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DWR actions to control salinity in the San Joaquin River upstream of Vernalis

This section summarizes the programs and activities that DWR has engaged in order to reduce the volume and concentration of saline discharges to the San Joaquin River. This information demonstrates the actions that DWR in cooperation with the United States Bureau of Reclamation (USBR) and local agencies have taken and plan to take to help achieve water quality standards in the Lower San Joaquin River Delta.

These measures include: 1) Providing fresh water to dilute saline discharges and to increase flows upstream of Vernalis through the Vernalis Adaptive Management Program (VAMP) agreement and 2) Controlling discharge of saline water into the SJR upstream of Vernalis.

1. Measures to provide fresh water for dilution of saline flows above Vernalis

1. Vernalis Adaptive Management Plan. The San Joaquin River Agreement (SJRA) commits DWR to fund water purchases to meet flow requirements on the SJR for VAMP until water year 2010. Under the SJRA, the USBR and DWR agreed to spend up to \$3 million and \$1 million, respectively, per year to purchase VAMP water. Until 2004, VAMP water flows volume averaged 63,000 ace-feet from mid April to mid May. In 2005, generally wet conditions in the San Joaquin River basin and tributary basins resulted in relatively high flow conditions entering the spring of 2005. Due to these high flows, DWR was unable to install the temporary Head of Old River Barrier (HORB). Additionally, the flow in the San Joaquin River at Vernalis exceeded the maximum VAMP target flow of 7,000 cfs during the VAMP pulse flow period, therefore no supplemental water was provided by the SJRGA agencies. Due to wet conditions in 2006, a similar scenario is expected.
2. Recirculation. The concept of recirculation means releasing CVP and potentially SWP water pumped from the Sacramento-San Joaquin River Delta into the Newman Wasteway and the San Joaquin River via Delta-Mendota Canal. Identified in D-1641, the concept could be a useful tool to help improve the overall flow and water quality in the San Joaquin River Basin. Still many questions need to be answer to determine its feasibility. DWR collaborated with the USBR and other agencies in a successful Pilot Recirculation Study conducted in August 2004. Currently, DWR is exploring its participation as the lead State agency in an EIR/EIS and a feasibility study of the concept.

2. Measures to control salinity in the San Joaquin River upstream of Vernalis

In D1641, the SWRCB recognizes that regional management of drainage water is the preferred method to meet the SJR objectives (page 84). Measures to control salinity upstream of Vernalis include: (a) On-farm management activities to reduce subsurface drainage, (b) Real-time water quality management to maximize the assimilative capacity of the SJR, and (c) Efforts to improve wetlands discharges:

a) On-Farm Drainage Management Activities

Drainage management activities involving source control have proven to be effective in reducing salt loads in the San Joaquin River. These measures include:

- Irrigation Water Conservation such as use of improved irrigation systems;
- Agricultural tailwater and tilewater control and recycling; and
- Agricultural subsurface drainage water reuse through the San Joaquin River Improvement Project.

Even though the San Joaquin Valley Drainage Implementation Program (SJVDIP) has been idled since 2003, DWR continues to implement many of its recommendations through its Agricultural Drainage and Water Use Efficiency Programs and working in partnership with California Universities, CALFED, USBR, Resource Conservation Districts, Watershed groups, Water and Drainage Districts and many other Local, State and Federal entities. These activities include:

- a) providing grants for control of agricultural drainage water and reduction of its toxic elements using (Propositions 13, 50, and 204) and DWR own project fund monies,
- b) developing, educate, and promote the use Integrated On-Farm Drainage Management Systems (IFDM) in the San Joaquin Valley,
- c) providing technical assistance and collaborating with water and drainage districts, and local entities to reduce and control surface subsurface agricultural drainage water,
- d) maintaining research and demonstration projects to develop drainage reuse systems, including development of cost effective salt tolerant crops, drainage treatment and disposal technologies, and salt separation and utilization,
- e) monitoring the quality and distribution of shallow groundwater water levels in drainage impaired areas of the San Joaquin Valley.

DWR is also a participant in additional efforts proposed by the USBR and Regional Agencies to control saline water discharges into the San Joaquin River. DWR participates by providing technical assistance and cooperation, data, plan review and funding in many cases. These efforts include the West Side Regional Plan, USBR's San Luis Drainage Feature Reevaluation to provide drainage service to the San Luis Unit of the CVP, USBR's Evaluation of its Operation Plan of New Melones Reservoir, and the Integrated On-Farm Drainage Management Program that DWR and collaborating agencies maintain. In addition, DWR supports the recommendations of the San Joaquin River Management Group made on its report controlling salinity in the San Joaquin River. Recommendations include:

1. Fully implementing the West Side Regional Drainage Plan.
2. Further evaluating and pursuing managed wetland drainage management actions to mitigate impacts of February through April drainage releases.
3. Developing a real-time water quality management coordination group involving LSJR tributaries, LSJR drainers and DWR to coordinate reservoir release and SWP/CVP Project operations (Head of Old River Barrier and New Melones operations) to realize opportunities to improve water quality and increase the utility of stored water releases.

The San Joaquin River Water Quality Management Group has merged into the Water Quality Subcommittee of the San Joaquin River Management Plan (SJRMP) with the purpose of implementing the above recommendations. DWR is a lead agency for the SJRMP.

One important activity of this program is forecasting flow and salinity conditions on the SJR so that decision makers can take advantage of assimilative capacity of the river when available. For this purpose, DWR collects data from the network of stations and inputs it into the San Joaquin River Input-Output Day (SJRIODAY) model. The model forecasts salinity and flow conditions on the River near Vernalis, and other upstream stations on a biweekly basis. DWR publishes the information on its website on a weekly basis. Currently DWR is evaluating options to upgrade the current forecast model and extend its capabilities to the LSJR compliance points.

c) Efforts to Improve Wetlands Discharges

As per 1998 data, wetlands discharges contributed about 9% of the total salt load in the San Joaquin River at Vernalis. The contribution is likely to be higher today as additional water supply and land are acquired for managed wetlands wildlife refuges through CVPIA, EWA, and other programs. Timing of wetland releases with assimilative capacity of the SJR will result in significant water quality improvements. However, little has been done in this regard due to concerns over disrupting existing, proven wetland management practices.

Research is needed to determine if improved wetlands management practices can be achieved for the benefit of both wildlife and SJR water quality. Current research has focused on real-time water quality monitoring and adaptive management. Research goals are to coordinate timing of wetland discharges when assimilative capacity is available. Multiple grants have been provided for these purposes. In addition to funds provided by CALFED for the study on the *Effect of Delayed Wetland Drawdown on Moist Soil Plants*, staff from DWR and DFG is conducting a joint study to assess other aspects of delayed wetland drawdown. The study will complement DFG's current wetland drawdown research. DWR, DFG and U.C. Davis staff is working cooperatively on preparing the study plan.

The studies on delayed wetland drawdown are complemented with a study funded by DWR under Proposition 204 (drainage sub-account). The study is a part of the Real-time Water Quality Monitoring Program.