved oxygen TMDL in the SJR, the Regional Board recommends that the State Board should consider requiring evaluation and full mitigation of the potential impacts of future water right permits or water transfer applications on reduced flow in the DWSC. This recommendation would apply to the impacts of export pumping and operations of the SDIP as described. It is also suggested that the State Board carefully consider the potential impacts of the SDIP as part of its periodic review of the flow objectives in the Bay-Delta Plan.

Proposed agricultural barriers in the SDIP will also impact flow within the south Delta. Old and Middle Rivers in the south Delta are included on the 303(d) list due to dissolved oxygen impairments. It is suggested that the State Board also address these concerns through the water rights process, and to carefully consider them as part of its periodic review of the flow objectives in the Bay-Delta Plan.

The California Department of Water Resources (DWR) commented that the Head of Old River barrier in coordination with pollution control measures may help to meet the dissolved oxygen objective in the late summer (DWR - EXH – 22). DWR will consider such operation of the structure provided water levels and circulation in the south Delta are protected and the Tracy wastewater treatment plant discharges are taken into account.

The Regional Board recognizes that organic loading and the presence of the DWSC geometry in the SJR are a contributing factor to the dissolved oxygen impairment. The position of DWR, however, does not specifically acknowledge that at times, when the Head of Old River structure cannot be operated (for whatever reason), that flow through the SJR through the DWSC can be significantly less due to export pumping. It is the position of the Regional Board that the impact of flow diversions caused by export pumping must be mitigated at all times.

The Regional Board has also taken the position that alternate measures, other than direct control, may be acceptable if these measures adequately address the impact and do not degrade water quality in any other way.

3.1.3 Reduced Vernalis Flows

Comments by the Department of Interior (DOI - EXH - 26 & 40) and Stockton East Water District (SEWD - EXH - 01) suggested that the flow objectives at Vernalis should be lowered and made more flexible.

Although the reasons cited by these agencies for the suggested changes did not include consideration of the dissolved oxygen impairment in the Stockton DWSC, any reduction in the flow objectives at Vernalis would only tend to decrease flow in the SJR through the DWSC (depending on Head of Old River barrier operations), and potentially exacerbate the dissolved oxygen impairment.

In response to the comments received, the State Board staff in its staff report for the periodic review recommended that the State Board investigate the appropriateness of reducing the flow objectives in favor of other actions that could obtain protections equivalent to the protections provided by the objectives. At the same time, State Board staff recommended that any proposed reduction in the flow objective be examined, among other things, to determine potential impacts on other purposes of the flow objectives. Regional Board staff supports the State Board staff recommendation to examine the extent to which reduced flow objectives would potentially reduce flows through the Stockton DWSC and exacerbate the dissolved oxygen impairment.

The SJRGA provided testimony (SJRG - EXH – 10) demonstrating that actual flows in the SJR at Vernalis are greater than estimated unimpaired flows during the months of June through October, and as a result, the associated upstream reservoir, diversions and evapotranspiration are not responsible for the dissolved oxygen impairment in those months.

The analysis provided by the SJRGA is fundamentally flawed because it is based on the assumption that the dissolved oxygen impairment only needs to be addressed in the months of June through October. In fact, it needs to be addressed whenever it occurs, regardless of season.

Although historically less frequent, the magnitude of the dissolved oxygen impairment in the late fall and winter months can be very severe. During February 2003, the DWSC experienced a low dissolved oxygen episode with several days less than 2 mg/l (Basin Plan objective is 5 mg/l) with several daily minimums measurements near zero. These conditions were present for a few weeks with fish kills having been reported (but not documented).

SJRGA agreement with the general statement that "flows at Vernalis have been reduced from the unimpaired condition" in fact supports the Regional Board position that, at times, there is less flow in the SJR because of upstream diversions and consumption. We agree with SJRGA that, at times, flow in the SJR may be greater than estimated unimpaired flows, however, at other times of the year that may not be the case.

It is suggested that the State Board address the impact of such activities when they reduce flow conditions in the SJR (and hence exacerbate the dissolved oxygen impairment) through the water rights process, and to carefully consider them as part of its periodic review of the flow objectives in the Bay-Delta Plan.

3.2 San Joaquin River Flow Modeling and Salinity Impairment

Numerous comments and exhibits were submitted that referred to a "revised" hydrology of the SJR that is based on a combination of new modeling tools and new data. The USBR presented graphics depicting modeled flow and salinity data, based upon both previous CALSIM II hydrology and new CALSIM II hydrology (DOI – EXH – 41). The new model results show relatively higher quality (low salinity) water in the SJR upstream of Vernalis, along with changes in the seasonal tends in water quality. This change in water quality was attributed to changes in input data and in model assumptions. Dan Steiner, representing the SJRGA, made a presentation on the current hydrologic setting of the San Joaquin River as depicted by a revised version of the CALSIM II model. (SJRG - EXH – 07 and SJRG- EXH – 13). Included in his presentation was a comparison with previous simulations of SJR conditions using earlier versions of CALSIM II. The version of CALSIM II that was used to develop the information presented in Mr. Steiner's testimony incorporated the following updates:

- Re-definition of San Joaquin River Basin hydrology
- Land use-based water demands for Eastside system operations

- Re-definition of Eastside system operations/interdependencies
- Re-mapping of Westside and Eastside return flows
- Development of a disaggregated water quality calculation

By necessity, SJR Basin reservoir operations must be linked to Vernalis salinity because of the requirement to meet Vernalis salinity objectives through releases from New Melones Reservoir. SJR Basin reservoir operations are therefore affected by methods and assumptions used to estimate SJR water quality upstream of Vernalis. The model and data updates relied upon in the information presented by the USBR and SJRGA show significant changes to the simulated water quality in the San Joaquin River upstream of the Stanislaus River. Use of the revised CALSIM II model to prescribe alternative flow or water quality objectives at this time is, however, premature. As indicated by the USBR and SJRGA, updates to the model have not undergone a thorough peer review.

The California Water and Environmental Modeling Forum (CWEMF) and the California Bay - Delta Authority (CBDA) Science Program are in the process of conducting a technical review of the improvements in the simulation of the San Joaquin Valley portion of the CALSIM II model. The review will be conducted in collaboration with the USBR and DWR, and public participation will be solicited through a series of workshops.

Use of any new modeled flow data will also have limited effect on the Regional Board's SJR salt TMDL and Salinity Control Program. The Salinity Control Program is based upon low flow conditions. Inspection of the graphics provided by USBR and SJRGA suggest that though there may have been changes in monthly mean flows and seasonal flow trends, there has been little or no change in expected low flow conditions over the period of record. The Salinity Control Program further recognizes that there may be changes in flow and water quality regimes which is why an adaptive, real-time component is included.

3.3 Flow Recommendations

In January 2005, the CVRWQCB adopted a TMDL and implementation plan addressing the dissolved oxygen impairment in the Stockton DWSC. This TMDL identified reduced flow through the DWSC as a major contributing factor to the dissolved oxygen impairment. If the State Board is considering a modification or reduction of SJR flow objectives at Vernalis, it is recommended that the associated potential impact on flow through the DWSC and the dissolved oxygen impairment be carefully considered.

Export pumping and Head of Old River barrier operation (the Head of Old River barrier is part of the DWR SDIP) can significantly impact flow in the DWSC portion of the SJR. Upstream diversions and consumptive use also reduce flow, at times, in the SJR. Consistent with recommendations made in the Dissolved Oxygen Basin Plan Amendment and TMDL adopted by the Regional Board in January 2005, Regional Board staff recommends that the State Board consider existing and potential future impacts of such activities when amending existing or developing new water right permits. These recommendations do not specify the manner in which the impact of reduced DWSC should be addressed in the water rights process or through flow objectives in the Bay-

Delta Plan. More study is required to determine the relative responsibility and quantify the impacts of the different contributing factors (e.g. loads of oxygen demanding substances and DWSC geometry) to the impairment. The dissolved oxygen TMDL is phased to provide an opportunity for the required studies to be performed. Any requirements or flow objectives to address the impact of reduced DWSC flow should, in fairness, take into consideration that there are other non-flow factors which also contribute to the dissolved oxygen impairment. The Regional Board also expressed a willingness to consider alternate measures (e.g. aeration) if such measures adequately address the impact and do not degrade water quality in any other way.

At a minimum, however, it is recommended that any new projects that impact flow through the DWSC should be required to evaluate and fully mitigate their impacts on the dissolved oxygen impairment. Existing projects that impact flow should also begin to evaluate and address their impacts on flow through the DWSC. The Basin Plan language for the dissolved oxygen TMDL adopted by the Regional Board contains recommendations to this effect to the State Board and agencies responsible for such projects (e.g. DWR and DOI).

In addition to the impact of the SDIP on dissolved oxygen in the DWSC, the proposed operation of its agricultural barriers have the potential to impact water quality conditions in Old and Middle Rivers in the south Delta. These water bodies are included on the State Board 303(d) list as impaired due to low dissolved oxygen conditions. It is suggested that the State Board address the impacts of exports and the SDIP through the water rights process, and to carefully consider them as part of its periodic review of the flow objectives in the Bay-Delta Plan.

Finally, it is recommended that the State Board not make any changes in flow objectives that are based upon the results of the CALSIM II revised hydrology until the model assumptions and data have been technically reviewed.

4 Salinity Objectives

Numerous parties submitted comments and exhibits regarding salinity water quality objectives in the SJR and Delta. State Board staff recommended in the 30 September 2004 staff report "Periodic Review of the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento- San Joaquin Delta Estuary" (referred to hereafter as Periodic Review staff report) that "the scope of the location-specific objectives in the Plan be limited to the confines of the legal Delta…" Numerous comments and exhibits were nonetheless submitted regarding salinity objectives in the SJR upstream of Vernalis. These comments therefore collectively address modification and establishment of salinity objectives in the Delta, the SJR near Vernalis, and in the SJR upstream of Vernalis. Following are Regional Board staff comments on the comments and exhibits submitted to the State Board from the entities and on the topics listed below:

- Need for flexibility and salt export
- No observed agricultural beneficial use impairment
- USBR responsibility

- Dilution flows
- Municipal and Domestic Supply beneficial use
- Leaching Requirements and Recommended Salinity Standards
- UC Davis Putah Creek Study
- Right to Discharge

Following are discussions of these comments and exhibits with reference to Regional Board programs.

4.1 Need for Flexibility and Salt Export

Contrary to testimony and exhibits submitted by Dr. Charles Burt, a consultant for the SJRECWA, and consistent with State Board direction in D-1641, the goal of the Regional Board's Salinity Control Program "is to achieve compliance with salt and boron water quality objectives without restricting the ability of dischargers to export salt out of the SJR basin (CRWQCB, 2004)." Dr. Burt commented, "TMDLs or an artificial and inflexible Vernalis standard… will result in a larger problem for landowners and users of water from the San Joaquin"(SJEC-EXH-01). The State Board in D-1641, and the Regional Board in the Salinity Control Program for the SJR Salt TMDL, recognize that inflexible implementation of standards could present a problem. Item 10 of the Salinity Control Program states:

> *"The Regional Board encourages real-time water quality management and pollutant trading of waste load allocations, load allocations, and supply water allocations as a means for attaining salt and boron water quality objectives while* ***maximizing the export of salts out of the LSJR watershed****. This control program shall in no way preclude basin-wide stakeholder efforts to attain salinity water quality objectives in the LSJR so long as such efforts are consistent with the control program"* **(emphasis added)**[2]

Though the Salinity Control Program also has fixed salt load allocations that are tied to the Vernalis salinity objective, these load limits provide a regulatory backstop in the event that dischargers are unable to develop and participate in a basin-wide, real-time, salt management program. It is recognized in the TMDL and Salinity Control Program that dischargers should have flexibility to achieve both attainment of standards and continue to export salts out of the Basin.

4.2 No Observed Agricultural Beneficial Use Impairment

Comments and exhibits submitted by the San Joaquin River Exchange Contractors Water Authority (SJRECWA) (SJEC-EXH-01) document the cropping patterns along the main stem SJR from Mendota Pool to Vernalis. Table 2 in the exhibit shows that more salt-sensitive crops are currently grown in the downstream reaches of the San Joaquin Basin than in the upstream reaches, with moderately sensitive crops grown throughout the San

[2] CRWQCB, 2004, p. 15

Joaquin Basin. These comments conclude: "a water quality objective as high as 2,500 µS/cm is reasonable within the historical cropping patterns". Rather, this exhibit demonstrates that the use is likely impaired and has resulted in cropping patterns consistent with the availability of mostly high salinity water.

4.3 USBR Responsibility

Comments and exhibits submitted by Chris White on behalf of the SJRECWA state that setting a numerical standard for salinity is not a large enough step toward solving the salinity problem in the SJR. Mr. White commented, "The correct approach is to compel USBR to implement and fund their drainage management plan as required under Decision 1641" (SJEC-EXH-02). Further arguments and data are provided demonstrating that the poor quality of water supplied to the service area of the SJRECWA via the Delta Mendota Canal make attainment of existing EC standards unreasonable. The State Board through their conditioning of USBR's water rights in D-1641 and the Regional Board through their Basin Plan Amendment for the Control of salt and boron discharges into the lower SJR, recognize the issues of salts in supply water. The Regional Board's SJR TMDL *Salinity Control Program* is consistent with D-1641 by providing additional encouragement for the USBR to address their contribution to the impairment. Item 8 of the *Salinity Control Program* states:

> *"The Regional Board will attempt to enter into a Management Agency Agreement (MAA) with the U.S. Bureau of Reclamation to address salt imports from the DMC to the LSJR watershed. The MAA shall include provisions requiring the U.S. Bureau of Reclamation to:*
>
> *a. Meet DMC load allocations; or*
>
> b. *Provide mitigation and/or dilution flows to create additional assimilative capacity for salt in the LSJR equivalent to DMC salt loads in excess of their allocation"* [3]

In the event that efforts to develop a MAA are unsuccessful, item 8 goes on to state that:

> *"The Regional Board shall request a report of waste discharge from the U.S. Bureau of Reclamation to address DMC discharges if a MAA is not established within 2 years from the effective date of this control program"*

The USBR's load allocation is equal to the volume of water delivered from the Delta Mendota Canal to the SJR Basin at a water quality of 85 µS/cm. The USBR is responsible to address, using methods described above, any salt loads imported in the basin in excess of this amount.

[3] CRWQCB, 2004. p. 15

4.4 Dilution Flows

With regard to salinity objectives in the range of 700 to 1,000 μS/cm, Dr. Charles Burt, representing the SJRECWA, states that he does "not understand the rationale behind a regulation prohibiting surface drainage into the river…" which then "…requires the addition of artificial surface flows to meet the water quality standards that the first steps were intended to meet" (SJEC-EXH-01).

At a CEQA scoping meeting and workshop held on 11 May 2005, Regional Board staff proposed a range of salinity water quality objectives, from 700 to 1,600 μS/cm, to protect the drinking water and agricultural beneficial uses. This scoping meeting was held to commence the Regional Board effort to establish salinity objectives in the SJR upstream of Vernalis. This is part of the second phase of the salinity TMDL in the SJR. The first phase of the TMDL, adopted by the Regional Board, established load limits for all sources of salt. The load limits and associated implementation requirements complimented the State Board's conditioning of the USBR's CVP permits to meet salinity objectives at Vernalis. In D-1641 the State Board provided the USBR with "wide latitude in developing a program to achieve this result".[4] Similarly, the Regional Board allows in its SJR TMDL Salinity Control Program implementation provisions, latitude to the USBR and other entities to obtain salt load allocation credits by providing dilution flows. Item 13 of the Salinity Control Program states:

> *Entities providing dilution flows, as described in item 12, will obtain an allocation equal to the salt load assimilative capacity provided by this flow. This dilution flow allocation can be used to: 1) offset salt loads discharged by this entity in excess of any allocation or; 2) trade, as described in item 10. The additional dilution flow allocation provided by dilution flows will be calculated as described in table IV-8.*[5]

Contrary to Dr. Burt's comment, the Regional Board's Salinity Control Program does not advocate or require the provision of dilution flows. It does however recognize that the USBR and other entities may choose to provide dilution flows. It therefore has an implementation provision (item 12) of the Salinity Control Program that states:

> *"Salt loads in the water discharged into the LSJR or its tributaries for the express* ***purpose of providing dilution flow are not subject to load limits*** *described in this control program if the discharge:*
>
> *a. complies with salinity water quality objectives for the LSJR at the Airport Way Bridge near Vernalis;*
> *b. is not a discharge from irrigated lands; and*
> *c. is not provided as a water supply to be consumptively used upstream of the San Joaquin River at the Airport Way Bridge near Vernalis."* **(emphasis added)**[6]

[4] SWRCB, 2000, p.86
[5] CRWQCB, 2004, p. 15-16
[6] CRWQCB, 2004, p. 16

These implementation provisions provide incentive for decreasing the amount of high salinity flows and increasing flows with better quality water.

In his testimony, Dr. Burt also concluded "meeting the least restrictive salinity objective proposed by the Regional Board would necessitate an additional instream flow of over 100% above historical conditions in the critical river section downstream of Mud Slough. This is equivalent to an additional flow rate of about 125 cfs during the middle of the irrigation season in August" (SJEC-EXH-01). No basis is provided for this conclusion, however, preliminary results of Regional Board analyses suggest that it may be difficult to achieve compliance with salinity objectives in portions of the SJR upstream of Vernalis through load reductions alone. For this reason, Regional Board staff solicited public comment on a proposal to recommend minimum flow objectives for some upstream reaches at its 11 May CEQA scoping meeting for the second phase of the SJR salt TMDL to establish salinity objectives in the SJR upstream of Vernalis.

Although the basis for the 125 cfs "additional flow rate" is not provided by Dr. Burt, such a minimum flow rate can be used to evaluate the cost of such an implementation mechanism. Such an analysis was conducted as part of the *Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control Program for Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel.* Since flow is one of the contributing factors affecting low dissolved oxygen, the cost of water was estimated to fix the impairment through flow augmentation alone. The DO TMDL calculated the cost of water to augment existing flows to a level of 3,000 cfs throughout the year to be $37 million per year (based upon a cost of water of $100 per acre-foot) [7] Based upon a cost of water of $100 per acre-foot, provision of an additional 125 cfs throughout the year would cost just over $9 million per year.

4.5 Municipal and Domestic Supply Beneficial Use

Dr. Charles Burt, representing the SJRECWA, states "there is justification to explicitly de-designating municipal and domestic water use as a potential beneficial use on the lower SJR because there are no urban or municipal users between Mendota Dam and Vernalis…" He also states that "the Regional Board has defined a formal procedure to de-designate beneficial uses, such as municipal and domestic supply", making reference to Resolution 88-63: Sources of Drinking Water Policy (SJEC-EXH-01). Resolution 88-63 states:

> *"Sources of drinking water shall be defined in Water Quality Control Plans as those water bodies with beneficial uses designated as suitable, or potentially suitable, for municipal or domestic water (MUN)."*
>
> "*All surface and ground waters of the State are considered to be suitable, or potentially suitable, for municipal or domestic water supply and should be so designated by the Regional Boards with the exception of:*

[7] CRWQCB, 2005, p. 74-75

1. *Surface and ground waters where:*
   a. *The total dissolved solids (TDS) exceed 3,000 mg/L (5,000 μS/cm, electrical conductivity) and it is not reasonably expected by Regional Boards to supply a public water system, or*
   b. *There is contamination, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for domestic use using either Best Management Practices or best economically achievable treatment practices, or*
   c. *The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.*

2. *Surface waters where:*
   a. *The water is in systems designed or modified to collect or treat municipal or industrial wastewaters, process waters, mining wastewaters, or storm water runoff, provided that the discharge from such systems is monitored to assure compliance with all relevant water quality objectives as required by the Regional Boards; or,*
   b. *The water is in systems designed or modified for the primary purpose of conveying or holding agricultural drainage waters, provided that the discharge from such systems is monitored to assure compliance with all relevant water quality objectives as required by the Regional Boards."*

This policy does not define a procedure for de-designating a drinking water beneficial use purely on the basis of a lack of existing urban or municipal water users. Further, the SJR does not fall under any of the surface water exceptions described above:

- Electrical conductivity in the SJR does not exceed 5,000 μS/cm
- There is insufficient evidence to demonstrate that water cannot reasonably be treated for domestic use using either Best Management Practices or best economically achievable treatment practices
- The SJR is not designed to collect or treat municipal or industrial wastewaters, process waters, mining wastewaters, etc,
- The SJR designed or modified for conveying or holding agricultural drainage water.

Removal of the MUN beneficial use is therefore not justified for the SJR.

4.6 Leaching and Recommended Salinity Standards

Charles Burt, James R. Brownell and others presented information in comments and exhibits submitted by the SJRECWA (SJEC-EXH-01) and SJRGA (SJRG-EXH-06) showing that higher levels of irrigation water salinity can be tolerated if additional water

is applied to increase the leaching fraction. Dr. Burt's testimony focused on soil salinity management, making specific reference to the leaching required to maintain the salt tolerance of beans (1.0 ds/m or 1,000 μs/cm). He makes the point that beans (a salt sensitive crop) can be grown using 2.0 ds/m irrigation water as long as sufficient leaching water is provided. The leaching requirement argument is used to justify salinity objectives of 2.0 ds/m between Vernalis and the Merced River and 2.5 ds/m upstream of the Merced River. Chris White, representing the SJRECWA (SJEC-EXH-02), testified that a Vernalis standard of 1,100 μs/cm is appropriate, but no support is provided to demonstrate how this salinity would protect the beneficial use.

In contrast, the State Water Board's 1987 Technical Committee Report, prepared in response to State Board Order 85-1, found that an EC of 700 μS/cm is the water quality criterion "needed to protect the identified beneficial uses." The technical committee further found:

"*The criterion is intended to permit the use of water without any detrimental effects under the wide range if conditions encountered in irrigated agriculture in the San Joaquin Valley. An EC of 0.7 mmhos (700 μS/cm) permits production of all crops on all soils with adequate drainage in the SJR Basin and downstream in the southern Delta. Salinity levels above this require special cropping or water management techniques*."[8]

So while Dr Burt's testimony is correct, there are adverse impacts to this salinity management practice that should be considered. First, the burden of purchasing and applying additional water falls on the user, not the upstream discharger. Second, the application of additional water takes labor, energy and may interfere with other necessary field operations. Lastly, the situation would be aggravated in areas where infiltration rates are low. Higher leaching fractions would aggravate local drainage problems and increase the volume of irrigation return flow that directly or indirectly flows back to the SJR.

No information was provided during this periodic review to suggest that the above Technical Committee finding is incorrect or should be modified. All suggestions are qualified with needs to differently manage irrigation water. This different management of water shifts agricultural production costs from dischargers to water users.

4.7 UC Davis Study

The record includes a paper titled *An Approach to Develop Site-Specific Criteria for Electrical Conductivity to Protect Agricultural Beneficial Uses that Accounts for Rainfall* by Daniel Isidoro-Ramirez, Ph.D, Maria Jose Berenguer-Merelo, Ph.D., and Stephen R. Grattan, Ph.D. (SJRG-EXH-03). The authors are affiliated with the University of California, Davis and this paper has been submitted to the Regional Board by the University in support of their request for higher receiving water limits for Total Dissolved Solids in their NPDES permit for discharges of sewage to Putah Creek. Following initial review of the paper, Regional Board staff requested additional

[8] SWRCB, 1987, p. IV-9

background information needed to conduct a full evaluation of the model. The University submitted additional material on 25 May 2005, but staff is still conducting the analysis of the model.

Regardless of the merit of the model developed by Isidoro-Ramirez, et. al., the paper only covers soil, rainfall and other conditions specific to the Davis area and it would be inappropriate to apply the results discussed in this paper to other locations. If, in the future, the model procedures are determined to be valid, the approach can be used to evaluate the electrical conductivity needed to protect crop production at other sites.

4.8 Right to Discharge

Testimony by Chris White, representing the SJRECWA, urges the State Board to recognize both irrigation and drainage as beneficial uses of the SJR (Exhibit SJEC-EXH-02). Agricultural water supply (irrigation) is a beneficial use, but drainage is not. While drainage of salt from soil is necessary for irrigated agriculture to continue, the discharge of drainage waters to the SJR is a privilege, not a right (Water Code 13263(g)). As specified in the Water Code Section 13241, water quality objectives are to provide protection of beneficial uses, and are not established to allow use of a water body as a least cost drainage conveyance channel.

4.9 Salinity Recommendations

Regional Board staff recommends no change at this time to the existing South Delta and SJR salinity objectives. Specifically, we recommend no change to the current Vernalis water quality objectives of 700 and 1,000 µS/cm EC. Review of the exhibits submitted to the State Board show they contain no new science to justify changing the salinity objectives or to discount the science upon which the existing objectives are based.

5 Drinking Water Objectives

State Board received comments on the chloride objective in the Delta, the compliance location for the chloride objective, and proposed new objectives for drinking water constituents, specifically disinfection by-product precursors. Several of the comments referred to the Regional Board's efforts toward developing a comprehensive drinking water policy for the Central Valley, indicating that State Board should not initiate a separate effort to develop new objectives for drinking water constituents.

5.1 Drinking Water Recommendations

Regional Board staff has no recommendation regarding the chloride objective in the Delta, the compliance location for the chloride objective, or proposed new objectives. Staff concur with comments that State Board need not initiate a separate effort to develop new objectives for drinking water constituents and that State Board staff should continue to engage in the process for developing a drinking water policy for the Central Valley.

6 Summary Recommendations

Regional Board staff recommends no change at this time to the existing South Delta and SJR salinity objectives and Vernalis flow objectives. We also recommend that the effect

of any changes on on-going Regional Board dissolved oxygen and salinity control efforts be considered before making any changes to flow and salinity standards. Finally, we recommend that the State Board first consider approval of the Regional Board's Basin Plan Amendments and TMDLs for Salt and Boron, and Dissolved Oxygen before making any changes to the flow and salinity standards in the Bay-Delta Plan.

Specifically, we recommend no change to the current Vernalis water quality objectives of 700 and 1,000 μS/cm EC. Exhibits submitted to the State Board contain no new science to justify changing the salinity objectives or to discount the science upon which the existing objectives are based. The Regional Board will be conducting additional review of the exhibits and additional information as part of its on-going development of salinity objectives in the SJR upstream of Vernalis. Regional Board staff concurs with the State Board staff recommendation to give the Regional Board additional time to develop these upstream objectives.

7 References

CRWQCB, Amendments to the Water Quality Control Plan For The Sacramento River And San Joaquin River Basins For The Control Of Salt And Boron Discharges Into The Lower San Joaquin River, Final Staff Report, 10 September 2004, 2004.

CRWQCB, Amendments to the Water Quality Control Plan For The Sacramento River And San Joaquin River Basins For The Control Program For Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel, 28 February, 2005, 2005.

SWRCB, SWRCB Order No W.Q. 85-1 Technical Committee Report, Regulation of Agricultural Drainage to the San Joaquin River, Final Report, 1987.

SWRCB, Revised Water Rights Decision 1641, Adopted December 29, 2000, Revised March 15, 2000 in accordance with Order WR 2000-02, 2000.