Department of Water Resources
Comments Regarding
Southern Delta Salinity Objectives (Topic 10)
State Water Resources Control Board Workshop
on Amending the 1995 Bay Delta Water Quality Control Plan

The State Water Resources Control Board (SWRCB) has asked whether it should amend the 1995 Bay-Delta Water Quality Control Plan (WQCP) with regards to changing the Southern Delta salinity objectives for agricultural beneficial uses to: (1) modify the 0.7 EC and 1. 0 EC objectives to be more reflective of salinity tolerances of crops currently grown in the Southern Delta; (2) modify the methodology for determining compliance with the Southern Delta objectives to ensure protection of agricultural beneficial uses; and/ or (3) modify the effective period of the 0.7 EC and 1.0 EC objectives.

The WQCP water quality objectives for protecting agricultural beneficial uses in the Southern Delta are measured on a 30-day running average as Electrical Conductivity (EC, or mmhos/cm). The objective is 1.0 EC from September through March and 0.7 EC from April through August during all year types and is measured at four locations: (1) San Joaquin River at Airport Way Bridge, Vernalis, (2) San Joaquin River at Brandt Bridge, (3) Old River near Middle River, and (4) Old River at Tracy Road Bridge. As an alternative to the 1.0 EC and 0.7 EC objectives, the WQCP provides:

> "If a three-party contract has been implemented among the DWR, USBR, and SDWA, that contract will be reviewed prior to implementation of the above and, after also considering the needs of other beneficial uses, revision will be made to the objectives and compliance/monitoring locations noted, as appropriate."
> (Table 2 of WQCP, p. 17.)

The Department of Water Resources (DWR) does not recommend that the SWRCB change the salinity objectives at this time. However, DWR recommends that the SWRCB modify the WQCP Program of Implementation to recognize that implementation of the more stringent 0.7 EC objective would not be required at the three interior Southern Delta stations (Old River at Tracy Road Bridge, Old River at Middle River, and San Joaquin River at Brandt Bridge) until: (1) permanent operable barriers are constructed and, (2) after more information is obtained to determine if the 0.7 EC objective is reflective of the water quality needed for crops in the Southern Delta.

Summary of DWR Presentation

At this Workshop, DWR will present graphs of water quality data obtained from Delta monitoring stations and from modeling studies for the proposed

permanent operable barriers, a component of the South Delta Improvement Program (SDIP). The data demonstrates that water quality at the three interior Southern Delta stations is influenced by water quality at Vernalis, especially in the San Joaquin River at Brandt Bridge, and by areas of poor circulation in the Southern Delta channels. DWR will explain the Temporary Barrier Program and its effect on water quality in the Southern Delta channels. The monitoring data obtained at stations for the temporary barriers program shows that these barriers help reduce salinity in the channels. Results of historical monitoring data obtained at the stations identified in the WQCP show that the temporary rock barriers do not effect water quality sufficiently to achieve the 0.7 EC objective during much of the agricultural season in dry years. The modeling results of the permanent operable barriers, however, show that the operable barriers are more effective than the rock barriers at controlling salinity in the Southern Delta channels. The modeling suggests that operation of the permanent barriers will meet the WQCP objectives in the Southern Delta interior channels under most conditions, except at Brandt Bridge. Attachment B to these comments includes copies of DWR's power point slides showing this data.

The history behind the Southern Delta salinity objectives is well documented as it has been an important subject of water quality control plan and water right hearings since 1978 (See Final Environmental Impact Report (FEIR) for Implementation of the 1995 Bay-Delta WQCP, Nov. 1999 (prepared by the SWRCB for Decision 1641 (D-1641) water right hearings).) DWR's comments for this Workshop include historical information to give some perspective on the past complexity in addressing the Southern Delta salinity issues. In addition, the comments include issues related to implementation of the objectives in response to the SWRCB suggestion that information provided during the workshops might support DWR and Reclamation's request for a change in their water right permits. On February 18, 2005 DWR and Reclamation submitted two joint petitions to the SWRCB requesting changes to their water right permits to allow a delay in the April 1 effective date of the 0.7 EC objective at the three interior Southern Delta stations. The delay has been requested to allow DWR and Reclamation time to complete the SDIP environmental review process and the construction of the proposed permanent operable barriers.[1] In the denial of the agencies' petition for a temporary urgency change of their permits, the SWRCB indicated that information presented during the WQCP workshops could serve as a basis for the SWRCB to consider future changes in the objectives and subsequently in the water right permits. DWR believes that information provided during the workshop will support DWR's recommendation that the SWRCB

[1] On February 18, 2005 DWR and Reclamation submitted a petition for Temporary Urgency Change pursuant to Water Code 1435 and a petition for change of their water rights pursuant to Water Code 1700. The SWRCB denied the Temporary Urgency Change Petition and has not yet acted upon the change under section 1700.

amend the WQCP Program of Implementation to recognize that the Southern Delta 0.7 EC objective at the three interior stations should not be implemented until the permanent operable barriers are constructed.

History of the Southern Delta Objectives

In 1978, the Southern Delta salinity objectives were established to protect agricultural water quality needs of the area based on the type of crops, soil type, and irrigation practices found in the area. The values were determined from equations of University of California Guidelines used to establish a maximum salinity of the applied water in order to achieve 100 percent crop yield (FEIR at IX-3). Beans and alfalfa, which are salt sensitive, were chosen as target crops. In 1978 the applied water quality objective for beans was established as 0.7 EC to protect crops during summer irrigation (April through August) and the objective of 1.0 EC was to protect alfalfa during the winter irrigation season (September through March) (*Id*. At IX-4).

Although the Southern Delta salinity objectives were established as part of the 1978 WQCP, implementation of the objectives was deferred until DWR, Reclamation, and Southern Delta Water Agency (SDWA) could resolve implementation responsibility among themselves (1995 SWRCB Environmental Report for the WQCP, p. VIII-61). In 1982, the SDWA filed a lawsuit against DWR and Reclamation alleging that joint operations of the SWP and CVP detrimentally affected the quantity and quality of water supply within the SDWA service area. SDWA complained that at various times and locations water users in the SDWA suffered from poor water quality and diminished water levels (FEIR IX-6; Closing Statement of DWR for Phase 5 of the Bay Delta Water Rights Hearing (May 10, 1999)). Negotiations among SDWA, DWR and Reclamation resulted in an approach to address SDWA concerns. Beginning in 1985, a series of immediate actions were undertaken in response to complaints about water levels in the Southern delta channels. DWR dredged parts of Tom Paine Sough and installed three temporary pumps to transport water from Sugar Cut (near Old River) into Tom Paine slough for agricultural diversion. DWR also modified its operations at Clifton Court Forebay gates to minimize the potential for operational effects on water level in the Southern Delta. Further actions included additional interim releases from New Melones by Reclamation to improve water quality at Vernalis, and the construction of four large siphons to provide a more reliable supply of water from Old River into Tom Paine Slough.

In 1990 Reclamation, DWR, and SDWA signed a letter asserting that the water quality and water level needed in the Southern Delta would be adequately met based on a proposed settlement agreement designed to resolve the dispute among them over the impacts of SWP and CVP on SDWA channels. (See Attachment A, DWR Exhibit 37, Attachment 1 (Summary of Settlement, August 28, 1990).) Although the proposed settlement agreement has not been

executed, the agencies believe the actions in the proposal address their concerns. These actions include construction of three flow control structures in the Southern delta channels in Old River, Middle River, and Grant Line Canal that could significantly enhance water levels and circulation. An additional barrier at the Head of Old River was later identified to provide benefits to San Joaquin fall-run Chinook salmon. These flow control structures are now known as the permanent operable barriers described in the CALFED ROD South Delta Improvement Program (SDIP) (CALFED ROD p. 48-50 (August 28, 2000)).

As a predecessor of the permanent barrier program, in 1991 DWR began installing and operating temporary rock barriers to assist SDWA diversion in the Southern Delta and help avoid water level and circulation problems. DWR is presently permitted under Section 404 of the Clean Water Act to install and operate the temporary barrier program and will continue the temporary barrier program until such time as the permanent operable barriers are constructed.

Southern Delta Salinity and Decision 1641

During D-1641 hearings, DWR submitted testimony explaining the effects of the temporary rock barriers and the proposed permanent operable barriers. Although the modeling results and design of the barriers have been updated, much of the information is helpful in explaining the basis for pursuing permanent operable barriers. For these purposes, DWR testimony from the D-1641 hearings is attached to these comments (Attachment A "Testimony of DWR on the Southern Delta Salinity Objectives," DWR-37, Phase 5, September 1998). Under D-1641, DWR and Reclamation have responsibility for implementing the three interior Southern Delta salinity objectives. Currently DWR and Reclamation are obligated to achieve the 1.0 EC objective at these stations year round. Reclamation historically has been implementing the Vernalis 0.7 and 1.0 EC objectives under D-1442, and since 1998, under Order WR 98-09 and later under D-1641.

As described in the recently submitted petitions to the SWRCB, the DWR and the Reclamation have concerns with the upcoming date of April 1, 2005 in D-1641 when the 0.7 EC will, for the first time, be effective at the three interior Southern Delta stations, requiring compliance with this objective. Since 1993, in almost all years, DWR and Reclamation have been able to achieve the 1.0 EC objective in the Southern Delta channels, as shown by the historic salinity data obtained at the D-1641 compliance stations (see Attachment B graphs "Historic Salinity"). Monitoring data obtained as part of the temporary barriers program show that these barriers help reduce salinity in the area (see Attachment B graphs "Typical TBP Water Quality Improvements"). However, modeling of water quality during operation of the proposed permanent operable barriers suggests that the operable barriers will achieve better circulation in Middle River and Old River and, in most cases, achieve the WQCP objectives in the interior Southern

Delta. The incidences when the objectives are not being met occur at Brandt Bridge during the summer and when the EC at Vernalis is either at or above the water quality objectives (See Attachment B graphs "Permanent Barriers (SDIP)").

In September 1998 during the water right hearings that led to D-1641, DWR presented testimony explaining modeling results for the proposed permanent barrier operation showing improved water levels and circulation in the southern Delta area (Attachment A, DWR-37, p.15-22; D-1641 p. 9). DWR explained that water quality in the interior Southern Delta is dramatically improved with the permanent barriers because of the improved circulation (*Id.* at p. 19). DWR further explained that the proposed permanent operable barriers would provide greater ability to improve water quality and water levels beyond that available using the current temporary rock barriers (*Id.* at p. 19-20).

In D-1641, the SWRCB recognizes the limits of the temporary rock barriers to control salinity and notes that modeling shows that "operation of the *temporary barriers* should achieve water quality of 1.0 mmhos/cm at the interior stations under most hydrologic conditions." (D-1641 p. 88, emphasis added.) The SWRCB then requires that DWR and Reclamation be responsible for meeting the 1995 WQCP salinity objectives in the Southern Delta under the assumption that the projects would have the permanent operable barriers in place to meet the objectives by April 1, 2005 (D-1641, p. 88). In 1998, DWR gave testimony that it expected to conclude consultation under the Endangered Species Act (ESA) and complete the final EIR/EIS for permanent barriers by spring of 1999; and operation of two agricultural barriers and the fish barrier by early 2005 (Attachment A, DWR-37, p. 6).[2] The SWRCB linked the effective date of the 0.7 EC objective to installation of the permanent barriers in recognition that State Water Project (SWP) and Central Valley Project (CVP) operations without the barriers could not, in many years, achieve the more stringent objective. The SWRCB states in D-1641, in reference to the *permanent barriers*, that:

> "benefits of the [permanent] barriers are integral to the implementation of several of the actions approved in this decision. The benefits of the barriers could be achieved by other means, such as increased flows through the southern Delta and export restrictions, but these measures could result in unreasonable use of water and a significant reduction in water supplies south and west of the Delta" (D-1641 p. 10).

As stated in the petitions submitted to the SWRCB requesting a delay in the effective date of the 0.7 EC objective, DWR and Reclamation have had

[2] The third agricultural permanent barrier at Grant Line Canal was scheduled for operation in mid-2006 but the other Interim South Delta Program barriers were expected to begin operation in early 2005 with expected improvements in water circulation and water quality (DWR Exhibit to D-1641 hearing, DWR-37, p. 9).

significant delays in developing the environmental documentation for the permanent operable barriers. The agencies have recently been able to define a new schedule for the proposed project after the conclusion of two related actions: (1) USFWS and NOAA Fisheries biological opinions regarding project operations and effects on endangered species were completed in October 2004 [3] and, (2) the California Bay Delta Authority (CBDA) developing its schedule for Delta improvements in August 2004. The CBDA adopted a Delta Improvements Package (DIP) that sets forth a schedule of programs and projects that enabled the SDIP to move forward (August 12, 2004).[4] It was only after these actions that DWR and Reclamation were able to develop a reasonably accurate schedule for implementation of the permanent operable barriers.

Recommendation to Modify Program of Implementation

Monitoring data and modeling results obtained for the temporary barriers program and the SDIP demonstrate that DWR and Reclamation can operate the barriers to help reduce salinity in the Southern Delta to help achieve the WQCP objectives for agricultural beneficial uses. However, DWR and Reclamation cannot reasonably control salinity in the Southern Delta with additional water from the San Joaquin River due to limited resources from this over-allocated system. In addition, DWR and Reclamation cannot reasonably affect salinity in the Southern Delta channels with releases of water from the Sacramento River. The permanent barriers program has appeared to be the only feasible tool available to enable DWR and Reclamation to achieve lower salinities in the Southern Delta channels. As shown in the attached graphs, the operation of the permanent operable barriers can achieve the WQCP 0.7 EC and 1.0 EC at the three interior Southern Delta stations under most conditions, except at San Joaquin River near Brandt Bridge. The modeling suggests that conditions at Brandt Bridge are highly influenced by water quality in the San Joaquin River at Vernalis and from local degradation upstream of Brandt Bridge. The permanent operable barriers may provide more flexibility for managing flows and salinity in the San Joaquin River near Brandt Bridge given these factors. Therefore, DWR

[3] In July 2004 and October 2004, DWR and Reclamation received biological opinions for SWP and CVP operations from the USFWS and NOAA fisheries. The opinions include early consultation regarding impacts to endangered species from the proposed permanent barrier operations. If the proposed operations change from that described in the opinions, the early consultation will be revisited and the opinions revised to address the changes, if needed.

[4] The California Bay Delta Authority's Delta (CBDA) Improvements Package that identifies other actions needed to fully protect Delta in-basin users can be seen at the CBDA website http://calwater.ca.gov/ under Featured Links or www.calwater.ca.gov/DeltaImprovements/DIP/DeltaImprovementPackage.shtml.

recommends that the SWRCB provide for a delay in the implementation of the 0.7 EC objective to enable DWR and Reclamation time to construct the permanent operable barriers as it provides the only feasible method to achieve this objective.

DWR recommends that the SWRCB amend the Program of Implementation (POI) of the WQCP to recognize the importance of the permanent operable barriers in helping to control Southern Delta salinity and that implementation is related to this facility. In addition the SWRCB should recognize the need for additional study to better determine the water quality needs of crops and influences of upstream water management. Also, the SWRCB should modify language in the POI to be consistent with D-1641 implementation found at Table 2, footnote 5 (D-1641, p. 182). Therefore, DWR recommends that the last sentence of the first paragraph in the POI, Section B.4 (Southern Delta agricultural salinity objectives), should be deleted and replaced with the following:

"The 0.7 EC objective at Brandt Bridge, Old River near Middle River, and Old River at Tracy Road Bridge shall be implemented at these locations by December 31, 2008 and the 1.0 EC objective shall apply at these stations year-round until that date. However, the 0.7 EC objective shall be replaced by the 1.0 EC objective from April through August if permanent operable barriers are constructed in the Southern Delta and an operations plan that reasonably protects Southern Delta agriculture is prepared by DWR and USBR and approved by the Executive Director of the SWRCB. The SWRCB shall evaluate whether other salinity objectives would be more reflective of salinity tolerances of crops currently grown in the Southern Delta based on analysis of rainfall effect on irrigation water in the Southern Delta. This analysis should address whether water quality for crop germination is different than water quality required for later stages of crop development."

In addition, the SWRCB should modify the WQCP Table 2 to update footnote 5 based on implementation required under D-1641 and to reflect any proposed changes made to the WQCP after conclusion of these Workshops.