

Status of the Control Program for Salt and Boron Discharges into the Lower San Joaquin River – March 2014

Purpose. The purpose of this Information Item is to describe the status of activities related to the *Control Program for Salt and Boron Discharges into the Lower San Joaquin River* (Control Program), also known as the Salt and Boron TMDL. The Central Valley Regional Water Quality Control Board (Central Valley Water Board) adopted the Control Program into the Water Quality Control Plan for the for the Sacramento River and San Joaquin River Basin (Basin Plan) on

10 September 2004. The goal of the Control Program is to achieve compliance with salt and boron water quality objectives at Vernalis, the boundary of the Delta, without restricting the ability of dischargers to export salt out of the San Joaquin River basin. The Office of Administrative Law approved the amendment on 28 July 2006.

Background. The San Joaquin River and its tributaries are highly developed, with dams capturing and diverting much of the natural flow under most conditions (Figure 1). The river also serves as the natural drain for the San Joaquin Valley Basin, with flows entering the Sacramento-San Joaquin Delta at Vernalis. The Lower San Joaquin River (LSJR) is the section of river between the Mendota Pool and Vernalis. As a result of the hydrologic modifications, the quality of water in the LSJR during the irrigation season is dominated by agricultural practices, irrigation water supplies, and groundwater.

The Vernalis objectives are 700 micro Siemens per centimeter ($\mu\text{S}/\text{cm}$) electrical conductivity from April 1st through August 31st, and 1,000 $\mu\text{S}/\text{cm}$ from September 1st through March 31st. The salinity objectives were developed to protect the agriculture beneficial use in the South Delta, and the Control Program noted that “*Control Actions that result in salt load reductions will be effective in the control of boron*”.

The Control Program has several components. One component requires the Central Valley Water Board to use waste discharge requirements (WDRs) or waivers of WDRs to apportion salt load allocations to each of the seven geographic subareas (see Figure 2) that comprise the LSJR watershed and to salt loads imported by the Delta Mendota Canal (DMC) which is owned and operated by the U.S. Bureau of Reclamation (Reclamation). Dischargers of irrigation return flows are in compliance with the Control Program if they meet any of the following conditions:

1. Cease discharge to surface water,
2. Discharge does not exceed 315 $\mu\text{S}/\text{cm}$ electrical conductivity (30-day running average),
3. Operate under WDRs that include effluent limits for salt, or
4. Operate under a waiver of WDRs for salt and boron discharges.

The Control Program also provided dischargers the opportunity to participate in a Central Valley Water Board approved real time salinity management program (RTMP). Participation in an approved RTMP and attainment of salinity and boron water quality objectives constitutes compliance with the Control Program.

The Control Program includes a timeline for implementation with initial control actions on the most significant sources of salt and boron discharges to the LSJR. Priority for implementation of load allocations was given to subareas with the greatest unit area salt loading (tons per acre per year) to the LSJR. Table 1 presents the priority compliance schedule in the Control Program for each of seven subareas and the Delta Mendota Canal (DMC).

To address impact of salt loads from the DMC, the Control Program provides Reclamation the opportunity to either enter into a Management Agency Agreement (MAA) with the Central Valley Water Board clarifying how Reclamation will mitigate imported salt loads or adhere to load allocations specified in WDRs. The Central Valley Water Board and Reclamation signed an MAA in December 2008. As required by the Control Program, the MAA includes provisions for 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”. As required by its water rights permits, Reclamation has maintained compliance of the Vernalis objectives since the 1995 water year.

In the 2008 MAA, Reclamation also committed to initiate and facilitate stakeholder efforts to develop a real time salinity management program (RTMP). The RTMP would maximize salt export out of the LSJR drainage basin while meeting water quality objectives at Vernalis by timing saline discharges to those times when there is assimilative capacity in the river.

Figure 3 depicts the concept of assimilative capacity. The graph shows the electrical conductivity (EC) concentrations in the San Joaquin River at Vernalis from the fall of 1992 through the fall of 1993. The dashed horizontal lines show the EC objectives for the river at Vernalis. The dashed line at 700 umhos/cm represents the Vernalis objective for the irrigation season and the dashed line at 1,000 umhos/cm is the Vernalis objective for the non-irrigation season

Whenever the graphed line goes above the dashed lines, as in April and August, EC levels exceeded the Vernalis objective. By contrast, whenever the graphed line is below the dashed lines, the river had assimilative capacity to take on more salt without exceeding the Vernalis objectives. So, if some of the salt discharged to the river during April and August could have instead been controlled and released to coincide with those periods when there was assimilative capacity in the river, the exceedences could have been avoided.

The 2008 MAA acknowledges uncertainty regarding the potential for establishing a real time salinity management program (RTMP) for the river. To address this uncertainty, specific tasks were incorporated into the MAA including performing initial RTMP monitoring, quantification, and evaluation. After completion of these items under the MAA, the Central Valley Water Board and Reclamation were to review the results to better define future efforts in an updated MAA.

During a Central Valley Water Board meeting on 3 February 2011, staff from both agencies gave presentations on the status of the MAA activities performed in 2009 and 2010, and the efforts under way to update the agreement. At that time, Central Valley Water Board staff was directed to review Reclamation technical studies, once completed, and to prepare an updated MAA.

The Control Program also anticipated that salt and boron water quality objectives and a program for implementation would be developed for the San Joaquin River from Mendota Dam to the Airport Way Bridge near Vernalis by September 2005. Staff conducted initial California Environmental Quality Act (CEQA) scoping sessions in May 2005, a public workshop in February 2006, and follow-up CEQA scoping in March 2009, and released a draft technical report on salt tolerance of crops in the lower San Joaquin River Basin in 2010. During 2010, work on developing salt and boron water quality objectives in the LSJR was incorporated into the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) initiative framework. The stakeholder-led LSJR Committee was formed under the CV-SALTS umbrella and tasked with developing the objectives and implementation program. The committee has been meeting since October 2010.

Status Update.

Management Agency Agreement (MAA). Since February 2011, Reclamation staff has initiated or completed several studies as follows:

- On 13 February 2013 Reclamation delivered two technical LSJR Watershed salinity memorandi: 1) Water Budget, Westside Salt Assessment, and 2) Salt and Nitrate Budget, Westside Salt Assessment.
- Pilot studies tracking salinity discharges from Mud Slough, the Grassland Resource Conservation District (GRCD) and the Grassland Bypass Project (GBP) area are anticipated to be completed in 2014.
- A pilot salt load forecasting model was developed and is being improved with input from local stakeholders as well as staff from the Department of Water Resources and Central Valley Water Board.
- Reclamation is working closely with the Westside San Joaquin River Watershed Coalition and other interested parties to complete a real time salinity management program framework document.

Real Time Salinity Management Program (RTMP) An important concept for development of a RTMP is “assimilative capacity.” Assimilative capacity of the LSJR can be defined as the mass load of salt that can be safely discharged to the river without exceeding the water quality objectives at Vernalis. The draft RTMP framework document will describe a set of water monitoring and management actions coordinated in conjunction with real time forecasts of river water quality to discharge salt during days that the river has assimilative capacity. Proper phasing of the effort is critical to ensure that salinity management can be adapted based on changes in water quality, water supplies, flow regimes, and other ongoing regulations and potential projects. The current draft framework document describes a phased approach to logically transition into a fully functioning RTMP.

Implementation of the RTMP described in the draft framework document includes four phases scheduled over the next 60 months. As the fully functional RTMP is being developed, Reclamation will continue to ensure that salinity objectives are met at Vernalis through fresh water releases from New Melones Reservoir.

The first phase, currently in progress, will be completed by 28 July 2014 – this is the first Control Program compliance date. The second, third, and fourth phases are anticipated to be completed in 12, 36, and 60 months, respectively, after 28 July 2014. The following summarizes activities identified for each phase in the draft RTMP document. The draft will be vetted with local stakeholders and through the CV-SALTS LSJR Committee before finalization.

Phase 1: Initiation Phase.

- To be completed prior to first compliance date of 28 July 28 2014,
- Identify the monitoring stations necessary for the River Forecast Model,
- Develop a River Forecast Model approach for the RTMP,
- Determine the appropriate forecasting interval,
- Develop operation and maintenance requirements for the monitoring stations (for the forecasting model) along with costs and funding for the monitoring stations,

- Complete pilot studies on: tracking discharge salinity that includes existing activities and monitoring in the Mud Slough drainage area (including the drainage of the GRCD and the GBP); and salt control techniques at GBP,
- Develop a Memorandum of Understanding (MOU) to organize participants and provide a mechanism for additional participants,
- Develop Management Agency Agreement between Reclamation and the Central Valley Water Board that identifies Reclamation activities supporting a RTMP.

Phase 2: Development Phase.

- Begin at first compliance date and complete in 12 months,
- Stakeholders participating in the RTMP will demonstrate and refine salinity management methods. Stakeholders can evaluate the GRCD demonstration project networked monitoring and control system and the GBP salinity control techniques for useful program development information,
- Participants throughout the program will as necessary improve the existing monitoring stations, install additional stations, and cooperate to further develop a model to be used to forecast SJR assimilative capacity,
- Initial participants in the RTMP will cooperate under the MOU including developing approaches for funding the necessary activities,
- Develop the data platform to support the River Forecast Model,
- Outreach will continue for additional stakeholders.

Phase 3: Early Implementation Phase.

- To be completed 36 months from first compliance date,
- One or more cooperating agencies or other entities will conduct programmatic weekly forecasting of assimilative capacity in the SJR. Data sharing is of utmost importance to the successful implementation of the RTMP; key stakeholders will be asked to share flow and water quality information throughout the basin,
- The RTMP participants will analyze the need for additional infrastructure and identify necessary funding requirements through the MOU,
- Develop and recommend specific additional management practices needed to better coordinate the real time operation of discharges to the San Joaquin River,
- Continue outreach for additional stakeholders.

Phase 4: Implementation Phase.

- To be completed 60 months from first compliance date,
- RTMP Participants will be implementing monitoring, data networking, management practices and utilizing the forecast model to coordinate the timing of discharges,
- RTMP participants will be addressing long-term funding and management needs,

- Additional parties would join by their Basin Plan compliance date. The future level of participation by additional regulated parties in the real time management program is difficult to predict. It is anticipated, however, since the alternative will be fixed load allocations, the coordinated and collaborative approach envisaged under a RTMP would be more cost-effective in the long term,
- It is further anticipated that during Phase 4 continuous implementation will bring about improvements to data processing, quality assurance and the river assimilative capacity forecast modeling.

Parallel Activities. Although stakeholders are committed to developing a fully-functional RTMP, several activities are being conducted in parallel with the effort:

- Reclamation is continuing to release mitigation flows to meet its water rights permit requirements including compliance with the Vernalis salinity objectives,
- Provisions of the Control Program have been incorporated by reference into both the Western San Joaquin and Eastern San Joaquin WDRs General Orders under the Irrigated Lands Regulatory Program, and
- Reclamation and Central Valley Water Board staff are preparing an updated MAA that reflects anticipated activities under a RTMP.

Development of Salt and Boron Water Quality Objectives and an Implementation Program for the Lower San Joaquin River

Central Valley Water Board staff is working with the CV-SALTS LSJR Committee on the identification of appropriate salinity and boron water quality objectives for the river between its confluence with the Merced River and Vernalis as well as an implementation program to ensure that the objectives are met. A detailed workplan has been developed with a draft Basin Plan Amendment anticipated for Central Valley Water Board consideration in December 2015. To date, the committee has been developing background material for the proposed amendment including a review of existing beneficial uses, an update of baseline water quality conditions, an initial screening matrix for alternative implementation strategies and a modeling tool to evaluate alternatives. (The real time salinity management program is being evaluated as one of the implementation alternatives to meet salinity objectives within that reach of the river.) The committee is currently addressing issues raised with the 2010 draft staff report on crop tolerances in order to identify appropriate salinity water quality objectives to protect agricultural supply. Adjustments to the dischargers allowable salt export allocations under the Control Program may be necessary depending on the outcome of the objectives setting process.

Next Steps.

It is expected that the Westside San Joaquin River Watershed Coalition on behalf of participating agencies and individuals within its boundaries and the Grassland Basin Drainers on behalf of all of its participants will sign the MOU by 28 July 2014. The executed MOU will be incorporated as Attachment A into the RTMP Framework document to be presented to the Central Valley Water Board during the Summer of 2014. Other districts, coalitions, or individuals in each of the other LSJR sub-basins may join at the outset or in the future.

Reclamation and the Central Valley Water Board staff are finalizing an updated MAA. The updated MAA will outline commitments over a five-year term. The updated MAA will reference a

workplan that the agencies will develop annually. The workplan will prioritize and forecast needs and funding over the term of the MAA. The executed MAA will be incorporated as Attachment B into the RTMP Framework document.

Reclamation, LSJR stakeholders and Central Valley Water Board staff anticipate bringing a proposed RTMP and an updated MAA to the Central Valley Water Board for consideration during the summer of 2014. The timing coincides with the compliance deadline required by the Control Program for salt discharges from the Northwest Side Subarea, the Grassland Subarea, and the DMC.

The Lower San Joaquin River Committee anticipates bringing a proposed Basin Plan Amendment on salt and boron objectives for the river upstream of Vernalis to the Central Valley Water Board for consideration in December 2015.



Figure 1. San Joaquin River Basin

Central Valley Regional Water Quality Control Board
 27/28 March 2014 Information Item

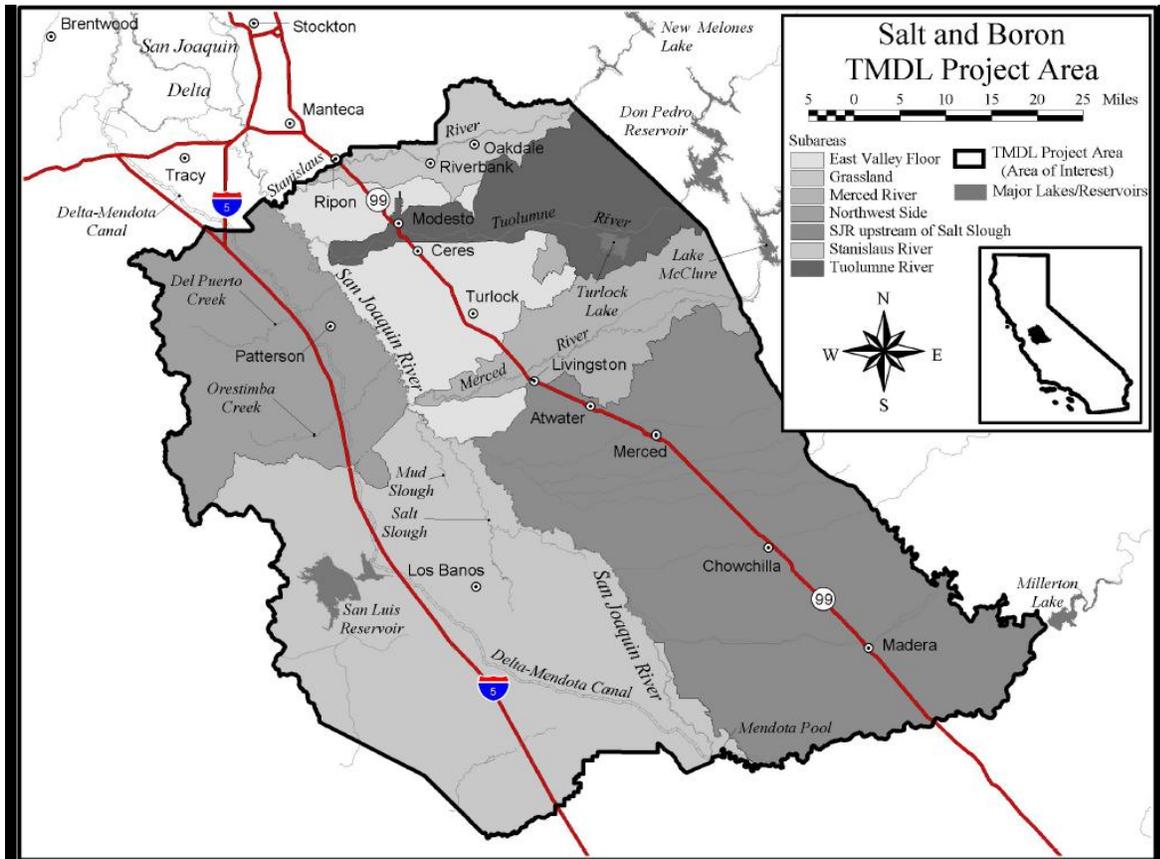


Figure 2. Control Program Subareas

Subarea	Map No.	Wet through Dry Water Year Type Deadline	Critical Water Year Type Deadline
Northwest Side	4	July 28, 2014	July 28, 2018
Grassland	2	July 28, 2014	July 28, 2018
Delta Mendota Canal (DMC) ^a	labeled	July 28, 2014	July 28, 2018
Tuolumne River	6	July 28, 2018	July 28, 2022
East Valley Floor	3	July 28, 2022	July 28, 2026
SJR Upstream of Salt Slough	1, 1a	July 28, 2022	July 28, 2026
Merced River	5	July 28, 2022	July 28, 2026
Stanislaus River	7	July 28, 2022	July 28, 2026

^a DMC is not a Subarea

Table 1. Lower San Joaquin Subarea Salt and Boron Control Program Compliance Schedule

San Joaquin River near Vernalis 30 Day Running Average Electrical Conductivity

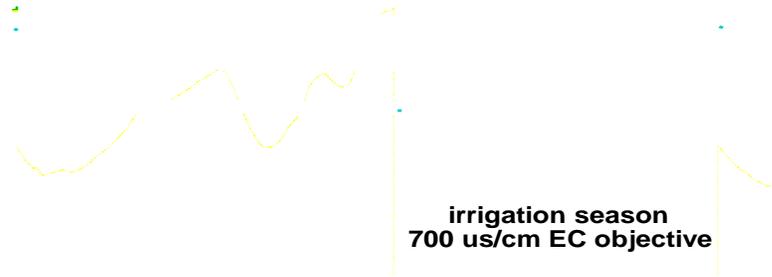


Figure 3. Assimilative Capacity Example