

# Quarterly Activity and Monitoring Report

July 1 – September 30, 2009

*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 22, 2008*

November 12, 2009

# Abbreviations and Acronyms

Action Plan	Actions to Address the Salinity and Boron TMDL Issues for the Lower San Joaquin River
AF	acre-foot or acre-feet
Authority	San Luis & Delta-Mendota Water Authority
Basin Plan	Water Quality Control Plan for the Sacramento and San Joaquin River Basins, 4 <sup>th</sup> Edition
BMP	Best Management Practices
CALFED	CALFED Bay-Delta Program
CDEC	California Data Exchange Center
CDFG	California Department of Fish and Game
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
CVO	Central Valley Operations
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CVRWQCB	Central Valley Regional Water Quality Control Board
CV-SALTS	Central Valley Salinity Alternatives for Long Term Sustainability
DCRT	Data Collection and Review Team
DMC	Delta-Mendota Canal
DWR	California Department of Water Resources
EC	electrical conductivity
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
Exchange Contractors	San Joaquin River Exchange Contractors Water Authority
GBP	Grassland Bypass Project
GDA	Grassland Drainage Area
GRCD	Grassland Resource Conservation District
GUI	graphical user interface
ID	irrigation district
Interior	U.S. Department of the Interior
IPO	Interim Plan of Operations
MAA	Management Agency Agreement
µS/cm	micro Siemens per centimeter
µg/L	microgram(s) per liter
mg/L	milligram(s) per liter

NPDES	National Pollutant Discharge Elimination System
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
Reclamation	Bureau of Reclamation
RTMP	Real Time Management Program
Secretary	Secretary of the Interior
Service	U.S. Fish and Wildlife Service
SJR	San Joaquin River
SJRIP	San Joaquin River Improvement Project
SJRWQMG	San Joaquin River Water Quality Management Group
SLDMWA	San Luis and Delta Mendota Water Authority
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAF	thousand acre-feet
TDS	total dissolved solids
TMDL	total maximum daily load
TPRT	Technical Policy and Review Team
VAMP	Vernalis Adaptive Management Plan
WAP	Water Acquisition Program
WCFSP	Water Conservation Field Service Program
WDR	Waste Discharge Requirement
WQO	water quality objective
WRDP	Westside Regional Drainage Plan
YSI	Yellow Spring Instrument

## **Purpose**

The Central Valley Regional Water Quality Control Board's Salt and Boron Total Maximum Daily Load (TMDL) was approved and placed into effect on July 28, 2006. In response to the Salinity and Boron TMDL, the United States Bureau of Reclamation (Reclamation) developed a salinity control plan, *Actions to Address the Salinity and Boron TMDL Issues for the Lower San Joaquin River* (Action Plan) and entered into a Management Agency Agreement (MAA) with the Central Valley Regional Water Quality Control Board on December 22, 2009. The MAA describe the actions Reclamation will take to meet the obligations allocated to it by the Salinity and Boron TMDL for the lower San Joaquin River. The MAA states:

Reclamation will submit quarterly reports to the Regional Water Board by 45 days after the end of the calendar quarter. The quarterly reports will include a summary of activities conducted by Reclamation during the quarter in conjunction with each element included in their Action Plan, including activities related to developing a Real Time Management Program. In addition Reclamation will include data collected relevant to DMC load evaluation.

The "Quarterly Activity and Monitoring Report" summarizes the activities conducted by Reclamation in conjunction with each element outlined in its salinity control plan for the lower San Joaquin River. The Action Plan describes Reclamation's past, current and planned 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 Regional Water Board's *Water Quality Control Plan for the Sacramento River and the San Joaquin River Basins – 4<sup>th</sup> Edition* (Basin Plan).

### **Organization of Quarterly Report**

The quarterly report will provide a synopsis of the various activities associated with each element identified in the Action Plan. The Action Plan describes all of the actions contemplated by the MAA. Within the Action Plan, actions are divided into three major categories: Flow, Salt Load Reduction, and Mitigation. For each action a brief description and list of activities are identified. The quarterly report will include calculations of salt loads based on DMC deliveries and calculations of assimilative capacity provide through dilution flows. The calculation methods used in this report are provisional and some elements in this report do not include estimations of benefits at this time. Reclamation is in the process of developing the *Compliance Monitoring and Evaluation Plan* which will outline the criteria and methodology for determining DMC loads and credits.

### **A. Flow Actions**

Reclamation has agreed to provide mitigation and dilution flows to meet the Vernalis salinity and boron objectives. Historically, Reclamation has provided dilution flows from the New Melones Project and through purchases for the Vernalis Adaptive Management Plan. Flow actions include: dilution flows from New Melones, water acquisitions, and Recirculation.

1. New Melones Reservoir Operations – Provision of Dilution Flow

Brief Description: In the Flood Control Act of October, 1962, the Congress reauthorized and expanded the New Melones project (P.L. 87-874) to a multipurpose unit to be built by the U.S. Army Corps of Engineers (Corps) and operated by the Secretary of Interior as part of the Central Valley Project (CVP), thus creating the New Melones Unit. The multipurpose objectives of the unit include flood control, irrigation, municipal and industrial water supply, power generation, fishery enhancement, water quality improvement, and recreation. New Melones Reservoir is currently operating under an "Interim Operating Agreement." This agreement was completed in 1996 with significant input from stakeholder interests.

Items 12 and 13 of the Control Program for Salt and Boron Discharges into the Lower San Joaquin River of the Basin Plan Amendment states:

12. Salt loads in 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.

13. 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.

Activity:

- *Developing a methodology to accurately depict the dilution flow allocation resulting from New Melones operations.*

Quantification Methodology: Table IV-8 in the Basin Plan Amendment states that dilution flow allocations are calculated as follows:

$$A_{dil} = Q_{dil} * (C_{dil} - WQO) * 0.8293$$

Where:

$A_{dil}$  = dilution flow allocation in thousand tons<sup>1</sup> of salt per month

$Q_{dil}$  = dilution flow volume in thousand acre-feet per month

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<sup>1</sup> This is a typographical error in the Basin Plan Amendment. The units are actually tons

$C_{dil}$  = dilution flow electrical conductivity in  $\mu\text{S}/\text{cm}$

WQO = salinity water quality objective for the LSJR at Airport Way Bridge near Vernalis in  $\mu\text{S}/\text{cm}$

Table 1 lists data and monthly calculations for the past quarter. Data for flow releases from Goodwin Dam, the Stanislaus River “design flows,” and salinity at Orange Blossom Bridge are used to calculate the monthly dilution flow allocations.

Dilution Flow Allocation: WY2009 was classified as a dry year.

**Table 1: Goodwin Dam Monthly Dilution Flow Allocation, tons**

	Goodwin Dam Flow, TAF	Base Flow, TAF	$Q_{dil}$ , TAF	WQO, $\mu\text{S}/\text{cm}$	$C_{dil}$ (monthly average EC at Orange Blossom Bridge), $\mu\text{S}/\text{cm}$	Dilution Flow Allocation, $A_{dil}$ , tons
Jul	20	3	17	700	67	8,924
Aug	17	12	5	700	67	2,625
Sep	32	15	17	1000	69	13,125

## 2. Water Acquisitions

Brief Description: The Central Valley Project Improvement Act (CVPIA) signed into law on October 30, 1992, modified priorities for managing water resources of the Central Valley Project. CVPIA altered the management of the Central Valley Project to make fish and wildlife protection, restoration, and enhancement as project purposes having equal priority with agriculture, municipal and industrial, and power uses. To meet water acquisition needs under CVPIA, the U.S. Department of the Interior (Interior) has developed a Water Acquisition Program (WAP), a joint effort by the Reclamation and the U.S. Fish and Wildlife Service (Service). The program's purpose is to acquire water supplies to meet the habitat restoration and enhancement goals of the CVPIA and to improve the Interior's ability to meet regulatory water quality requirements.

Activity:

- *Developing a methodology to accurately depict dilution flow allocation resulting from Water Acquisition Purchases.*
- *Reclamation did not acquire any VAMP flows this quarter that provided assimilative capacity to the river.*

Quantification Methodology: The discussion on dilution flow allocation presented under New Melones Reservoir Operations is pertinent here as well. Table IV-8 of the Basin Plan Amendment states that dilution flow allocations are calculated as follows:

$$A_{dil} = Q_{dil} * (C_{dil} - WQO) * 0.8293$$

Where:

- $A_{dil}$  = dilution flow allocation in thousand tons<sup>2</sup> of salt per month
- $Q_{dil}$  = dilution flow volume in thousand acre-feet per month
- $C_{dil}$  = dilution flow electrical conductivity in  $\mu\text{S}/\text{cm}$
- WQO = salinity water quality objective for the LSJR at Airport Way Bridge near Vernalis in  $\mu\text{S}/\text{cm}$

### 3. DMC Recirculation – Provision of Dilution Water

**Brief Description:** The DMC Recirculation Project is one project Reclamation is studying that could provide dilution water for salinity management. As part of the project studies, Reclamation conducted three pilot recirculation studies, in 2004, 2007, and 2008. The pilot studies pump water from the Delta at Tracy and convey it through the DMC to the Newman Wasteway, where it is then conveyed to the lower San Joaquin River.

**Activity:**

- *No recirculation occurred in 2009. A Preliminary Feasibility Report is scheduled to be finalized by the end of the year.*

Quantification Methodology: For the quantification of dilution flow allocations, the Basin Plan prescribes the following equation to calculate assimilative capacity. The Basin Plan specifies that entities providing dilution flows obtain an allocation equal to the salt load assimilative capacity provided by this flow, calculated as follows:

$$A_{dil} = Q_{dil} * (C_{dil} - WQO) * 0.8293$$

Where:

- $A_{dil}$  = dilution flow allocation in tons<sup>3</sup> of salt per month
- $Q_{dil}$  = dilution flow volume in thousand acre-feet per month
- $C_{dil}$  = dilution flow electrical conductivity in  $\mu\text{S}/\text{cm}$
- WQO = salinity water quality objective for the LSJR at Airport Way Bridge near Vernalis in  $\mu\text{S}/\text{cm}$
- 0.8293 = Salinity unit conversion, to convert TDS to tons (using the same EC:TDS as is used for the DMC)

### **B. Salt Load Reduction Actions**

Reclamation is under a court order to provide drainage to its San Luis Unit, on the Westside of the lower San Joaquin River. As part of its efforts to provide drainage, Reclamation has historically supported the Westside Regional Drainage Plan (WRDP) through monetary grants and in-kind services. Reclamation recognizes there is still much to be done to implement the Westside Regional Drainage Plan. Salt Load Reduction Actions include the Grasslands Bypass

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<sup>2</sup> *ibid*

<sup>3</sup> *ibid*

Project, the Westside Regional Drainage Plan, and conservation programs (Water Conservation Field Services Program, Water 2025 Grants Program, and the CALFED Water Use Efficiency Program).

### 1. Grassland Bypass Project

**Brief Description:** The Grassland Bypass Project is a multi-agency stakeholder project based upon an agreement between the Reclamation and the Authority to use a 28-mile segment of the San Luis Drain to convey agricultural subsurface drainage water from the Grassland Discharge Area (GDA) to Mud Slough, a tributary of the San Joaquin River. The purpose of the project is to separate unusable agricultural drainage water discharged from the GDA from wetland water supply conveyance channels, facilitate drainage management that maintains the viability of agriculture in the GDA, and promote continuous improvement in water quality in the San Joaquin River.

#### Activity:

- *Reclamation continues to administer the 2001 Agreement to Use the San Luis Drain and meet the terms of the 2001 Waste Discharge Requirements. The agreement will end December 31, 2010.*
- *In Water Year 2009, the third year of drought reduced the acres of irrigated field crops in the GDA. Consequently, the volume of unusable subsurface drainage water discharged from the GDA to Mud Slough (north) was significantly reduced. The annual load of salts discharged in 2009 are estimated to be about 54,000 tons, the lowest in 23 years and half of the load discharged in drought year 1991.*
- *Reclamation is negotiating a third use agreement to continue the Project through 2019, allowing more time to obtain funds to construct treatment facilities that will completely eliminate all discharges of unusable agricultural subsurface drainage water from the GDA to the San Joaquin River and local wetland water supply channels.*
- *Reclamation has completed important documentation to support the new Use Agreement, including an Administrative Draft EIS/EIR, prepared by Entrix Inc. Written comments were received from 14 agencies for Appendix 1.*
- *The EIS/EIR for the continuation of the Grassland Bypass Project was completed and sent to the EPA. A notice of availability will be published in the Federal Register soon. The San Luis and Delta-Mendota Water Authority has certified that the document complies with CEQA and the Regional Board will use the document to proceed with the amendment to the Basin Plan. The NEPA portion will be completed with the receipt of a Biological Opinion from the US Fish and Wildlife Service.*

### 2. Westside Regional Drainage Plan (WRDP)

**Brief Description:** The Westside Regional Drainage Plan is a local stakeholder program developed by integrating all consistent elements of drainage management developed by government and local agencies and private partnerships. The original efforts of the WRDP focused on reducing selenium discharges to the San Joaquin River. Success of the original effort prompted a proposal to expand the WRDP to go beyond regulatory requirements and eliminate

selenium, boron, and salt discharges to the San Joaquin River, while maintaining productivity of agriculture lands in the solution area and enhancing water supplies for the region.

While Reclamation lacks control of many of the resources needed to be an active participant in the WRDP, Reclamation provides annual funding to support and sustain the WRDP.

Activity:

- *Reclamation executed a grant for \$6.385 million dollars to support development of the WRDP. The grant, combined with state Proposition 50 funding and local cost sharing, will be used to develop more than 6,000 acres of reuse lands. This reuse area has been an important tool to ensure the success of the Grassland Bypass Project.*
- *Funds will be used to install facilities to collect and distribute drain water across the reuse area, remove and replace open drain ditches that were hazardous to waterfowl, and line earth canals with concrete to reduce seepage losses.*
- *Funds will also be used to line water supply canals in three districts in the GDA to reduce seepage losses to the shallow aquifer, and to plumb six sumps that currently discharge highly saline groundwater into the DMC.*

### 3. Conservation Efforts

Brief Description: The water use efficiency program element includes several grant programs which fund actions to assure efficient use of existing and any new water supplies. Efficiency actions can alter the pattern of water diversions and reduce the magnitude of diversions, providing additional benefits. Efficiency actions can also result in reduced discharge of effluent or drainage and improved water quality. Although Reclamation is unable to quantify the benefits of the various funded projects as related to salinity reduction, the following information is provided to depict the agency's water conservation efforts in the basin. Through Water 2025, CALFED, and the WCFSP, Reclamation has awarded 40 projects in the San Joaquin Valley that require performance measures since 2006. As information is collected from these projects quantifiable benefits may be determined in the future.

Activity:

Under the 2009 CALFED Grant Program, two proposals from the water districts within the San Joaquin Basin have been awarded. These proposals included canal lining and spill recovery projects. San Luis WD received a \$554,665 grant to line 3.3 miles of unlined canal. The total project cost is \$1,109,330. Merced ID received a \$1,000,000 grant to provide improvements to several laterals, and install 3 SCADA sites and automated gates in order to reduce seepage and reduce system spills. The total project cost is \$2,487,000.

The Water for America Initiative has awarded nine Water Marketing and Efficiency Grants and one System Optimization Review Challenge Grant projects in the San Joaquin Valley as follows:

- *Arvin-Edison Water Storage District received a \$300,000 grant for water banking and efficiency measures. The total project cost is \$878,800.*

- *Buena Vista Water Storage District received a \$300,000 grant to construct a new turnout structure. The total project cost is \$4,155,776.*
- *Delano-Earlimart ID received a \$300,000 grant for a groundwater recharge basin, recovery and monitoring wells. The total project cost is \$1,014,100.*
- *Fresno ID received a \$300,000 grant to construct a groundwater recharge basin, recovery and monitoring wells. The total project cost is \$1,600,195.*
- *Lower Tule River ID received a \$300,000 grant for canal improvements including SCADA installation. The total project cost is \$606,000.*
- *Madera ID received a \$299,715 grant to develop a groundwater bank system. The total project cost is \$1,110,816.*
- *Semitropic Water Storage District received a \$300,000 grant to install water measurement devices to manage water from a groundwater bank. The total project cost is \$1,514,000.*
- *Shafter-Wasco ID received a \$300,000 grant to make canal improvements to increase capacity. The total project cost is \$650,400.*
- *Tulare ID received a \$300,000 grant to construct water banking facilities. The total project cost is \$1,060,000. Tulare ID also received a \$300,000 system optimization grant to study the optimization of surface and groundwater resources. The total project cost is \$655,150.*

Under the American Recovery and Reinvestment Act, Reclamation identified four projects within the San Joaquin basin to be awarded. The program has a 50% applicant cost-share requirement and awards will range from \$1,000,000 to \$5,000,000. The projects include recharge and delivery systems for groundwater banking, and canal improvement projects. Additional information will be provided post award.

### **C. Mitigation Actions**

Reclamation's Action Plan identifies two mitigation actions to reduce salinity loads: a real time management program to maximize the removal of salt using assimilative capacity in the San Joaquin River, and a wetlands BMP plan to research and potentially develop practices to reduce salinity loading from managed wetlands. Reclamation has actively supported the development of a real time monitoring and forecasting program in the River and in managed wetlands.

#### **1. Real Time Management Program** – Development of Stakeholder-Driven Program

Brief Description: The Real Time Management Program is described in the TMDL as a stakeholder driven effort to use “real-time” water quality and flow monitoring data to support water management operations in order to maximize the use of assimilative capacity in the San Joaquin River. The Regional Board describes this assimilative capacity as up to 85% of the load determined by Vernalis salinity objective. Reclamation is working with a facilitation firm to support the development of a stakeholder-driven program.

Activity:

- *Reclamation continues working with its consultants to facilitate stakeholder involvement in developing a Real Time Management Program (RTMP).*
- *Reclamation held a second stakeholder workshop on August 12, 2009 at the Robert J. Cabral Agricultural Center in Stockton, CA.*
- *Reclamation awarded a contract for additional technical support of the Real Time Management Program for FY 2010.*
- *Reclamation's contractor, CDM initiated efforts to develop a salt source map and white paper for the project area.*
- *Reclamation staff began conversion of information on TMDL loading and allocation schemes into a white paper for program discussion.*

## 2. Real Time Management Program – Technical Support

Brief Description: A successful RTMP will require a real time monitoring network and a model capable of reasonably accurate forecasting of assimilative capacity. Reclamation is committed to participate in the development and support of these tools. Reclamation staff has valuable experience in both of these areas. The technical support of this program will follow the stakeholder process.

Activity:

- *Reclamation's contractor, completed a demonstration graphical user interface (GUI) and water quality data management tool. This work was presented at the second stakeholder workshop in August 2009.*
- *Reclamation's contractor developed a database model that is gaining acceptance across the region. A demonstration of this model was presented to stakeholders at the second stakeholder workshop in August 2009.*
- *Routine conference calls are taking place among the various work groups. Discussions during these meetings intersect many other programs (Upstream TMDL, CV SALTS, South Delta Salinity and Flow, ILRP, SJR Restoration, etc.) and there is a need for great coordination amongst agency members and stakeholders.*
- *Reclamation is engaged with Berkeley National Laboratory to oversee the development and analysis of various salinity scenarios through the WARMF model. Work was presented at the second stakeholder workshop in August 2009.*

The concept behind the RTMP is to enable the use of available assimilative capacity to export salt loads from the basin or to better time the release of salinity loads into the river to times when there is greater dilution capacity, which should also reduce the times where river capacity is exceeded (to the extent that exceedances are caused by discharges and not by background or allowed loads). Development of an accurate forecast model will to serve as a decision making tool to help manage salinity loads in the river without violating water quality standards.

## 3. Wetlands BMP Plan

Brief Description: The Service, CDFG, and the Grassland Resource Conservation District (GRCD) in coordination with Reclamation are developing BMP plans to reduce the impact of

discharges from managed wetlands into the San Joaquin River. Reclamation also provides resources to support the development of a real-time monitoring network (over 28 stations) and other potential BMP analysis tools within federal, state, and private managed wetlands. At present, the Plan has not been completed and released to the public.

Activity:

- *Reclamation has sponsored a project entitled “Water Quality Monitoring in the Grassland Resource Conservation District.” This 3-year project will retrofit 6 existing monitoring stations and integrate these stations with stations carried over from a SWRCB-sponsored pilot project on wetland real-time salinity management. Twenty-eight additional stations are being installed in the Grassland Water District, CDFG, and US Fish and Wildlife Service lands. All stations will become part of a sensor network currently supported by YSI EcoNet. Research supported by Reclamation as part of this project is investigating data management systems and is developing software that will integrate existing sensor networks into a common decision support system. The decision support system will ultimately be used to help schedule wetland salt loading to the San Joaquin River.*
- *Berkeley National Laboratory has provided project oversight for the installation of new stations is 80% complete in the Grassland Water District, Los Banos WMA and San Luis NWR. All installed stations are currently telemetered for flow, temperature and electrical conductivity through YSI-EcoNet and the NIVIS data server. Instantaneous data is publicly available through the Grassland Water District website – time series data will be made available to the public after undergoing data quality assurance. This data management system has been successfully deployed for the past 3 years; however; it is not a viable long-term enterprise solution for the watershed – the scaled up costs are beyond what is affordable to the wetland entities – therefore alternative systems are being investigated.*
- *Reclamation is working with the Service, CDFG, and local wetlands managers to update and finalize the BMP Plan taking into consideration the data being generated within the Basin that can provide a more quantitative characterization of wetland hydrology than has been possible in the past.*
- *Reclamation is sponsoring several groundwater conjunctive use investigations in the western San Joaquin Basin that have direct relevance to salinity management. The first project will drill and complete two production wells in the Volta Wildlife Management Area to supplement current wetland water supply. These wells will be continuously monitored for electrical conductivity and drawdown to assess long term impacts on refuge water quality and local groundwater resources. Well sites have been selected, implementation documentation is being prepared and a monitoring plan has been developed. Construction on the first well, located north of the Volta Wasteway, is scheduled for completion within 6 months.*

#### 4. Involvement in CV-SALTS program

**Brief Description:** The Central Valley Water Board and State Water Board initiated a comprehensive effort to address salinity problems in California’s Central Valley and adopt long-term solutions that will lead to enhanced water quality and economic sustainability. The Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) is a collaborative basin planning effort aimed at developing and implementing a comprehensive salinity management program. The goal of CV-SALTS is to maintain a healthy environment and a good quality of life for all Californians by protecting the state’s most essential and vulnerable resource: water.

**Activity:**

- *Reclamation continues to participate in various sub-committees of the program – Leaders Group, Technical Advisory Committee, Education and Outreach. In addition:*
- *Reclamation was involved in the development and review of solicitation packages from potential contractors to conduct a salt and nitrate pilot study.*
- *Reclamation provided an update to the technical advisory committee regarding MAA and RTMP activities.*
- *Reclamation issued a contract to Montgomery Watson Harza to complete a pilot source study in the Northwest and Grassland areas.*

#### **D. Central Valley Project Deliveries Load Calculation**

**Brief Description:** The Central Valley Project (CVP) delivers water to both the Grassland and Northwest subareas (as described in the Basin Plan) through the Delta-Mendota Canal (DMC). The DMC starts at the pumping headworks in the Delta, the C.W. Jones (Jones) Pumping Plant at Tracy, California. Water is conveyed south to the San Luis Reservoir, where water is mixed with the State Water Project in O’Neill Forebay and then either pumped into San Luis Reservoir for later delivery, or conveyed further south through the DMC to the Mendota Pool. Turnouts and groundwater pump-ins occur at several locations along the DMC. “Reach 1” of the DMC includes turnouts between the Jones Pumping Plant and the San Luis Reservoir. Deliveries for Reach 1 are made through the San Luis Canal and the Cross Valley Canal, as well as directly out of the DMC. “Reach 2” of the DMC includes turnouts between the O’Neill Forebay and the Mendota Pool. “Reach 3” covers deliveries made out of the Mendota Pool. Some simplification of this system has been made for accounting purposes, as some districts take portions of their deliveries through several turnouts.

**Quantification Methodology:** The Basin Plan allocates a load to Reclamation for water delivered to the Grassland and Northwest side Subareas. This load allocation is calculated according to Table IV-8 Summary of Allocations and Credits:

$$L_{\text{DMC}} = Q_{\text{DMC}} * 52 \text{ mg/L} * 0.0013599$$

## Quarterly Activity Report – 3<sup>rd</sup> Qtr 2009

Where:

- $LA_{DMC}$  = Load Allocation of salts, in tons
- $Q_{DMC}$  = monthly amount of water delivered to Grassland and Northwest side subareas, in acre feet
- 52 = “background” TDS of water in the San Joaquin River at Friant per the Basin Plan
- 0.0013599 = factor for converting units into tons

Anything above this load allocation is an excess salt load which must be offset. Reclamation is proposing to offset this excess salt load through the actions described in the Action Plan. Excess salt loads are calculated by the following equation:

$$EL_{DMC} = Q_{DMC} * (C_{DMC} - 52 \text{ mg/L}) * 0.0013599$$

Where:

- $EL_{DMC}$  = excess salt load above the Load Allocation ( $LA_{DMC}$ ), in tons
- $Q_{DMC}$  = monthly amount of water delivered to Grassland and Northwest side subareas, in acre feet
- $C_{DMC}$  = monthly average (arithmetic mean) of salinity of the water delivered to Grassland and Northwest Subareas, in mg/L
- 52 = “background” salinity of water in the San Joaquin River at Friant per Basin Plan
- 0.0013599 = factor for converting units into tons

Each delivery reach’s  $Q_{DMC}$  is calculated and then paired with the associated monthly average EC for that reach, so the equation essentially becomes:

$$EL_{DMC} = 0.0013599 * \Sigma(Q_{DMC} * (C_{DMC} - 52 \text{ mg/L}))_{\text{Reach 1-3}}$$

This equation is then broken into two calculations, one for each subarea. Table 2 summarizes data taken from the monthly report titled *Delta-Mendota Canal Water Quality Monitoring Program* and illustrates the excess loads from the subareas and the total excess loads from CVP deliveries.

**Table 2: Calculation of WY2009 DMC Allocations and Loads**

	Grassland Subarea						Northwest Subarea						Total
	San Joaquin River and Mendota Pool Deliveries from CVP, load in thousand tons	Delta- Mendota Canal Deliveries from CVP, load in thousand tons	San Luis and Cross Valley Canal Deliveries from CVP, load in thousand tons	Total Flow, TAF	Load Allocation, thousand tons	Actual Load – Load Allocation, thousand tons	San Joaquin River and Mendota Pool Deliveries from CVP, load in thousand tons	Delta- Mendota Canal Deliveries from CVP, load in thousand tons	Total Flow, TAF	Load Allocation, thousand tons	Actual Load – Load Allocation, thousand tons	Total DMC Actual Load – Load Allocation, thousand tons	
September to March Standard, 1000 $\mu\text{S}/\text{cm}$													
Oct	24.9	13.0	2.8	92	6.5	34.1	1.9	0.9	7	0.5	2.2	<b>36.3</b>	
Nov	11.2	5.6	1.8	40	2.8	15.8	0.2	0.2	1	0.1	0.3	<b>16.0</b>	
Dec	0.6	4.0	0.4	8	0.6	4.5	0	0.2	0	0	0.1	<b>4.6</b>	
Jan	4.8	3.2	0.8	12	0.8	8.0	0	0.2	0	0	0.2	<b>8.2</b>	
Feb	20.6	1.9	2.2	33	2.3	22.4	1.2	0.3	2	0.1	1.3	<b>23.7</b>	
Mar	28.3	8.7	3.5	68	4.8	35.8	2.5	0.8	6	0.4	2.9	<b>38.6</b>	
April to August Standard, 700 $\mu\text{S}/\text{cm}$													
Apr	25.1	6.6	5.2	75	5.3	31.7	1.6	1.6	7	0.5	2.7	<b>34.4</b>	
May	38.1	13.8	7.1	122	8.6	50.4	3.3	2.1	12	0.9	4.5	<b>54.8</b>	
Jun	45.4	13.3	8.1	134	9.5	57.3	3.9	3.1	14	1.0	6.1	<b>63.4</b>	
Jul	31.4	10.0	4.8	160	11.3	34.9	2.8	2.6	17	1.2	4.2	<b>39.0</b>	
Aug	35.6	12.5	4.1	130	9.2	43.1	3.0	2.5	13	0.9	4.6	<b>47.7</b>	
September to March Standard, 1000 $\mu\text{S}/\text{cm}$													
Sep	42.6	14.2	2.7	133	9.4	53.1	2.7	1.7	9	0.6	3.8	<b>56.9</b>	

**E. Reporting Requirements**

In the MAA, Reclamation agreed to provide quarterly reports to the Regional Board. Reclamation will consult with the Regional Board before proposing any changes to the sample report format. Quarterly reports are due 45 days after the end of the calendar quarter:

<b>End of calendar quarter</b>	<b>Due date of Quarterly report</b>
Dec 31, 2008	Feb 15, 2009
March 31, 2009	May 15, 2009
June 30, 2009	August 15, 2009
September 30, 2009	November 15, 2010
December 31, 2009	February 15, 2010
March 31, 2010	May 15, 2010
June 30, 2010	August 15, 2010
September 30, 2010	November 15, 2010
December 31, 2010	February 15, 2011

**F. Funding Reporting**

Reclamation agreed in the MAA to seek additional funding, including grant funding, to support salinity control efforts. In its quarterly reports, Reclamation will report on its efforts to support the securing of additional funding.

Activity:

- *A funding request was submitted for the 2010 budget for WSRDP.*
- *A funding request was submitted for the 2011 budget for WSRDP.*
- *A funding request was submitted for the 2011 budget for administrative coordination and activities related to the RTMP.*
- *A funding request was submitted for the 2011 budget for the administration of the Grassland Bypass Project.*
- *A Science and Technology Grant proposal was submitted to fingerprint salt sources in the San Joaquin Basin*