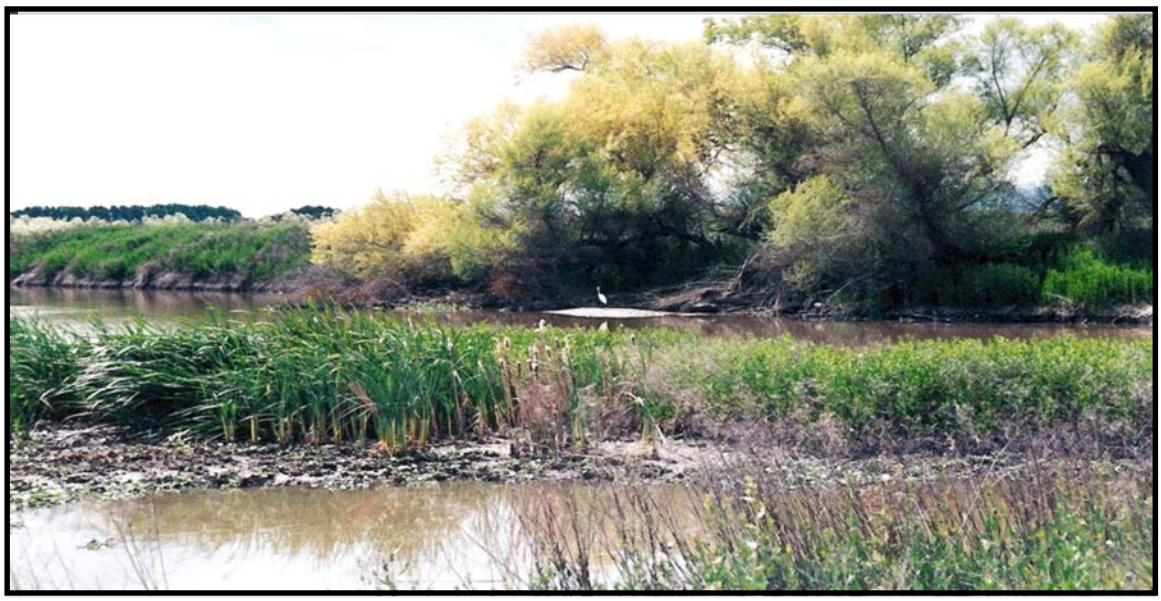
RECLAMATION

Managing Water in the West

DRAFT Annual Work Plan, FY2017

October 1, 2016 – September 30, 2017

In compliance with the "Management Agency Agreement between the Central Valley Regional Water Quality Control Board and the United States Bureau of Reclamation" executed on December 04, 2014



Salt Slough near Los Banos, CA

U.S. Department of the Interior
Bureau of Reclamation

July 01, 2016

Table of Contents

Tables:

Abbreviations and Acronyms

Action Plan	Actions to Address the Salinity and Boron TMDL Issues for the Lower San Joaquin River November 2008
Authority	San Luis & Delta-Mendota Water Authority
Basin Plan	Water Quality Control Plan for the Sacramento and San Joaquin River Basins, 4th Edition
BMP	Best Management Practices
BO	Biological Opinion
CALFED	California Bay-Delta Authority
CCID	Central California Irrigation District
CDEC	California Data Exchange Center
CDFW	California Department of Fish and Wildlife
Corps	U.S. Army Corps of Engineers
CVO	Central Valley Operations
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CV Water Board	Central Valley Regional Water Quality Control Board
CV-SALTS	Central Valley Salinity Alternatives for Long Term Sustainability Stakeholder Group
D-1641	State Water Resources Control Board Decision 1641
DMC	Delta-Mendota Canal
DSS	Decision Support System
DWR	California Department of Water Resources
EC	electrical conductivity
GBP	Grassland Bypass Project
GDA	Grassland Drainage Area
GOES	Geostationary Operational Environmental Satellites
GRCD	Grassland Resource Conservation District
GWD	Grassland Water District
LBNL	Lawrence Berkeley National Laboratory
LSJR	Lower San Joaquin River
MAA	Management Agency Agreement
µS/cm	micro Siemens per centimeter
mg/L	milligram(s) per liter (parts per million)

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PTMS	Program to Meet Standards
Reclamation	United States Bureau of Reclamation
RTMP	Real Time Management Program
Service	U.S. Fish and Wildlife Service
SJR	San Joaquin River
SJRIP	San Juan Recovery Implementation Program
SJTSP	San Joaquin Tributary Settlement Process
State Water Board	State Water Resources Control Board
TAF	thousand acre-feet
TDS	total dissolved solids
TMDL	total maximum daily load
VAMP	Vernalis Adaptive Management Plan
WARMF	Watershed Analysis Risk Management Framework
WARMF – SJR	Watershed Analysis Risk Management Framework San Joaquin River
WDR	Waste Discharge Requirement
WQO	water quality objective
WRDP	Westside Regional Drainage Plan
WSI	Water Supply Index

Reclamation San Joaquin River Salinity TMDL MAA Fiscal Year 2017 Annual Work Plan

Purpose

The Central Valley Regional Water Quality Control Board's (CV Water Board) Salt and Boron Total Maximum Daily Load (TMDL) for the San Joaquin River was approved and placed into effect on July 28, 2006. In response to the Salt and Boron TMDL, the United States Bureau of Reclamation (Reclamation) drafted an Action Plan (dated July 9, 2008) and entered into a Management Agency Agreement (MAA) with the CV Water Board on December 22, 2008. The Action Plan was created to accompany the MAA and provide details about Reclamation's planned activities to comply with the TMDL. Many of the activities were scientific in nature and intended to characterize the basin and identify future projects to meet the needs of the TMDL. A good example study that has been completed is the Delta Mendota Canal (DMC) Recirculation Project. This project evaluated the feasibility of recirculating water from the DMC to the San Joaquin River and back into the DMC when necessary to reduce the salinity concentration in the river. The project was not deemed feasible but serves as an example of the scientific study and discovery that was accomplished to find effective salinity management practices for the San Joaquin River.

The initial requirements for creating a real-time management program for the San Joaquin River were also explored and a real-time pilot has been implemented in the San Joaquin watershed to be used as an example for stakeholders within the watershed. A Reclamation Compliance Plan (dated May 2010) and Compliance Report (dated May 2010) were also written to provide the methodology used for the activities described in the Reclamation Action Plan. These documents contain information regarding the technical analysis, computation, and methodology utilized in each Reclamation activity. The updated MAA states that Reclamation actions will be described in an Annual Work Plan. The Annual Work Plan serves as a continuation of the work that was initiated in the Reclamation Action Plan.

The Annual Work Plan summarizes annual planned activities to be conducted by Reclamation in conjunction with each element outlined in the MAA.[1] The original Action Plan described Reclamation's past practices and procedures to mitigate and manage adverse impacts of salt and boron imported into the San Joaquin Basin via the Delta Mendota Canal (DMC) in order to help achieve compliance with the objectives contained in the CV Water Board's *Water Quality Control Plan for the Sacramento River and the San Joaquin River Basins – 4th Edition* (Basin Plan). Those actions have now been updated, added to the MAA and are reported in the Annual Work Plan.

Reclamation performs a variety of salinity management activities within the San Joaquin watershed. Examples of these activities include the Grassland Bypass Project, WaterSMART Grant Program, New Melones Plan of Operations, real time salinity management program

[1] The activities in the Work Plan are subject to the availability of a financial allocation.

development, support to the Westside Regional Drainage Plan and salinity management support to Grassland Water District and State and Federal wildlife refuges. Reclamation has committed significant resources to the development of a real time management pilot project in Grassland Water District to initiate the real-time water quality management program. Reclamation is committed to continuing the development of real time salinity management within the San Joaquin River watershed to reduce reliance on New Melones dilution flows. Reclamation's planned activities for FY2017 regarding the real time salinity management program are described in this work plan.

Reclamation Staff Resources

Table 1 lists Reclamation staff resources that are utilized at least in part for activities relating to salt and boron in the San Joaquin River.

Table 1: List of Reclamation Staff

Agency	Staff Resource Name	Role
USBR		PTMS project manager
Lawrence Berkeley National Lab/USBR	Nigel Quinn	Technical Expert contracted to Reclamation
USBR	Michael Mosley	Regional Water Quality Coordinator
USBR	Michael Eacock	Natural Resource Specialist
USBR	Jun Wang	WARMF modeler
USBR	Kirk Nelson	Contract manager; modeler
USBR	Junaid As-Salek	Contract manager; modeler

Goals and Objectives for FY 2017

All the activities and technical support planned for the 2017 fiscal year are intended to provide resources, information and support to San Joaquin stakeholders that wish to participate in the real-time management program. Reclamation intends to spend substantial time conducting outreach activities and providing technical support to those who wish to gather knowledge and/or participate in real-time management. Reclamation will continue to fund and support the real-time management program through the real time management stakeholder group. Experience gained from the Grassland Water District pilot will also be utilized to guide expansion of the program into other water districts, refuges and entities in the San Joaquin River Basin.

Goals for the 2017 fiscal year:

- Continue funding and managing a contract to support and develop the WARMF Online website for stakeholder use.
- Begin posting stakeholder drainage discharges into the San Joaquin River on WARMF Online – beginning with data from GWD. Work with stakeholders to develop real-time drainage data QA – using WISKI or similar software tools.
- Hold two Technical Research Team (TRT) meetings in Los Banos and/or Modesto to facilitate stakeholder participation.
- Assess model accuracy at predicting flow and EC at Vernalis; analyze data requirements that will be required to incorporate upstream San Joaquin River EC standard into the model forecast.
- Continue to provide technical support as needed.
- Continue the effort to incorporate real-time east side SJR data into the WARMF forecast model.
- If approved, utilize grant funds awarded to install and/or improve monitoring stations on the Merced and Tuolumne Rivers

The Bureau of Reclamation, in response to the passage of the Water Supply, Reliability, and Environmental Improvement Act (Public Law 108-361), which includes the CALFED Bay-Delta Authorization, has initiated implementation of the Program to Meet Standards. This program intends to provide greater flexibility in meeting existing water quality standards for the CVP; a major objective of the program is to reduce reliance on releases from New Melones Reservoir for water quality purposes. Reclamation currently utilizes the CALFED funding authorization for the Program to Meet Standards.

The goals for the 2017 fiscal year, listed above, include improvements and refinements to the existing WARMF San Joaquin River forecast model with emphasis on ease of use, automation of data inputs (which can take up to 3 hours to complete) and visualization of both data input and WARMF model output. A significant initiative in FY-2017 will be continuing the development of online tools. These tools will allow users to access flow, water quality and meteorology data that is used directly in the model. This work coincides with work commissioned by the East-side Drainage Coalition under grant funding from the Environmental Protection Agency.

Reclamation will continue to provide technical support for the current real-time monitoring network and for those entities which desire to participate in real time management. Each water district will pose a different challenge given the different levels of monitoring, reporting and automated control capabilities. Real-time drainage data quality assurance (QA) is known to be a potential impediment to sharing real-time data. Concerns from each district will be addressed to build participation and reliance on the forecast model and sensor network. The Basin Plan includes a tiered implementation schedule; some stakeholders have chosen to participate despite the fact that they are not required by the Basin Plan to participate for several more years.

Another goal associated with technical support is improved communication to solicit information on flows, EC and salt loads discharged or diverted from the river that can be utilized to improve the quality of the forecast model. The Los Banos and/or Modesto stakeholder meetings will

improve Reclamation's ability to deliver this technical support where needed during the fiscal year.

Other planned activities include incorporating real-time data from Turlock Irrigation District into the WARMF forecast model and holding periodic informational meetings with stakeholders on the real-time salinity management program. Lawrence Berkeley Lab will continue activities to improve the accuracy of the model at simulating flows and salt loads generated at the sub-watershed level. The work will focus on the eight west-side drainage stations and the managed wetland entities; improved model accuracy should facilitate stakeholder acceptance of the WARMF forecast model predictions. Reclamation staff is working to create a schedule for Modesto Irrigation District, but our time and resources in fiscal year 2017 will continue to focus on Turlock Irrigation District.

The following are specific FY17 program goals and objectives:

A. Manage contracts.

B. Provide technical support to the RTMP network.

1. Vital stations along the River and on the west side of the San Joaquin basin:[2]
    i. Salt Slough at Hwy 165 (near Stevenson)[a]
    ii. Mud Slough near Gustine (GBP Site D)[a]
    iii. Mud Slough above San Luis Drain Confluence (GBP Site C)[b]
    iv. San Luis Drain at Outlet (GBP Site B)[b]
    v. Los Banos Creek at Highway 140[c]
    vi. Newman Wasteway[a]
    vii. Marshall-Spanish-Moran Drains[c]
    viii. Ramona Lake[c]
    ix. Orestimba Creek near Crows Landing[a]
    x. Westley Wasteway[c]
    xi. Del Puerto Creek[c]
    xii. Hospital Creek[c]
    xiii. Ingram Creek[c]
    xiv. San Joaquin River near Patterson[d]
    xv. San Joaquin River at Maze Road bridge[d]
    xvi. San Joaquin River near Crows Landing[a]

2. Reclamation is providing troubleshooting assistance and overseeing maintenance of the west side stations in cooperation with the Westside Drainage Authority.

[2] Stations are referenced from the 2014 San Joaquin River RTMP Framework Document
(a) Stations maintained by the USGS under contract with Reclamation
(b) Stations monitored for the Grassland Bypass project by the San Luis and Delta Mendota Water Authority with funding from Reclamation
(c) Station monitoring supported by the Westside Drainage Authority (maintenance) and Reclamation (upgrades and troubleshooting)
(d) Stations maintained by DWR

Reclamation has contracted with the USGS for routine maintenance of many of the San Joaquin River stations as well as the important west-side tributary stations at Mud and Salt Slough. Reclamation currently cooperates with the USGS to provide timely technical support to minimize station down time.

C. Provide funding and technical support to the Grassland Resource Conservation District.

1. To support the district's real-time salinity management staff, equipment, etc. During FY 2016 solutions will need to be found to replace the current YSI-ECONet system, which is being retired by the XYLEM Corporation (which acquitted YSI). Considerable effort is being expended to find a cost-effective long-term solution. Several grant applications have been submitted to funding agencies to share some of the cost of the system refurbishment. Replacement of the data loggers alone for the 50 stations could cost in excess of $200,000.

D. Provide technical support for RTMP in the San Joaquin watershed; data acquisition from Irrigation Districts on the east and west sides of the San Joaquin Basin.

1. Real-time management technical support throughout the basin.
2. Provide funding for a technical expert in real-time management. The technical expert is Nigel Quinn, through an Interagency Agreement with Lawrence Berkeley Laboratory.
3. Considerable field level experience has been gained over the past 15 years with respect to monitoring station design, monitoring equipment integration and data telemetry options. The goal has always been to increase and improve data access while causing minimum disruption or security threat to potential data providers. Reclamation continues to be involved in researching new sensors and monitoring technologies and improving monitoring integration. Reclamation has experience with solutions for real-time data quality assurance using the hydrological data management software WISKI. This software is presently being used by Merced, Turlock and Modesto Irrigation Districts and was recently installed in Grassland Water District.

E. Work directly with Turlock Irrigation staff to develop a cost-effective and secure real-time data access solution.

1. During FY2017 continue the series of meetings with TID staff to explain the goals and principles of real-time salinity management and explain model data needs and technical requirements for access. The most recent meeting concluded with a commitment from TID engineers and IT personnel to develop a prototype solution for testing. Although the east side of the SJR are not scheduled for compliance with the salinity TMDL or required to fully implement real-time management until after 2016, early participation by TID and other stakeholders is appreciated and important to the success of real-time salinity management in the LSJR Basin.

F. Hold Technical Research Team (TRT) meetings in Los Banos and/or Modesto with Stakeholders

G. Run the San Joaquin River salinity forecast model weekly and make the information available to San Joaquin River Stakeholders

1. Although Reclamation currently funds both development and use of the WARMF forecasting model – the long term goal is to share this activity among primary stakeholders. These include the California Department of Water Resources, the Westside Drainage Coalition, the Eastside Drainage Coalition and Reclamation. Responsibility for developing weekly forecasts has been successfully shared between small numbers of entities in past regulatory programs.

H. Participate in CV-SALTS.

1. Reclamation attends CV-SALTS Executive Administrative and Policy sessions and Lower San Joaquin River Committee meetings. Reclamation provides support to the CV-SALTS Technical Advisory Committee.

Status of the Program

Table 2. FY 2017 Proposed Funding

No.	Funding Program	Year	Allocation	In Kind
I.	Program to Meet Standards (PTMS) -Technical Support to RTM Model data automation -Visualization tool WARMF-Online -Forecasting model development/improvements - Water district/agency outreach activities -Grassland WD technical support	2017	$700K estimated	
II.	Staff resources	2017		$200K estimated
III.	Grassland Bypass Project[1]	2017	$860K estimated	
IV.	WaterSMART Program[1]	2017	TBD	

No.	Funding Program	Year	Allocation	In Kind
V.	Westside Regional Drainage Plan[1]	2016-2019	$3.8M estimated	

[1] The funding allocation is not specifically a PTMS allocation but yields salinity benefits in the San Joaquin River.

Funding amounts listed in Table 2 are subject to allocation and are to be considered estimates until allocations have been completed. **The PTMS allocation is utilized to fund Reclamation activities directly related to salinity in the San Joaquin River.** The Grassland Bypass Project and WaterSMART Program also provide salinity management benefits to the San Joaquin River, and are listed accordingly in Table 2. Table 3 lists major activities planned in accordance with the funding allocation listed in Table 2. The activities list is not all-inclusive or binding; Reclamation may choose to perform other tasks as necessary or required.

Table 3: Planned Reclamation Activities to meet San Joaquin River salinity regulations for Fiscal Year 2017

Activity Number	Table 2 Funding Authority	Activity Name	Activity Description	Estimated Completion Date
1	I	WARMF model forecasting capability	Improvements to algorithms to add groundwater flow capability to west-side watersheds to improve small watershed simulation. Model currently assumes no groundwater pumping on west-side of Valley. Work on wetland simulation to improve realism of wetland simulations.	projected completion in late FY2017
2	I	WARMF-Online data and output visualization	Improve relevance of model output visualization through use of customized stakeholder dashboards. Increase use of WARMF-Online.	Ongoing
3	I	TRT meetings and participation in Westside Coalition RTMP Workgroup	Participate in meetings, activities and forecasting discussions related to implementation of RTM. During late FY 2016 and into FY 2017 a new working group will be started under auspices of the Westside Drainage Coalition to develop protocols to implement short-term westside drainage management actions.	Ongoing
4	I	CV-SALTS	Participate in the CV-SALTS	Ongoing

Activity Number	Table 2 Funding Authority	Activity Name	Activity Description	Estimated Completion Date
		Participation	Executive Committee, Technical Committee and Lower San Joaquin River Committee.	
5	I	Contract/Project Management	New project contracting and renewal of existing contracts and cooperative agreements	Ongoing
6	I	Technical support to Grassland Water District	Ongoing technical support. New initiative (starting in FY 2016) to develop a cost-effective, long-term alternative to YSI-ECONet which is no longer being supported. Grant funding being applied for to offset costs.	Ongoing into FY 2017
7	I	Technical support to other east and west-side water districts/agencies	Primary effort on data integration and development of common data quality assurance protocols. This will be accomplished using a combination of tools to be added to current WARMF Online capabilities and for individual water districts use of commercial real-time hydrological data management and QA tools such as WISKI.	Ongoing
8	I	Outreach to east and west-side water districts	Ongoing technical support on design of monitoring stations, selection of sensors, choice of telemetry (CDMA, GOES, SCADA, LAN). Collaborative data acquisition and sharing. Resolution of web access, data quality assurance and data security issues.	Ongoing
9	CVP Operations	New Melones Operations Plan	Reclamation will continue to operate New Melones reservoir according to State Water Board Water Rights stipulations to ensure that the D-1641 salinity standard at Vernalis is not exceeded.	Ongoing

Publications Update

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Quinn N.W.T, 2009. Environmental decision support system development for seasonal wetland salt management in a river basin subjected to water quality regulation. Agricultural Water Management, 96 (2), p.247-254, Feb 2009.

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CV Water Board 2004a	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 Draft Final Staff Report Appendix 1: Technical TMDL Report, Regional Water Quality Control Board Central Valley Region, July 4, 2004.
Basin Plan 2011	The Water Quality Control Plan (Basin Plan) for the Sacramento River Basin and the San Joaquin River Basin, Fourth Edition, California Regional Water Quality Control Board Central Valley Region, October 2011.
Reclamation Action Plan 2008	Reclamation's Salinity Management Plan, Actions to Address the Salinity and Boron Total Maximum Daily Load Issues For the Lower San Joaquin River, July 2008.
Compliance Plan 2010	Compliance Monitoring and Evaluation Plan, In compliance with the "Management Agency Agreement between the Central Valley Regional Water Quality Control Board and the Bureau of Reclamation" executed on December 22, 2008, May 2010.
Compliance Report 2010	Compliance Monitoring and Evaluation Report, WY 2000 to Present In compliance with the "Management Agency Agreement between the Central Valley Regional Water Quality Control Board and the Bureau of Reclamation" executed on December 22, 2008, May 2010.
Management Agency Agreement, 2008 and 2014	Management Agency Agreement Between the Central Valley Regional Water Quality Control Board and the United States Bureau of Reclamation, Mid-Pacific Region. A Cooperative Means of Implementing Relevant Provisions of the Regional Water Board's Water Quality Control Plan for the Sacramento River and the San Joaquin River Basins – 4th Edition, executed in December 2008 and updated in December 2014.