CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ATTACHMENT A TO ORDER R5-2014-XXXX
INFORMATION SHEET

WASTE DISHARGE REQUIREMENTS GENERAL ORDER
FOR

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY
AND
United STATES DEPARTMENTO OF THE INTERIOR
BUREAU OF RECLAMATION

SURFACE WATER DISCHARGES FROM THE
GRASSLAND BYPASS PROJECT

FRESNO AND MERCED COUNTIES

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I. Overview

This attachment to Waste Discharge Requirements for Surface Water Discharges from the Grassland Bypass Project, Order R5-201X-XXXX (referred to as the "Order") is intended to provide information regarding the rationale for the Order, general information on surface monitoring that has been conducted, and a discussion of this Order's elements that meet required state policy.

II. Introduction

The Grassland Bypass Project (GBP) addresses the transport of subsurface drainage, as well as stormwater runoff, from a portion of the agricultural lands in the western portion of the San Joaquin River (SJR) Basin. Soils on the west side of the SJR Basin are of marine origin and are high in selenium and salts. Major land uses in the watershed include agriculture and managed wetlands. Irrigation is necessary for nearly all crops grown commercially in the watershed. Supplied irrigation water applied without adequate drainage causes the shallow or perched water table to rise, leading to waterlogging and evapoconcentration of salts and trace elements in the crop root zone. Adding irrigation water to dissolve and leach these salts and trace elements into the shallow groundwater is necessary to maintain the salt balance in the crop root zone. Drainage tiles and associated sumps are used to lower the water table. The subsurface drainage from this area typically contains high concentrations of dissolved solids, selenium and boron.

The Grassland watershed is a valley floor sub-basin of the San Joaquin River Basin, covering an area of approximately 370,000 acres. The Grassland Drainage Area (GDA), about 97,400 acres, is located within the Grassland watershed, roughly between Los Banos to the north and Mendota to the south (Figure 1). The GDA is the primary source of selenium in the watershed area. The GBP routes subsurface drainage and surface runoff from the GDA to a portion of the San Luis Drain, then to Mud Slough (north), a point about six miles upstream of the San Joaquin River confluence. The Grasslands Bypass Project effectively allows agricultural drainage water to "bypass" wetland supply channels, thereby, avoiding the discharge of high levels of selenium to managed wetlands, where waterfowl could be impacted.

Phase I of the GBP went into operation in 1996 and Waste Discharge Requirements (WDRs) were first issued in 1998. Updated WDRs for Phase II of the GBP were adopted in 2001.Since then the board has adopted general waste discharge requirements under the Irrigated Lands Regulatory Program (ILRP), which include provisions related to surface water discharges from irrigated lands. This update of the Order incorporates changes to the Basin Plan, modifications to the GBP (Phase III) and elements of other ILRP WDRs.

There are differences between this Order and the general WDRs issued by the ILRP for the rest of the Central Valley. While the ILRP general orders address both surface water and groundwater, this order specifically addresses surface water discharges. Discharges to groundwater from the area served by the GBP will be regulated in the future through a separate order or orders.

The GBP WDRs are issued to the U.S. Bureau of Reclamation, owner of the San Luis Drain (Drain), and to the San Luis & Delta-Mendota Water Authority that represents member districts within the GDA. Members of the San Luis & Delta-Mendota Water Authority, a Joint Power Authority, operate the GBP.

III. Description of the Grassland Bypass Project

Seven contiguous member districts[1] of the San Luis & Delta-Mendota Authority (Authority) are within the GDA. These districts supply or transport irrigation water and/or subsurface drainage to the Grassland Area Farmers (GAF) in the GDA. Figure 2 is a map of the GBP and GAF member locations.

Figure 1: Map of Grassland Bypass Project

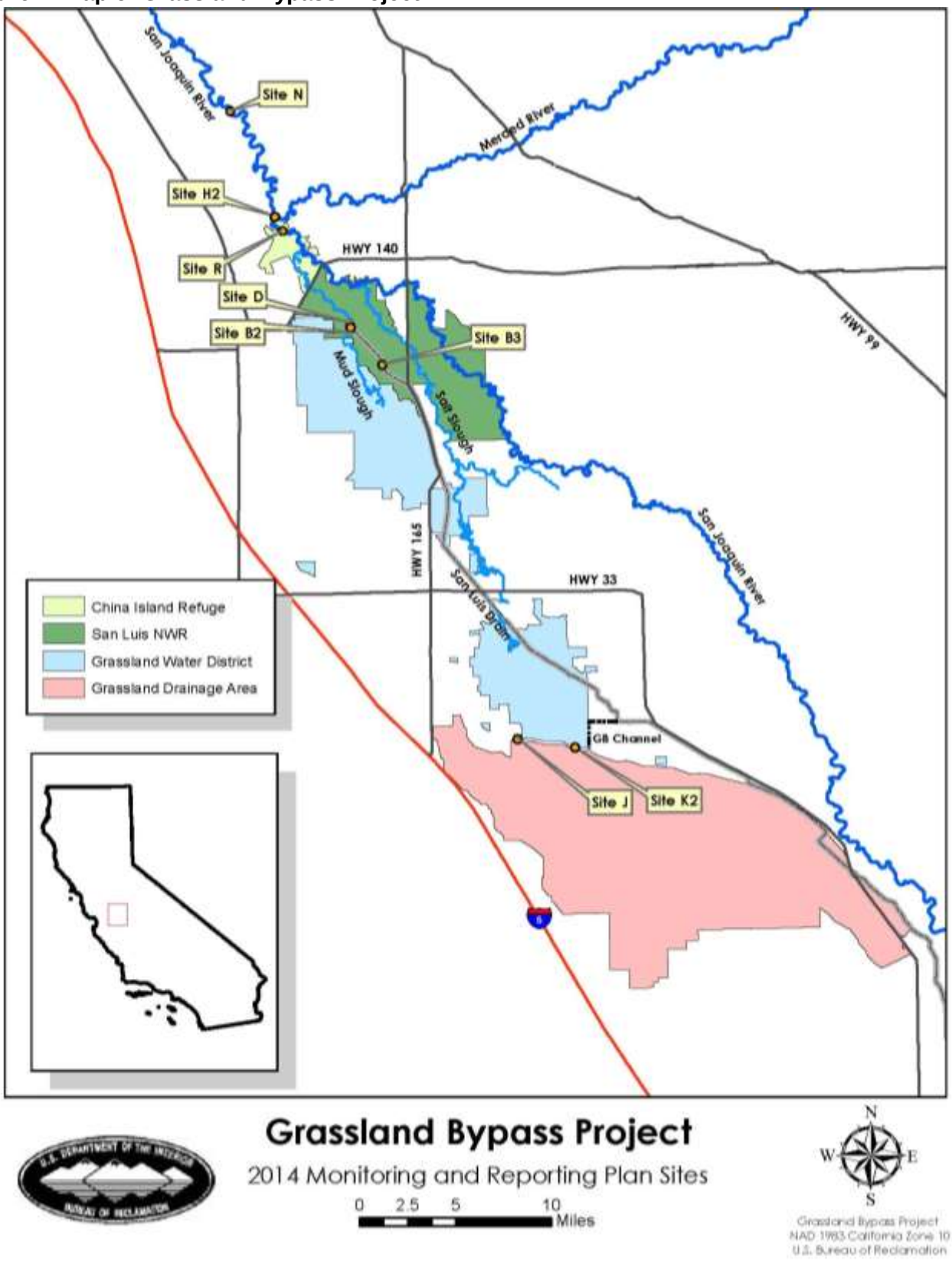
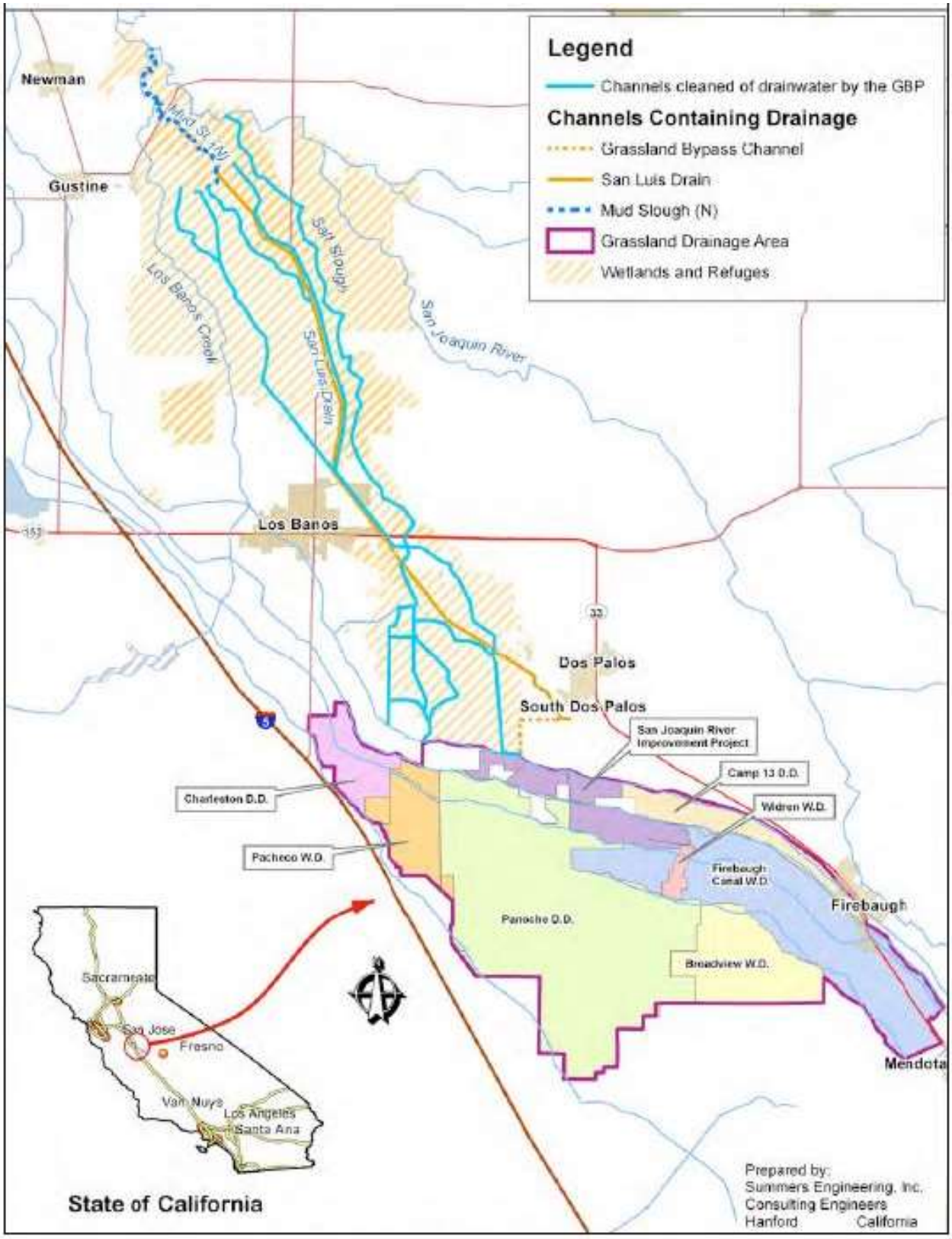


Figure 2: Map of Grassland Bypass Project and Grassland Area Farmers
(from Grassland Bypass Project Annual Report 2008-2009)

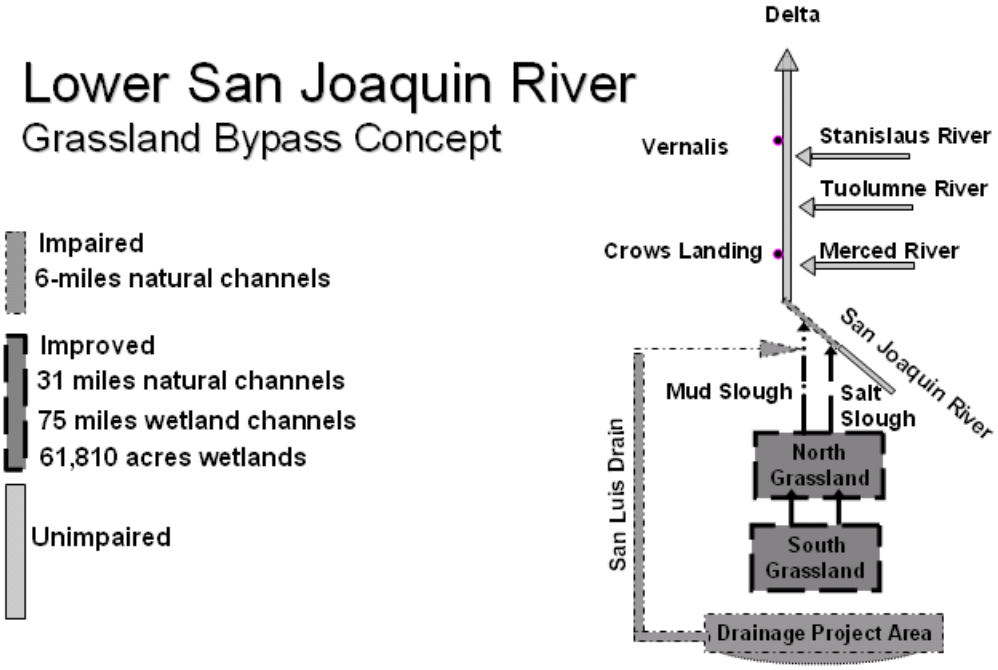


Subsurface agricultural drainage from approximately 38,700 acres in the Grassland Drainage Area is routed to the Drain through the Grassland Bypass Channel. From there, it travels 28 miles to the Drain's terminus and discharges to Mud Slough (north). During most of the year, the discharge primarily consists of subsurface agricultural drainage that is high in salts, selenium, boron, and other constituents. The GBP is also designed to handle local stormwater runoff. The Drain has been blocked above the Grassland Bypass Channel at Check 19 to prevent the introduction of other flows.

The GBP discharges the subsurface drainage to Mud Slough (north) at a point six miles upstream of the San Joaquin River confluence. Historically, this subsurface agricultural drainage reached the San Joaquin River via Mud Slough (north) or Salt Slough, but was routed through various channels in the Grassland Water District (GWD). These channels were also used to supply water to wetlands within the GWD. The dual use of the channels as both drainage and supply canals limited the ability to provide good quality water to the wetlands. The GBP removes the GDA subsurface agricultural drainage and routes it around the wetland areas using several ditches and a portion of the Drain. Figure 3 shows the conceptual model for the GBP.

When the GBP began, it was known that a 6-mile portion of Mud Slough would be impaired for a time in exchange for permanent improvement of the water supply channels serving wetlands. The GBP temporarily allows drainage to exit the basin, progressively decreasing loads of selenium while management practices to control selenium and adequate in-basin drainage management facilities were developed. The performance goals and time schedules to achieve the selenium water quality objectives for the San Joaquin River were incorporated as part of the Basin Plan. This Order allows for the implementation of further practices and treatment to meet the water quality objectives stated in the Basin Plan.

Figure 3: GBP Conceptual Model



During major storm events, general surface runoff and stormwater flows may exceed the capacity of the Grassland Bypass Channel. It is not possible during these major events to separate agricultural drainage from surface runoff and stormwater flows. During these major events, all of the commingled surface runoff, storm water flows and agricultural drainage may be diverted temporarily to the Grassland Water District channels, ditches and sloughs that carried drainage water and stormwater runoff to the San Joaquin River prior to the GBP implementation. The procedures and monitoring required for such an

event are outlined in "*A Storm Event Plan for Operating the Grassland Bypass Project*"[2] and in revised Monitoring and Reporting Program Order WDR 5-01-234[3], and further detailed in section IV.9 of the MRP Order.

IV. History of the Grassland Bypass Project

Phase I

The original GBP proposal had a maximum of 5-years for use of a portion of the Drain to convey subsurface drainage through the GWD and adjacent area. The original GBP was implemented through an "Agreement for Use of the San Luis Drain"[4] between the Bureau and the Authority for the period of 1 October 1996 to 30 September 2001 (Water Years[5] 1997 to 2001). A Finding of No Significant Impact was adopted by the Bureau for the original project.

In 1996 the Central Valley Regional Water Quality Control Board (Central Valley Water Board) amended the *Water Quality Control Plan, Third Edition, for the Sacramento and San Joaquin River* (Basin Plan) to address selenium in the San Joaquin River, Salt Slough, and Mud Slough. The amendment indicated that WDRs would be used to regulate discharges and included time schedules, performance goals and water quality objectives. The control actions were designed to achieve the following in the order of priority:

1. Separate subsurface agricultural drainage containing high levels of selenium from sensitive wildlife areas.
2. Obtain compliance with selenium water quality objectives in the San Joaquin River downstream of the Merced River confluence.
3. Obtain compliance with the selenium objectives in Mud Slough downstream of the San Luis Drain outfall and in the San Joaquin River from its confluence with Mud Slough to the confluence with the Merced River.

The first goal was achieved through the implementation of the GBP and is reinforced by a prohibition of discharge in the WDRs for the project. The second goal has been achieved through selenium load reduction measures implemented by the Grasslands Area Farmers – Salt Slough and the stretch of the San Joaquin River downstream of the Merced is no longer listed as impaired by selenium. The third goal has not yet been achieved. However, this Order and the Basin Plan requires that the third goal be met by 2019.

The Central Valley Water Board issued WDR 98-171 on 24 July 1998 for Phase I of the GBP. The WDRs established selenium discharge load values (pounds of selenium monthly and annually) that resulted in a 15 percent reduction from the average historical load to the San Joaquin River by the 5th year. Additional reductions in the selenium load were required to continue improvements to the San Joaquin River water quality and meet selenium requirements in the 1998 Basin Plan.

WDR 98-171 also required an annual update of the long-term Drainage Management Plan (LTDMP) that would include a summary of achievements of the water quality objectives in the Basin Plan and set in the WDR. Any plans and activities for long-term drainage management by the Grassland Area Farmers to meet the water quality objectives were discussed and goals were established. Any developments impacting the efforts of the Grassland Area Farmers were also discussed.

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2 The Storm Event Plan was approved on 25 August 1997 by GAF and the Authority.
3 The process for the storm event notifications was incorporated in the revised MRP approved on.7 September 2001.
4 Agreement No. 6-07-20-21319
5 A water year is defined as a 12 month time period from 1 October of one year to 30 September of the next. The water year is designated by the calendar year in which it ends (the year within which 9 of the 12 months fall).

Phase II

A new Use Agreement[6] between the Bureau and Authority was completed on 28 September 2001 following the completion of a Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR)[7]. Phase II covers a period from 1 October 2001 to 31 December 2009. During this period, the GBP was regulated by WDR Order 5-01-234 issued on 7 September 2001. The Monitoring and Reporting Program (MRP) attached to the Order required monitoring for general parameters[8], selenium, boron, molybdenum, nitrates and aquatic toxicity testing at specific sites with set schedule and frequency. Stormwater monitoring was required during storm events when the GBP may not be able to accommodate all surface runoff, stormwater flows, and agricultural drainage water. The stormwater monitoring was required to determine the effect of GDA discharge diversion to Grassland and wetlands channels. The Order also included continued reporting of the LTDMP on an annual basis.

Selenium loads limits[9] were established for discharge to the San Joaquin River and waste discharge requirements were used to control discharges of subsurface agricultural drainage from the Grassland Drainage Area. The compliance timetable gave the Dischargers deadlines to meet the selenium objective in the San Joaquin River and various channels, including Salt Slough and Mud Slough (north).[10] There was also a prohibition of discharge effective 1 October 2010 for subsurface agricultural drainage discharges unless selenium water quality objectives were being met.

The GBP was in compliance with applicable objectives in most channels addressed in the Basin Plan, but was unable to fully manage all agricultural subsurface drainage to meet the water quality objective for Mud Slough (north) and the San Joaquin River above the Merced River confluence by the 1 October 2010 deadline. The GBP operators believed the project area would achieve full control of agricultural subsurface drainage if additional time beyond the set compliance date was granted to allow time to obtain funding and develop technology to reduce selenium loads.[11]

Phase III

The Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for Phase III of the GBP was finalized August 2009.[12] A new Use Agreement for the continued use of the San Luis Drain was signed for the period of 1 January 2010 through 31 December 2019.[13] The Central Valley Water Board passed amendments to the Basin Plan[14] to: 1) extend the date for meeting the selenium objective in Mud Slough (north) and the San Joaquin River above the Merced River to 31 December 2019; and 2) revised the compliance time schedule located in chapter IV (implementation chapter) of the Basin Plan for

6 Agreement No. 01-WC-20-2075

7 URS, 2001. *Grassland Bypass Project Environmental Impact Statement and Environmental Impact Report*. Final May 25, 2001. Prepared for U.S. Bureau of Reclamation, Sacramento and Fresno, CA. and San Luis & Delta-Mendota Water Authority, Los Banos, CA.

8 General parameters included flow, pH, electrical conductivity and temperature.

9 Load limits for selenium were based on water year classification established using the best available estimate of the 60-20-20 San Joaquin Valley water year hydrologic classification (as defined in Footnote 17 for Table 3 in the State Water Resources Control Board's *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*, May 1995) at the 75% exceedance level using data from the Department of Water Resources Bulletin 120 series. The previous year's classification will apply until an estimate is made of the current water year.

10 Salt Slough and the wetland channels had a deadline of 10 January 1997 to meet 2 µg/L selenium, monthly mean; Mud Slough (north) and the San Joaquin River from Sack Dam to the Merced River had a 1 October 2010 deadline to meet 5 µg/L (4-day average); and the San Joaquin River below the Merced River (above normal and wet water years) a deadline of 1 October 2005 at 5 µg/L (4-day average), with critical, dry and below normal water years a deadline of 1 October 2010 at 5 µg/L (4-day average).

11 Stated in ES2 Project Purpose and Need of the EIS/EIR for Phase III. See next section for more information.

12 Entrix, 2009. *Grassland Bypass Project, 2010-2019, Environmental Impact Statement and Environmental Impact Report.* Final August 2009. Concord, CA. Prepared for: U.S. Bureau of Reclamation, South Central California Office and Mid-Pacific Region; and San Luis & Delta-Mendota Water Authority, Los Banos, CA.

13 Agreement No. 10-WC-20-3975, finalized 17 December 2009.

14 Resolution No. R5-2010-0046, Amending the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Selenium in the Lower San Joaquin River Basin, 27 May 2010.

Agricultural Drainage Discharges in the San Joaquin River Basin and its accompanying narrative description in Regional Board Prohibitions, section 6.c.

This Order implements the WDRs for Phase III of the GBP. New features in Phase III include in-valley treatment drainage reuse at the San Joaquin River Quality Improvement Project (SJRIP) facility; utilizing and installing drainage recycling system to mix subsurface drain water with irrigation supplies under strict limits; continuing current land retirement policies; an active land management program to utilize subsurface drainage on salt-tolerant crops; and a no-tailwater policy to prevent silt from being discharged into the Drain. Discussion of these elements is in section V.

The Use Agreement and WDRs specified load reductions for selenium and salinity with values expressed in annual and monthly load objectives. It should be noted that the selenium load values were designed to meet the total maximum daily limit (TMDL) for the San Joaquin River by 2015.[15] The GDA is the major contributor for selenium in the San Joaquin River Basin.[16] The WDR selenium performance goal is 15 µg/L (monthly mean) by 31 December 2015 in Mud Slough (north) and the San Joaquin River from the Mud Slough confluence to the Merced River. The selenium water quality objective for the same locations is 5 µg/L (4-day average) by 31 December 2019.

The Use Agreements between the Bureau and Authority also incorporated a performance incentive system in which GAF is assessed fees if selenium and/or salinity load reduction goals are not met. The fees are used for projects approved by the Oversight Committee. Fees are calculated by the Bureau of Reclamation for the attributable discharge for each year and month.

The 2009 Use Agreement provides “Incentive Fee Credits” when annual and monthly discharges are more than 10 percent below the respective load values specified in the tables for selenium and salinity. These incentive credits may be applied against future monthly or annual exceedances through December 2017. These “credits” apply to the Use Agreement between the Bureau and Authority, but are not part of this Order. Such credits could not be applied in a manner that would negate a violation of the limits in this Order.

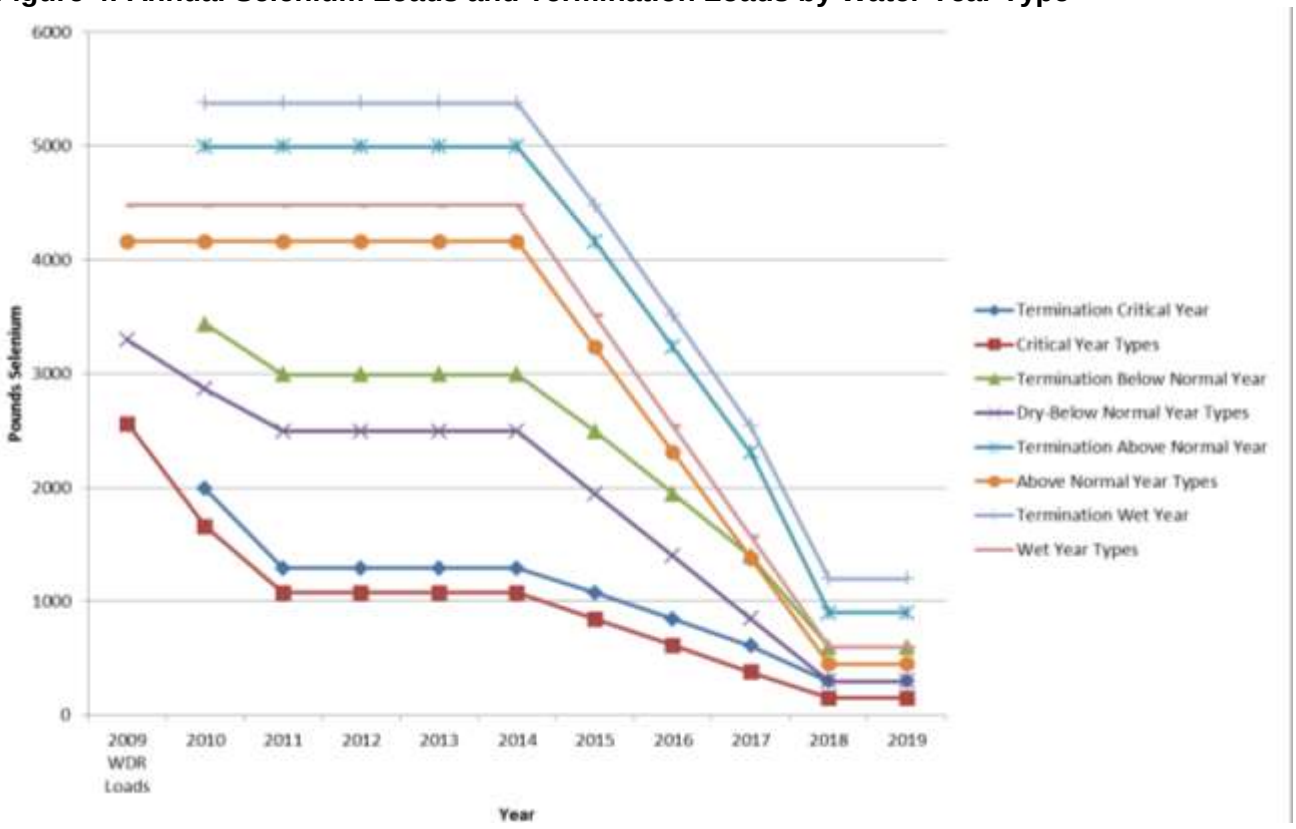
The Use Agreements provides for project termination if annual selenium loads from the GBP exceed certain values. Figure 4 shows the annual selenium loads required by the water year type (critical, below normal, above normal and wet) with the corresponding values for termination of the project.[17] The graph shows a decrease in the annual selenium loads for each water year type until 2018 when the selenium loading will comply with the water quality objectives and TMDL requirements.

[15] Selenium load limits have been met for the San Joaquin River below the confluence with the Merced River. The selenium objectives in Mud Slough (north) have not been met.

[16] Chilcott, J.E., 1988, *Water Quality of Tile Drainage Discharges in the San Joaquin River Basin*, Regional Water Quality Control Board, Central Valley Region, Staff Report. October, 1988.

[17] The Oversight Committee may overrule the termination if it finds, after consultation with other parties, the Authority has shown the exceedance was caused by unforeseeable and uncontrollable events.

Figure 4: Annual Selenium Loads and Termination Loads by Water Year Type



A. Project Management

The Authority represents the collection of local drainage and water districts that operate the GBP. The Bureau and the Authority are the responsible parties for the GBP.

A number of participating organizations, besides the Bureau, Authority and Central Valley Water Board, are involved in the GBP data collection, monitoring, and reporting. These participants include:

- U.S. Environmental Protection Agency (USEPA)
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Geological Survey (USGS)
- National Marine Fisheries Service (NMFS)
- California Department of Fish and Wildlife (CDFW)

To assist the Bureau and Authority, several committees and teams of private, State and Federal agencies are directly involved in aspects of the GBP by providing technical, advisory, and policy review and oversight. These include:

Oversight Committee

The Oversight Committee was created in Phase II and consists of representatives from the Bureau, USFWS, CDFW, USEPA and the Central Valley Water Board. The Oversight Committee role is to evaluate overall operations of the GBP, assess monetary charges to the Authority for selenium loads exceeding those specified in the Use Agreement, and to act on other issues brought to them by the Technical and Policy Review Team (TPRT) and/or the public.

Technical and Policy Review Team (TPRT)
The Technical Policy Review Team (TPRT) assists the Oversight Committee with technical issues. TPRT members include a representative the Bureau, the Central Valley Water Board, CDFW, NMFS, USFWS, and USEPA. A representative from the USGS serves as an independent technical advisor. Responsibilities of the TPRT include the review and analysis of analytical data and reports, and obtaining appropriate peer or scientific review as necessary.

Data Collection and Reporting Team (DCRT)
The Data Collection and Reporting Team (DCRT) members are agency representatives and contractors collecting, verifying, and reporting GBP data. The DCRT coordinates monitoring activities and address issues and concerns regarding data collection, data management, and quality assurance/quality control.

Quality Control Officer
A Bureau representative serves as the quality control officer, working with cooperating agencies to verify, validate, coordinate and update the quality control activities associated with the project.

B. Surface Water Monitoring History
Initial monitoring for the GBP started in 1995 and was performed by the Central Valley Water Board until 2011, when the Bureau assumed the duties. Monthly, quarterly, and annual reports are posted for all GBP monitoring on the San Francisco Estuary Institute (SFEI) website at http://www.sfei.org/Project/reports.

While selenium is the primary concern, the drainage also contains boron, molybdenum, high levels of salts and other constituents that can impact receiving waters. The Basin Plan contains numerical objectives for boron and molybdenum as well as narrative water quality objectives that apply to this water body. Table 1 shows the numerical objectives for selenium, boron and molybdenum for Mud Slough (north) and the San Joaquin River at various points.

Table 1: Selenium, Boron and Molybdenum Numerical Objectives

Constituent	Monthly Mean	Maximum	Location
Selenium	20 µg/L	5 µg/L 4-day average	Mud Slough (north) and the San Joaquin River from the Mud Slough confluence to the Merced River
	12 µg/L	5 µg/L 4-day average	San Joaquin River, mouth of the Merced River to Vernalis
Boron	0.8 mg/L (15 March-15 September) 1.0 mg/L (16 September - 14 March) 1.3 mg/L (Critical Year)	2.0 mg/L 2.8 mg/L	San Joaquin River, mouth of the Merced River to Vernalis
Molybdenum	19 µg/L	50 µg/L	Salt Slough, Mud Slough (north) and San Joaquin River from Sack Dam to mouth of Merced River
	10 µg/L	15 µg/L	San Joaquin River, mouth of Merced River to Vernalis

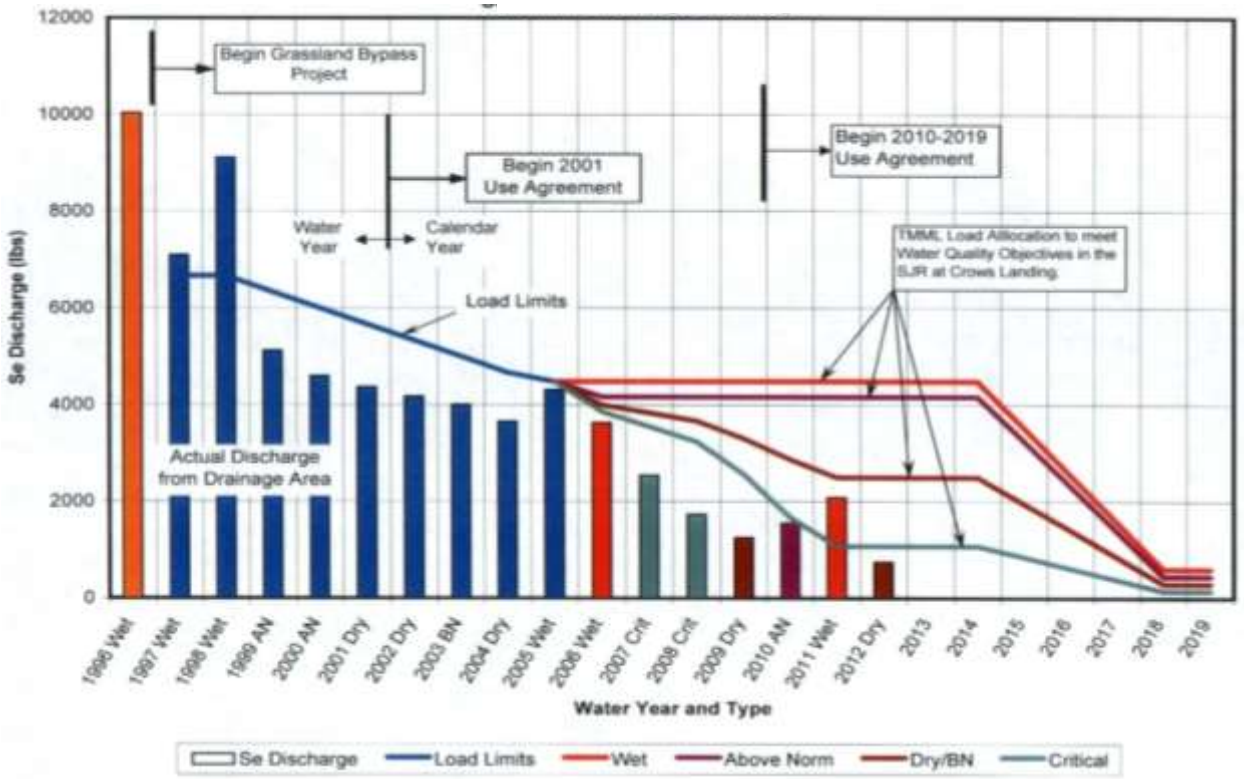
The lower San Joaquin River is 303(d) listed for salts. Effluent limits for salts are not in the waste discharge requirements for the GBP. The Basin Plan provisions for the *Control Program for Salt and Boron Discharges into the Lower San Joaquin River*[18] requires that the Dischargers must by 30 June 2014: 1) participate in a Central Valley Water Board approved real-time management program; or 2) submit a management plan that includes the elements identified in the Monitoring and Reporting Program Appendix MRP-1 and is designed to meet the Base Salt Load Allocations identified in

[18] Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, page IV-32.00

Table IV-4.4, *Summary of Allocations and Credits,*[19] within the applicable compliance schedule for compliance in Table IV-4.3.[20] A real-time monitoring program is being used to measure and report flow and electrical conductivity as part of the Use Agreement monitoring program. It is expected that the selenium reduction in waste discharges will also result in boron and salt reduction.

Previous monitoring sites targeted selenium concentrations from the GBP to determine compliance with selenium load limits set within the Use Agreements and the corresponding WDRs. Monthly load limits for selenium were also calculated based on the category of water year, historical monitoring data, the TMDL allocations, and required water quality objectives. Figure 5 shows the selenium discharged from the Grassland Drainage Area on an annual basis, with the limits set by the water year type.

Figure 5: Grassland Drainage Area – Selenium Discharge and Targets
From draft WY2010-WY2011 report (WY 2013 data has not been evaluated)



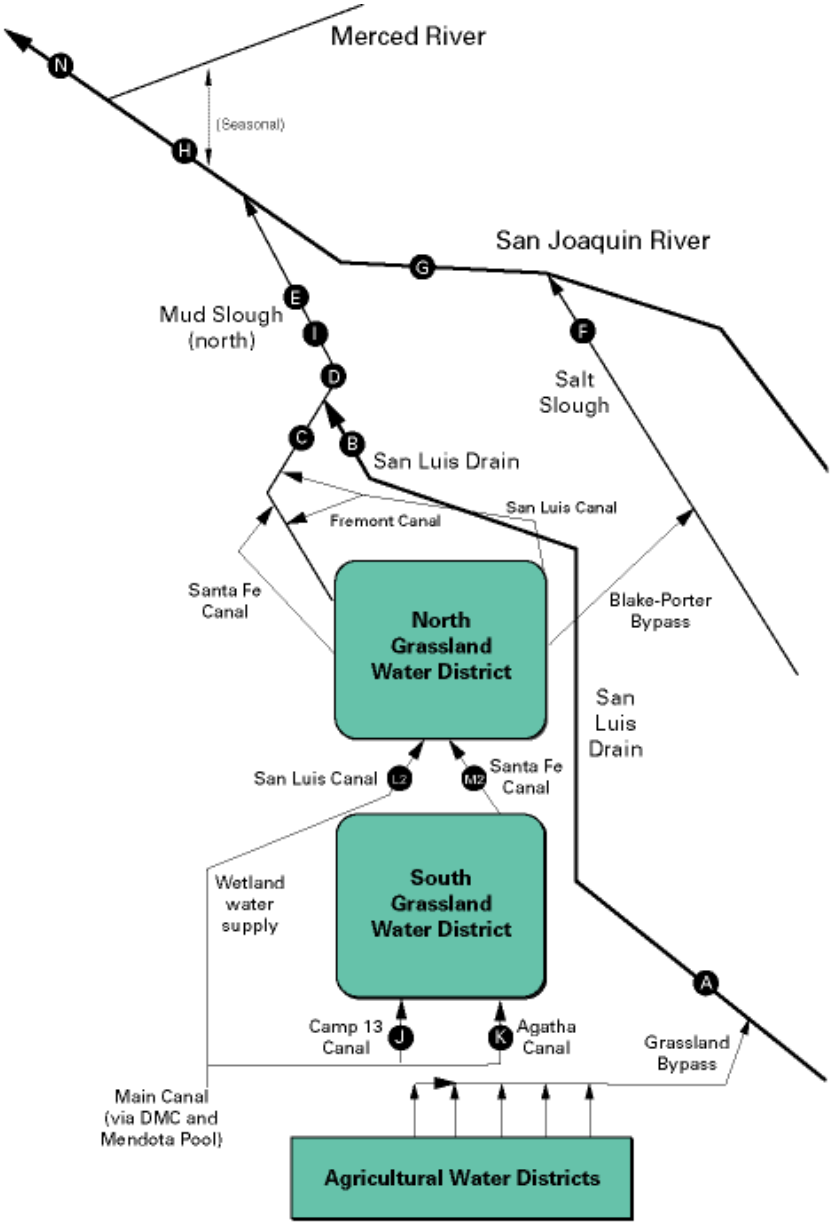
Historically, monitoring has consistently occurred at four areas with at least one monitoring location: 1) the San Luis Drain; 2) Mud Slough (north); 3) the wetlands channels; and 4) the San Joaquin River. The monitoring program has included sampling upstream and downstream sites (shown in Table 2) to determine selenium loading from the GBP and possible other contributors to the total selenium load. Selenium monitoring has historically occurred at Mud Slough (north) upstream of the Drain (Station C) to determine wetlands contribution; Mud Slough (north) downstream of the Drain (Station D) to determine total discharge from the GBP and wetlands to the San Joaquin River; and the GBP contribution to the selenium load by sampling in the Drain before discharge to Mud Slough (Station B). San Joaquin River monitoring has occurred downstream of the Mud Slough discharge (Stations H and N) to determine the GBP's contribution to the river before and after confluence with the Merced River. Figure 6 is a schematic showing the location of these sites.

[19] *Ibid.*, page IV-32.04
[20] *Ibid.*, page IV-32.03

Table 2: Historic Monitoring Sites in Phases I and II of the Project

Feature	Station	Description
San Luis Drain	B	San Luis Drain, upstream of discharge to Mud Slough (north)
Mud Slough (north)	C	Mud Slough (north) upstream of the San Luis Drain discharge.
	D	Mud Slough (north) downstream of the San Luis Drain discharge
San Joaquin River	H	San Joaquin River before confluence with Merced River
	N	San Joaquin River at Crows Landing; downstream of confluence with Merced River, upstream of Vernalis

Figure 6: Schematic of Past Monitoring Sites

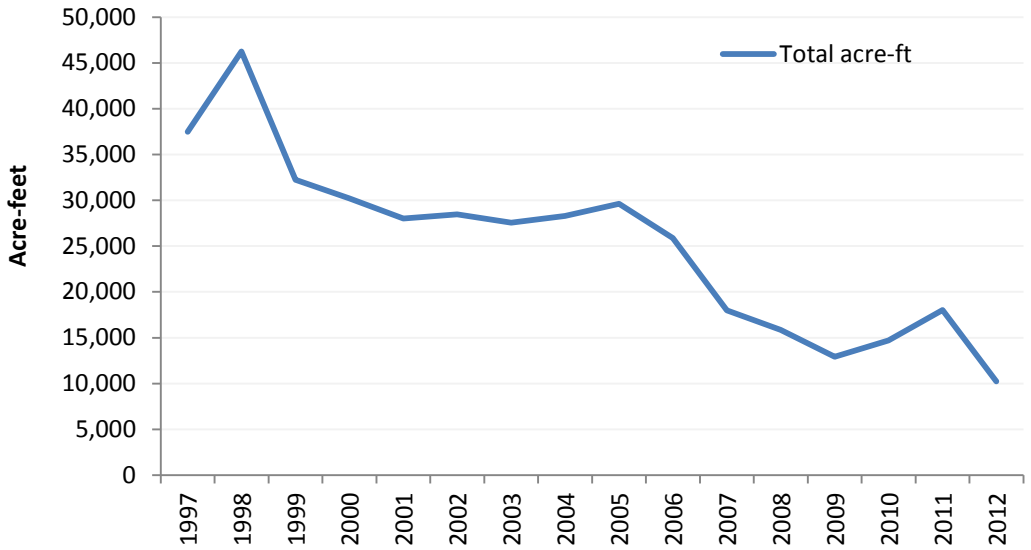


Additional monitoring sites included areas within the Drain (Station A), in Salt Slough (Station F), in Mud Slough (north) (Stations E and F), and the San Joaquin River (Station G). These sites are still being monitored, but on a less frequent schedule or during major storm events. Salt Slough monitoring was reduced since the Basin Plan selenium water quality objective[21] was met in Phase II and the channel has been delisted for selenium.

C. Past Monitoring Results

Past monitoring results are summarized in this section for the following parameters that are of concern: selenium, boron, molybdenum, salts (as indicated by electrical conductivity measurements), and aquatic toxicity. Figure 7 shows that the discharge from the Grassland Drainage Area has decreased significantly[22] since GBP implementation. The decrease in flow is likely due to the combined result of water delivery infrastructure improvements, irrigation system modernization, and reuse activities for subsurface drainage.

Figure 7: Total Flow from the Grassland Drainage Area, Years 1997 to 2012



1. Selenium

Figure 8 shows graphically the monthly average of selenium concentrations at Mud Slough (north) downstream of the Drain discharged from the GDA (Station D) from 2007 to 2013. The decrease in selenium concentration with the decrease in discharge volume from the GDA has decreased the selenium loading and moved the GAF along the "glidepath" identified in the Use Agreement. The selenium load has decreased approximately 80%[23] since the start of the program. Activities implemented to decrease the selenium loading include improved irrigation application, tiered water pricing, tailwater controls, seasonal land fallowing, and reuse and treatment involving recycling, and the use of subsurface drainage water on salt tolerant crops and to wet roadways for dust control.

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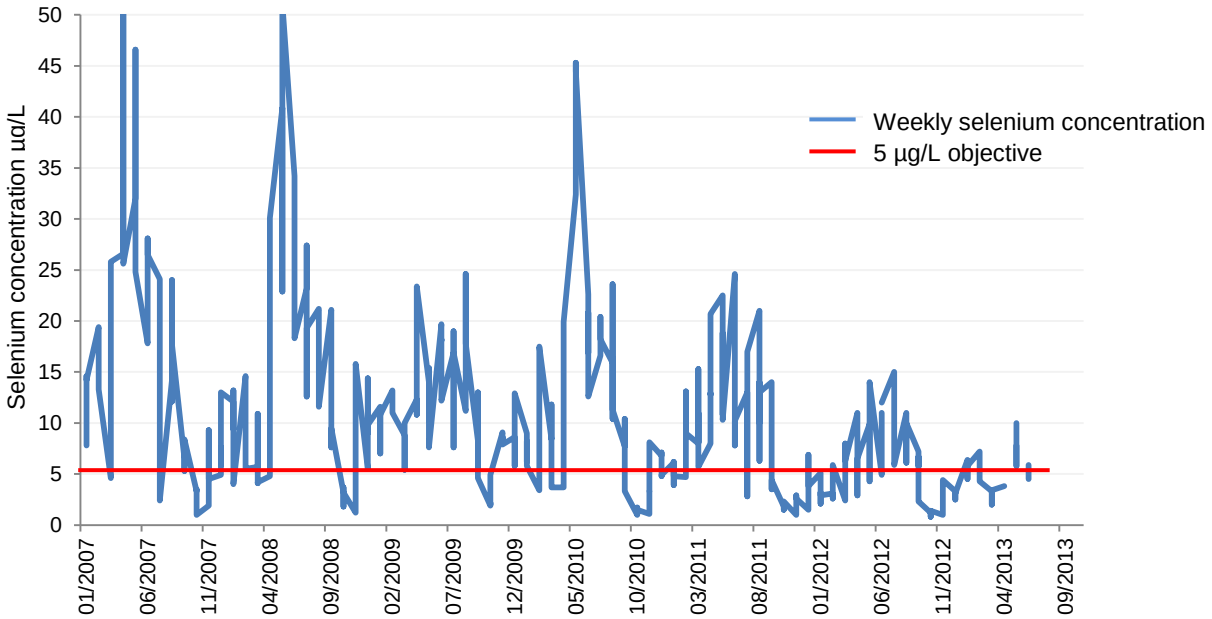
[21] Water quality objective was 2 µg/L selenium (monthly mean) in Salt Slough and wetland water supply channels.

[22] Drainage is down 72% when comparing total flow from CY 2012 with CY1997.

[23] Percentage calculated based on average of selenium annual loads from 2008 to 2012 and the load in 1997. Values for 1997, 2008 to 2011 from Table 3c of Grassland Bypass Project Annual Report 2010-2011. 2012 selenium load value from letter dated 26 December 2013 from Joseph C. McGahan to Pamela C. Creedon, *Waste Discharge Requirement Order No. t-01-234, Update of Long Term Drainage Management Plan.*

Figure 8: Selenium Concentration in Mud Slough below San Luis Drain 2007 to 2013



2. Boron and Molybdenum

Figure 9 shows graphically the monthly average of boron concentrations in the San Joaquin River after the confluence with the Merced River (Station N) from 2007 to 2013. The boron concentration generally meets the water quality objective and it is anticipated further implementation of the San Joaquin River Improvement Project will further reduce the boron concentrations from the GBP.

Figure 9: Boron Concentration in San Joaquin River (Station N) 2007 to 2013

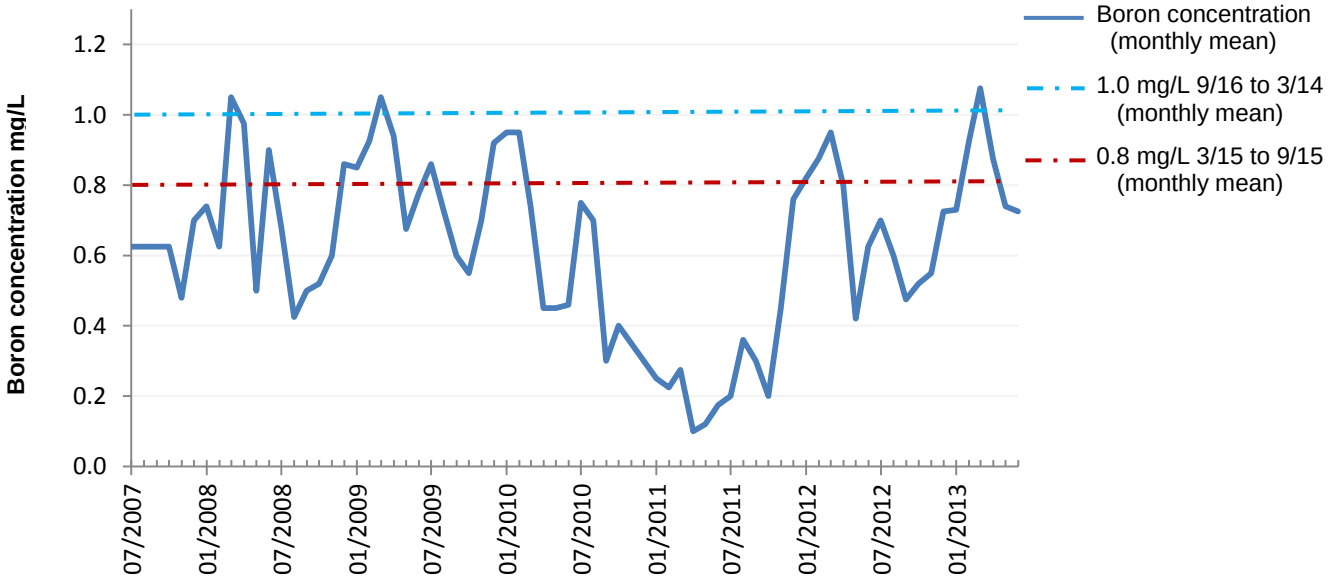
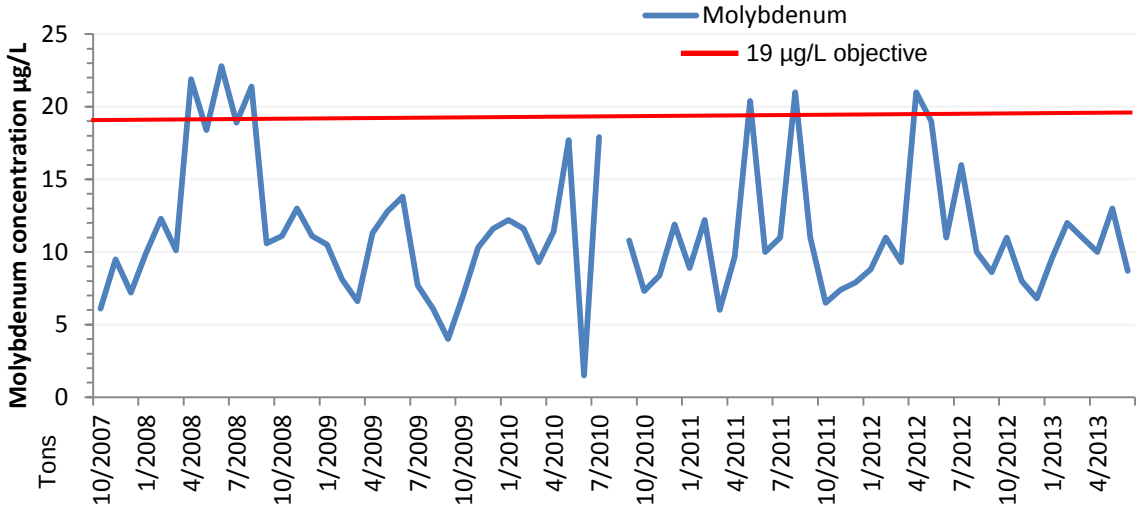


Figure 10 shows graphically the molybdenum concentrations observed in Mud Slough (Station D) from 2007 to 2013.[24] Molybdenum has been observed below the 50 µg/L maximum concentration.

Figure 10: Molybdenum Concentration at Mud Slough below San Luis Drain

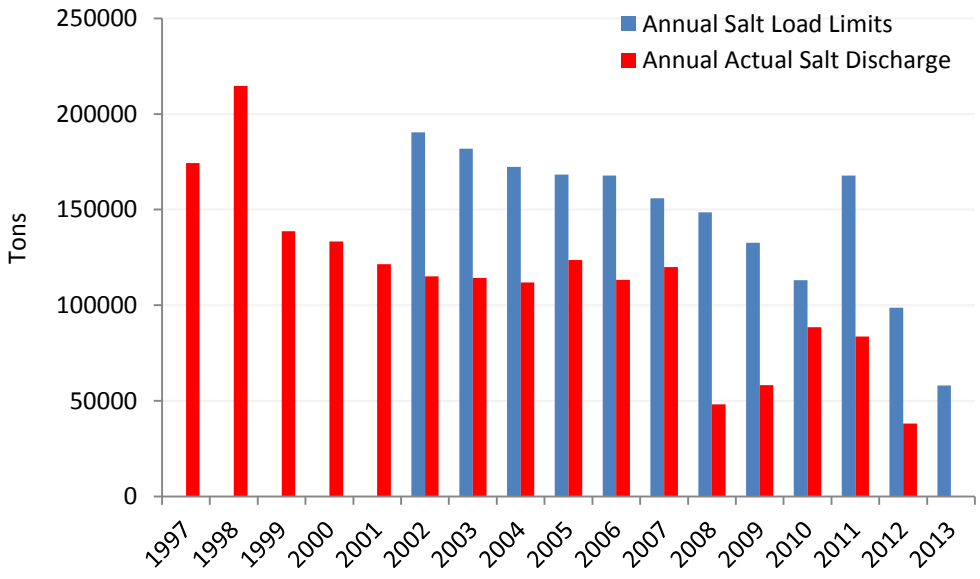


3. Salts

Salt loads are part of the Use Agreements and are calculated using electrical conductivity and flow. Salt or salinity load limits are part of the Use Agreements and based on water year category. Figure 11 shows the salt load limits based on the methodology in the 2001 Use Agreement with selenium loads as the driving management constraint.

In addition, the Basin Plan has a control program for salt and boron discharges from the Lower San Joaquin River. Both the U.S. Bureau of Reclamation and the San Luis & Delta-Mendota Authority are participating in the Central Valley Water Board CV-SALTS program.

Figure 11: Annual Loads of Salt Discharged from the Grassland Drainage Area Compared to Salt Load Limits



[24] Water Year 2012 data ends in December 2011.

V. Implemented Actions and Management Practices

The ultimate goal of the Grassland Bypass Project is to eliminate all agricultural subsurface drainage to the San Joaquin River, a zero discharge to the river. To accomplish this goal, the Grassland Area Farmers (GAF) and the Dischargers have worked to implement management practices and actions to lower the selenium load discharged to the San Joaquin River. This section lists some of the management practices and actions that have been implemented or are planned for implementation:

A. Conservation Efforts

Conservation efforts were initiated by GAF and by the water district to reduce the volume of subsurface drainage to the GBP. These efforts include the following:

1. Improved irrigation management
   Growers have implemented management practices that limit pre-irrigation use and over-watering. Installation of drip or micro-irrigation, combined with improved water management, lowers water use and increases irrigation efficiency. Shorter water runs are encouraged. Improved irrigation efficiency results in less water going past the crop root zone and, thereby, raising the water table, which generates the subsurface drainage.

   The member districts of the GDA have or had programs that encourage growers to improve their irrigation practices. Several of the districts have provided low interest loans to growers for improved irrigation equipment.

2. Initiation of tiered water pricing
   The member districts of the GDA have implemented a tiered water price structure that encourages the conservation of water and efficient use of any delivered irrigation water. Higher prices per acre-foot of water delivered are charged if growers go above a certain amount.

3. Installation of tailwater controls
   Growers are required to separate tailwater from subsurface drainage. Discharge of tailwater is prohibited from the GDA to the Grassland Bypass Channel. A number of GDA growers have installed tailwater return systems or use irrigation methods that do not generate surface runoff.

4. Reduced drainage seepage
   Infrastructure improvements, such as lining canals and installing piping, have reduced drain seepage through the transport system. Reducing drainage seepage to groundwater helps keep groundwater levels lower, and, thereby, reduces the amount of subsurface drainage water produced.

B. Reuse and recycling

The GAF and water districts have implemented the following efforts to reduce the subsurface drainage from entering waters of the state.

1. Recirculation of subsurface drainage by participating districts
   The participating water and irrigation districts in the GDA have constructed facilities to recirculate drain water back into their irrigation distribution system. Recycling drainage water reduces the amount of water that would otherwise need to be imported or pumped and reduces the net amount of subsurface drainage that needs to be discharged out of the area.

2. Prohibition of tailwater discharge into water district canals
   To encourage conservation and recycling, water districts do not allow the discharge of tailwaters into their canals within the GDA.

3. Use of subsurface drain waters on roads
   Subsurface drainage has been reused to wet roads for dust control.

C. Fallowing of land

Approximately 10,400 acres in the GDA have been permanently fallowed, including lands served by the Broadview Water district and Widren Water District. These retired lands are no longer irrigated with supplied water, which reduces the impacts of deep percolation from these areas.

D. San Joaquin River Improvement Project

The San Joaquin River Improvement Project (SJRIP) is a series of projects to aid the GAF with lowering the selenium loading from the GBP. Subsurface drainage from the surrounding area is channeled to the SJRIP area. Projects in progress or being proposed include the following:

- Reuse of subsurface drainage water: Started in 2002, this project included the construction of distribution facilities and the planting of salt tolerant crops on agricultural land. The planted acreage has increased from the original 1,821 acres to more than 5,200 acres, which have been irrigated with drainage water or blended water (subsurface drainage and "fresh" irrigation water). In 2013, approximately 26,000 acre-feet of drain water was reused to irrigate the crops that include producing pistachio trees and salt-tolerant grasses.
- Future phases of the SJRIP project involve the development of additional acreage, installation of more subsurface drainage systems, and implementation of treatment and salt disposal components.
- Another SJRIP project involves a contaminant monitoring program for bird eggs. This biological monitoring started in 2002 and has examined the levels of selenium in a small sample of bird eggs each year. In line with this project, the GAF, Bureau and Authority have tried to discourage birds from inhabiting or nesting in the SJRIP. The program involves hazing birds during the nesting season, diligent water management, and modification of drains to discourage avian use.

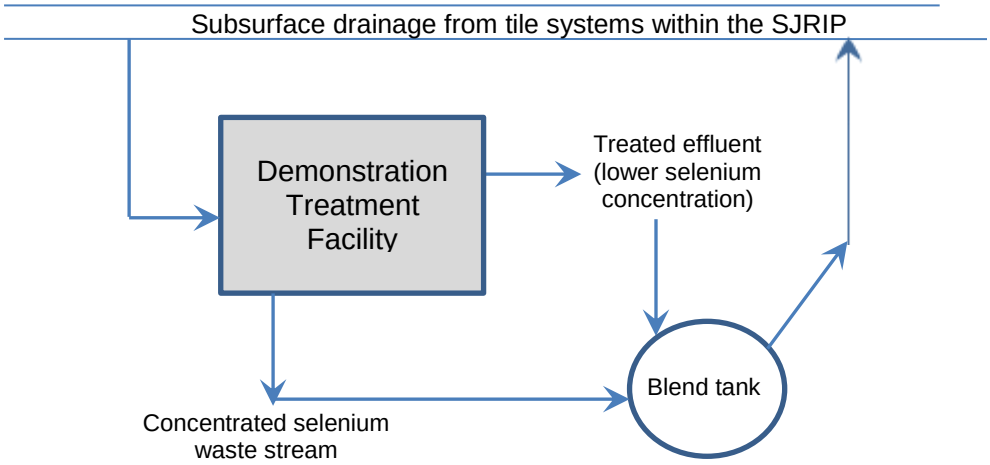
E. Demonstration Treatment Facility

Although not part of the SJRIP, but complementary to the GBP, is the Panoche Drainage District Demonstration Treatment Facility. The facility is located on a portion of the SJRIP reuse area and will test various treatment projects to reduce selenium and salinity loads from the GAF. Projects being considered are:

- Water FX Solar Distillation Demonstration Project: use of a parabolic solar collector to heat and distill the subsurface drain water, then condensing the evaporate which should be "clean" water. A concentrated brine solution is produced as the other byproduct. Phase I of the pilot project has been completed. The contractor proposes to expand the project to increase capacity and install thermal storage to allow operation through the night.
- UCLA Smart Membrane Pilot Test: project will test an optical membrane monitoring device on a reverse osmosis pilot treatment system. Assembly of the system is in progress.
- HDR Deep Well Injection Study: The project reviewed existing information on deep aquifer formations to estimate the potential for deep well injection of subsurface drainage as a management tool.
- USBR RO Demonstration Project: The project will construct a demonstration-scale reverse osmosis treatment plant and a selenium removal component.

The Demonstration Treatment Facility is operated by the Bureau and the Panoche Drainage District to intercept drainage from the existing subsurface agricultural drain systems in the SJRIP area, run the drainage water through various treatment processes to evaluate the efficacy for salt and selenium removal, blend the output from each of the treatment systems, and then recycle the blended mixture back into the SJRIP drainage system (see schematic shown as Figure 12). The selenium loading will not change with operation of the Demonstration Treatment Facility since both the treated effluent and the higher selenium byproduct will be blended prior to being discharged back into the SJRIP subsurface drainage system.

Figure 12: Schematic of Demonstration Treatment Facility



The different treatment options will be evaluated and assessed for efficiency and effectiveness in removing selenium and salts from the subsurface drainage waters. The ultimate goal of the GAF is a "zero discharge" from the GDA by the end of 2019.

F. Removal of sediment from the San Luis Drain

Selenium is listed as a hazardous waste at high concentrations under the USEPA 40 CFR 261.24.[25] Sediments in the San Luis Drain (SLD) may contain selenium. These sediments, if transported along the Drain, would transport the selenium that may then migrate back into the water column. If selenium migration from the sediment to water column occurs, this selenium would be included in the total annual load discharged by the GAF. If sediment acts as a sink (or repository) for the selenium, then the selenium concentration may reach the value where it may be considered "hazardous" waste.

The 2010 Use Agreement limits the maximum rate of flow in the Drain to be 150 cfs in order to avoid re-suspending sediment that may contain selenium. If monitoring results indicate the Drain behaves like a sink, the total selenium load in the sediment can be calculated and the information used to determine if the concentrations are close to hazardous waste values. Sediments would be removed before composite concentrations reach those values.

VI. Monitoring in Phase III

The Basin Plan amendments allow discharges from the GBP area to continue to exceed selenium objectives at Mud Slough (north) and the San Joaquin River between the Mud Slough discharge and the confluence with the Merced River. Load limits for selenium set forth in this Order and the required monitoring will determine if progress is being made to reach compliance with water quality objectives.

[25] USEPA defines materials with a selenium concentration of 1 ppm (or mg/kg), if no longer useful and "discarded", to be "hazardous waste" and must be disposed in accordance with regulations.

Table 3 shows the compliance time schedule for meeting the selenium water quality objective and performance goal as specified in the Basin Plan.

Table 3: Selenium Compliance Time Schedule
(The performance goal is in italics; the water quality objective is in bold.)

Water Body	31 December 2015	31 December 2019
Mud Slough (north) and the San Joaquin River from the Mud Slough Confluence to the Merced River	*15 µg/L monthly mean*	**5 µg/L 4-day average**

Total maximum monthly loads (TMMLs) for selenium have been established based on the water quality objective which will apply no later than 31 December 2019 (Table 4.)

Table 4: Selenium Monthly Load Allocations for the Grassland Drainage Area[26]
(pounds of selenium)

Month	Effluent Limits which apply no later than 31 December 2019			
	Critical	Dry/Below Normal	Above Normal	Wet
October	55	233	260	328
November	55	233	260	328
December	152	319	398	211
January	151	319	398	211
February	93	185	472	488
March	92	184	472	488
April	101	193	490	506
May	105	197	497	512
June	69	130	212	354
July	70	131	214	356
August	75	137	225	366
September	57	235	264	332
Total	1075	2496	4162	4480

Past monitoring has shown boron and salt loads have decreased as selenium loads have decreased. It is expected that this correlation will continue.

A. Monitoring in Phase III

The monitoring sites and parameters analyzed in this MRP Order are used to evaluate compliance with the objectives and limitations in the Basin Plan. Additional monitoring at other locations and for other constituents are specified in the Use Agreement, but not required by this MRP Order.

GBP's Phase III monitoring sites relevant to this Order are shown in Table 5. Monitoring sites from the previous MRP Order were changed due to safety concerns, operational changes, and monitoring costs. Monitoring at Salt Slough was dropped since the selenium water quality objective was met. These changes include: 1) continuous monitoring of flow, electrical conductivity and temperature at certain stations due to installation of transmitting pressure transducers; 2) replacement of Station H2 with Station

[26] The effluent limits in Table 4 are based on the calculated load allocation need to meet the water quality objectives the San Joaquin River at Crows Landing. The monthly load allocation is based on the water year classification applied to the following calendar year. For example, the October through December 2014 load limits are based on the water year classification for October 2013 through September 2014.

R as a monitoring site in the San Joaquin River; 3) replacement of Station B2 with Station B3 in the San Luis Drain; and 4) removing monitoring from the wetland channels except during storm events. A map of these sites is shown in Figure 13.

Table 5: Phase III Monitoring Stations

Feature	Station	Location	Latitude	Longitude
San Luis Drain	B2**	Terminus at Mud Slough	37.26100 N	-120.90520 W
	B3	Gun Club Road	37.23159 N	-120.87599 W
Mud Slough (north)	D	Downstream of SLD discharge	37.26374 N	-120.90627 W
Wetlands channels	J*	Camp 13 Drain, headworks	36.94117 N	-120.75685 W
	K*	Agatha Canal, headworks	36.93399 N	-120.70258 W
San Joaquin River	R	China Island Unit	37.33622 N	-120.96763 W
	H2**	Hills Ferry above Merced River	27.34737 N	-120.97500 W
	N	Crows Landing	37.43149 N	-121.01341 W

* Samples will be collected when water is passing site during a storm event.
** Flow monitoring at station only; no monitoring required by MRP.

Figure 13: Monitoring Stations for Phase III

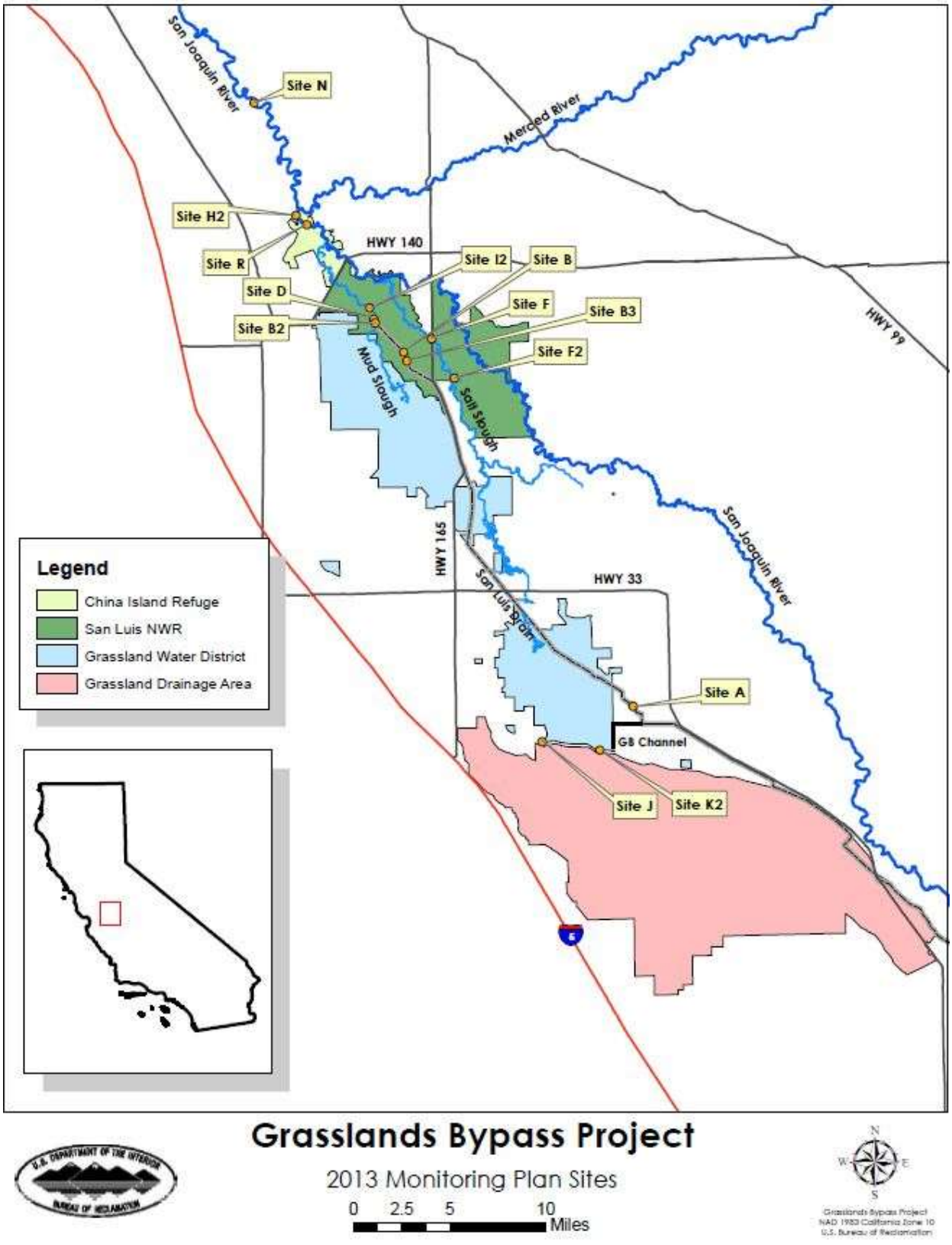


Figure is from *Grassland Bypass Project 2013 Revised Monitoring Program, 26 March 2013*

B. Surface Water Monitoring Requirements in Phase III[27]

Table 2 of the MRP Order summarizes the monitoring stations, parameters and frequency for sampling required by the WDR during Phase III. At Stations B2 and H2 only flow will be monitored.

Monitoring will be performed by the entities with responsibilities and authority in the Grassland Drainage Area as specified in WDR Order R5-2014-XXXX. The Dischargers are required to submit an Annual Monitoring Report by 31 March of each year that will cover the monitoring period from the previous calendar year (1 January through 31 December). The following parameters will be monitored.

1. Flow

Flow is a basic parameter in the measurement of contaminant loads in the Grassland Basin. Flow in the San Luis Drain must be managed to prevent sediment erosion. For all sites, flow measurements are daily averaged based on continuous measurements, or the flow observed passing over weir boards or across a staff gauge.

2. Selenium

The monitoring program for Phase III requires weekly monitoring of selenium (total) at Stations B3, D, R, and N. Additional sampling will occur in the wetlands channels and Mud Slough (north) if flow is passing through during a storm event.

3. Boron and Molybdenum

Boron is to be measured on a weekly basis at Stations D, R, and N to determine compliance with the numeric objectives in the Basin Plan for the San Joaquin River. Sampling at Stations D and R will be used to determine if discharge from Mud Slough (north) after the confluence with the San Luis Drain or other sources in the San Joaquin River may be contributing to any boron exceedances further downstream

Molybdenum is sampled monthly at Stations B3, D, R, and N to determine compliance with numeric objectives in the Basin Plan for Mud Slough (north), San Joaquin River downstream of the confluence with the Merced River, and the San Joaquin River after the Merced River confluence. Monitoring at Station B3 will determine the contribution from the GDA to Mud Slough (north).

4. Salts

Electrical conductivity, taken on a daily average, can be used as an indicator of salts. Continuous real-time monitoring for electrical conductivity and flow are taken at Stations D, H2 and N. Flow measurements are measured by pressure transducers at these sites. Weekly sampling at Stations B3 and R will be required by the MRP and will include electrical conductivity as part of the field measurements.

5. Nutrients

Nutrients monitoring include nitrates as Nitrogen (N) and total ammonia as N. Previous monitoring data from 2000 to 2013 at Station D indicate total phosphorus as P is less than 0.5 mg/L. Nitrate as N during that same period showed 21 events (weekly sampling) with concentrations above the 10 mg/L level, but only 1 event since 2008. Monitoring occurs monthly at Stations B3 and D.

6. Pesticides

Pesticides will be monitored biannually with the pesticides analyzed based on evaluation by the Discharger and the Regional Board of pesticide use data for the GDA. Sampling timing will be dependent on use periods and will occur at Stations B3, D and R. The entire Central Valley currently has Total Maximum Daily Loads (TMDLs) for diazinon, chlorpyrifos, and organochlorine pesticides, and Regional Board staff is developing a general pesticide TMDL for the Central Valley.

7. Aquatic Toxicity

Aquatic toxicity monitoring is used to evaluate compliance with the Basin Plan narrative toxicity water quality objective. The toxicity monitoring is monthly for all species. Samples are to be collected from

[27] DCRT. Grassland Bypass Project 2013 Revised Monitoring Program dated 26 March 2013.

Station D. Toxicity testing will involve three species: *Magna dubia*, *Pimpehales promelas*, and *Selenastrum capricornutum*. Acute toxicity testing (4-day test) will be used for *M. dubia and P. promelas*, with results reported on survival compared to a lab control.[28] Chronic toxicity testing (7-day) shall be performed with *S.capricornutum* with the results reported based on growth compared to the lab control.[29]

8. Sediment Toxicity
Sediment toxicity is used to evaluate compliance with the Basin Plan narrative toxicity water quality objective and narrative settleable material objective. The sediment toxicity test is a 10-day test with *Hyalella* azteca with reporting based on survival compared to a lab control.[30] Sediment testing for total organic carbon and grain size will be concurrent with the *H. azteca* toxicity testing since these factors have been found to influence sediment toxicity results.

9. Sediment Monitoring
Sediment testing is required annually for Station B3 with the analyses to be determined.

Additional testing, not required by the MRP, will occur at various locations in the San Luis Drain for sediment depth and cross-sectional area, selenium, total organic carbon and percent moisture. These values will be used to determine the sediment volume in the drain, and changes in quantity and movement of sediment in the Drain. The chemical analyses will be used as a comparison with Department of Health Services and USFWS selenium criteria for hazardous waste and ecological risk, respectively.

C. Stormwater Monitoring

Storm and flood event monitoring will be required when flows are expected to exceed the capacity of the San Luis Drain as a result of major rainfall events. Actions to be taken are specified in the MRP and Storm Event Plan.[31]

VII. Technical Reports

The surface water quality monitoring under the Order is regional in nature, since the GBP addresses drainage discharges at a regional level and responsibility for those discharges is assumed by entities with responsibility and authority in the Grassland Drainage Area. A benefit of regional monitoring is the ability to determine whether water bodies accepting discharges from the Grassland Drainage Area are meeting discharge and receiving water limitations. Regional monitoring allows the Central Valley Water Board to determine, at the regional level, whether implemented operations and actions are protective of water quality. There are limitations to regional monitoring when trying to determine possible sources of water quality problems.

Therefore, through the Surface Water Quality Management Plans, the Dischargers must evaluate the effectiveness of its operations in meeting discharge and receiving water limitations. Through the evaluations and studies conducted by the Dischargers, and the board's compliance and enforcement activities, the board will be able to determine whether is the Dischargers are complying with the Order.

This Order requires the Dischargers to provide technical reports. These reports may include special studies at the direction of the Executive Officer. The Executive Officer may require special studies where

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28 USEPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. USEPA-821-R-02-012. Test methods 20021.0 and 2000.0 for D. magna and P. promelas, respectively.

29 USEPA, 2002. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organism, Fourth Edition. USEPA-821-R-02-013. Test method1003.0.

30 USEPA, 2000. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates, Second Edition. Test method 100.1.

31 Grassland Area Farmers and San Luis & Delta-Mendota Water Authority. "A Storm Event Plan for Operating the Grassland Bypass Project". August 25, 1997.

the required monitoring is ineffective in determining potential sources of water quality problems. Special studies help ensure that the potential information gaps may be filled through targeted technical reports.

VIII. Reports and Plans

Central Valley Water Board staff will post all plans and reports required for approval by the Executive Officer on the board's website upon approval.

IX. Water Quality Objectives

Surface water limitations in section II of the Order specify that waste discharge may not cause or contribute to an exceedance of discharge or receiving water limitations, or cause a trend in degradation that may threaten applicable beneficial uses, or cause a condition of pollution or nuisance.

Water quality objectives that apply to surface water are described in the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins* (Basin Plan). Applicable water quality objectives include, but are not limited to, (1) the numeric objectives, including the bacteria objective, the chemical constituents objective (includes listed chemicals and state drinking water standards, i.e., maximum contaminant levels (MCLs) promulgated in Title 22 California Code of Regulations (CCR) Division 4, Chapter 15 sections 64431,64444 and 6449 that are applicable through the Basin Plan to waters designated as municipal and domestic supply), dissolved oxygen objectives, pH objectives, the salinity objectives, and the turbidity objectives; and (2) the narrative objectives, including the biostimulatory substances objective, the chemical constituents objective, and the toxicity objective. The Basin Plan also contains numeric water quality objectives that apply to specifically identified water bodies, such as the areas in the Grassland Bypass Project. The Basin Plan includes performance goals and discharge and receiving water limitations for the Grassland area. Federal water quality criteria that apply to surface water are contained in federal regulations referred to as the California Toxics Rule and the National Toxics Rule. See 40 CFR sections 131.36 and 131.38.

The requirements that waste discharge not unreasonably affect beneficial uses or cause a condition of pollution or nuisance are prescribed pursuant to sections 13263 and 13241 of the California Water Code. Section 13263 of the California Water Code requires Regional Water Boards, when establishing waste discharge requirements, to consider the need to prevent nuisance and the provisions in section 13241 of the California Water Code. Section 13241 requires Regional Water Boards to consider several factors when establishing water quality objectives including prevention of nuisance and reasonable protection of beneficial uses.

A. Implementation of Water Quality Objectives

The Basin Plan includes numeric and narrative water quality objectives. The narrative toxicity objective states: *"All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life."* The Basin Plan states that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. The narrative chemical constituent objective states that waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At a minimum, *"…water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs)"* in Title 22 of the California Code of Regulations (CCR). The Basin Plan further states that, to protect all beneficial uses, the Regional Water Board may apply limits more stringent than MCLs. The narrative tastes and odors objective states: *"Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses."*

The Sacramento-San Joaquin Basin Plan at page IV-16.00, contains an implementation policy, "Policy for Application of Water Quality Objectives," that specifies that the Central Valley Water Board "*will, on a*

case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives." With respect to narrative objectives, the Regional Water Board must establish limitations using one or more of three specified sources, including: (1) USEPA's published water quality criteria, (2) a proposed state criterion (i.e., water quality objective) or an explicit state policy interpreting its narrative water quality criteria (i.e., the Regional Water Board's "Policy for Application of Water Quality Objectives"), or (3) an indicator parameter. For purposes of this Order, all three sources will be used as part of the process described below.

Implementation of numeric and narrative water quality objectives under the Order involves an iterative process. The Order's MRP establishes management plan trigger limits that are equivalent to the applicable Basin Plan numeric water quality objectives. For constituents that are not assigned Basin Plan numeric water quality objectives, Central Valley Water Board staff will develop trigger limits in consultation with the Department of Pesticide Regulation (for pesticides) and other agencies as appropriate. Central Valley Water Board staff will provide interested parties, including the Dischargers, with an opportunity to review and comment on the trigger limits. The Executive Officer will then provide the trigger limits to the Dischargers. Those trigger limits will be considered the numeric interpretation of the applicable narrative objectives. In locations where trigger limits are exceeded, water quality management plans must be developed that will form the basis for reporting which steps have been taken to achieve compliance with numeric and narrative water quality objectives.

X. Non-Point Source (NPS) Program

This Order regulates waste discharges from irrigated agricultural lands to state waters as an NPS program. Accordingly, the waste discharge requirements must implement the provisions of the State Water Board's *Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program* (NPS Policy). Under the NPS Policy, the Regional Water Board must find that the program will promote attainment of water quality objectives. The nonpoint-source program also must meet the requirements of five key structural elements. These elements include (1) the purpose of the program must be stated and the program must address NPS pollution in a manner that achieves and maintains water quality objectives and beneficial uses, including any applicable antidegradation requirements; (2) describe the practices to be implemented and processes to be used to select and verify proper implementation of practices; (3) where it is necessary to allow time to achieve water quality requirements, include a specific time schedule, and corresponding quantifiable milestones designed to measure progress toward reaching specified requirements; (4) feedback mechanisms to determine whether the program is achieving its purpose; and (5) the consequences of failure to achieve the stated purpose.

This Order addresses each of the five key elements, as described below.

(1) The purpose of this Order is to address the water quality impacts of surface water discharges from the area served by the GBP. The principal goal of the GBP is summarized as providing for the achievement of the water objectives set by the board and the Basin Plan related to subsurface drainage discharges from the Grassland Drainage Area while maintaining viable agricultural production in the area. The requirements of this Order include requirements to meet discharge and receiving water limitations, applicable water quality objectives as stated in the Basin Plan and the requirements of State Water Board Resolution 68-16 (antidegradation requirements). Further discussion of this Order's implementation of antidegradation requirements is given below under the section titled "State Water Board Resolution 68-16."

(2) The board is prevented by Water Code section 13360 from prescribing specific management practices or measures to be implemented. However, it may set forth performance standards and require dischargers to report on what measures they have or will implement to meet those standards. This Order requires that the Dischargers report in the Drainage Management Plan updates on the actions that have or will be implemented to achieve compliance with discharge and receiving water limitations. The update will include the description of various control or management practices utilized to control the discharge of selenium and other constituents of

concern and the milestones achieved set in the Basin Plan or previous annual reports under the Drainage Management Plan. The Drainage Management Plan may be submitted as part of the Annual Monitoring Report.

(3) This Order requires the development and implementation of a management plan to meet water quality objectives stated in the Basin Plan. A time schedule for compliance with the Basin Plan objectives is part of this Order. In addition, this Order requires the development of SQMPs when water quality objectives are not met. For constituents that do not have a specific time schedule in the Basin Plan, SQMPs must include time schedules for implementing the plans and meeting the receiving water limitations (section II of the Order) as soon as practicable, but within a maximum of 10 years. The time schedules for the SQMPs must be consistent with the requirements for time schedules set forth in this Order. The time schedules must include quantifiable milestones that will be reviewed by the Executive Officer and the public prior to approval. The time schedule requirements in this Order are consistent with Key Element 3.

(4) To provide feedback on whether program goals are being achieved, this Order requires surface water quality monitoring. This feedback will allow iterative implementation of practices to ensure that program goals are achieved. This feedback mechanisms required by this Order are consistent with Key Element 4.

(5) This Order establishes the following consequences where requirements are not met:

(a) The Dischargers will be required, in an iterative process, to conduct additional monitoring and/or implement actions/measures when discharge or receiving water limitations or water quality objectives are not being met;

(b) Appropriate Central Valley Water Board enforcement action where the iterative process is unsuccessful, program requirements are not met, or time schedules are not met;

This Order describes consequences for failure to meet requirements and is consistent with Key Element 5.

XI. California Environmental Quality Act (CEQA)

This Order is covered by the Environmental Impact Statement and Environmental Impact Report for the Grassland Bypass Project (EIS/EIR).[32] The lead agency for the EIS was the U.S. Bureau of Reclamation. The lead agency pursuant to CEQA (Public Resources Code section 21100 et seq.) was the San Luis & Delta-Mendota Water Authority. A Notice of Determination (NOD) was filed on 12 October 2009.[33] A Record of Decision (ROD-07-141) was issued in December 2009. No legal challenges were made to either decisions.

This Order relies on the environmental impact analysis contained in the EIS/EIR to satisfy the requirements of CEQA. The EIS/EIR identifies the following mitigation measures that apply to surface water discharges regulated by this Order:

- Update and implement a water quality monitoring program.
  Results of the monitoring program for the GBP will be reviewed semi-annually, or more frequently as required, by the Oversight Committee. If unacceptable problems or impacts re identified, appropriate mitigative actions will be identified by the Oversight Committee to address the problems.

  Appropriate mitigative actions may include, but not necessarily be limited to, interruption of specific identified contaminant pathways through hazing or habitat manipulation; increased

[32] Entrix, 2009. *Grassland Bypass Project, 2010-2019, Environmental Impact Statement and Environmental Impact Report.* Final August 2009. Concord, CA. Prepared for: U.S. Bureau of Reclamation, South Central California Office and Mid-Pacific Region; and San Luis & Delta-Mendota Water Authority, Los Banos, CA

[33] NOD filed for the Grassland Bypass Project, 2010-2019, State Clearinghouse Number 2007121110.

management, enhancement, and recovery activities directed at impacted species in channels cleaned up as a result of the GBP, and/or establishment and attainment of more stringent contaminant load reductions. The costs of mitigation, as well as any required cleanup, will be borne by the draining parties. Monitoring to ensure the mitigative actions are effective will be required or continued to evaluate effectiveness.

- Implement the Storm Event Plan developed in 2007 when trigger event occurs.
  When major storm events occur, the Grassland Bypass Channel may not be able to handle the combined commingled discharge of surface runoff, storm water flows and agricultural drainage Flow may be diverted to Grassland Water District channels. Increased water velocities in the Drain have the potential to scour and damage the structural integrity of the Drain, as well as releasing the accumulated sediment in the channel. The Storm Event Plan details a process for notifying regulatory and system users, the trigger velocity when gates to the Grassland Water District supply channel may be opened and then closed, and a requirement for daily monitoring to determine quantity and quality of the bypassed flows.

The board Order requires implementation of these mitigation measures.

XII. Statement of Policy With Respect to Maintaining High Quality Waters in California (State Water Board Resolution 68-16)

This section of the Information Sheet first provides background on State Water Board Resolution 68-16 *Statement of Policy with Respect to Maintaining High Quality of Waters in California* (Resolution 68-16). Following the background discussion, the Information Sheet describes how the various provisions in the WDR and MRP collectively implement Resolution 68-16. In summary, the requirements of Resolution 68-16 are met through a combination of upfront project-level planning and implementation; monitoring and assessments to determine trends; and regional planning and revisions to project implementation when trends in degradation are identified. This project has been in operation since 1996 and it has been regulated by WDRs since 1998. Monitoring has demonstrated that there have been significant reductions in the discharge of selenium and salt.

Regional trend monitoring of surface water together with periodic assessments of available surface water information is required to determine compliance with water quality objectives and determine whether any trends in water quality improvement or degradation are occurring. If trends in such degradation are identified that could result in impacts to beneficial uses, a surface quality management plan must be prepared by the Dischargers. The plan must include the identification of steps that will be implemented to address the trend in degradation and an evaluation of the effectiveness of those practices in addressing the degradation. Failure to implement improved practices will result in further direct regulation by the board, including, but not limited to, taking enforcement action.

A separate Board order will be developed for regulation of discharges to groundwater from the area served by the GBP. As discussed further below, the combination of these requirements fulfill the requirements of Resolution 68-16 for any degradation of high quality waters authorized by this Order.

A. Background

Basin Plan water quality objectives are developed to ensure that beneficial uses are protected. The quality of some state surface waters is higher than established Basin Plan water quality objectives. For example, nutrient levels in good, or “high quality” waters may be very low, or not detectable, while existing water quality standards for nutrients may be much higher. In such waters, some degradation of water quality may occur without compromising protection of beneficial uses. State Water Board Resolution 68-16 *Statement of Policy with Respect to Maintaining High Quality of Waters in California* (Resolution 68-16) was adopted in October of 1968 to address high quality waters in the state. Title 40 of the Code of Federal Regulations, Section 131.12 -- Antidegradation Policy (40 CFR 131.12) was developed in 1975 to ensure water quality necessary to protect existing uses in waters of the United

States. Resolution 68-16 applies to discharges to all high quality waters of the state (Water Code section 13050[e]); 40 CFR 131.12 applies only to surface waters.

The requirement to implement the Antidegradation Policy is contained in Resolution 68-16 (provision 2 presented below) and in the Basin Plan. The Basin Plan states that the Central Valley Water Board actions must conform to State Water Board plans and policies and among these policies is Resolution 68-16, which requires that:

1. "Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies."
2. "Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."

For discharges to surface waters only, the Federal Antidegradation Policy (Section 131.12, Title 40, CFR) requires:

1. "Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

2. Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control.

3. When high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

4. In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with section 316 of the Act."

The State Water Board has interpreted Resolution 68-16 to incorporate the Federal Antidegradation Policy in situations where the policy is applicable. (SWRCB Order WQ 86-17). The application of the Federal Antidegradation Policy to nonpoint source discharges (including discharges from irrigated agriculture) is limited.[34]

[34] 40 CFR 131.12(a)(2) requires that the "State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and *all cost-effective and reasonable best management practices for nonpoint source control.*" The EPA Handbook, Chapter 4, clarifies this as follows: "Section 131.12(a)(2) does not mandate that States establish controls on nonpoint sources. The Act leaves it to the States to determine what, if any, controls on nonpoint sources are needed to provide attainment of State water quality standards (See CWA Section 319). States may adopt enforceable requirements, or voluntary programs to address nonpoint source pollution. Section 40 CFR 131.12(a)(2)

Administrative Procedures Update (APU) 90-004, Antidegradation Policy Implementation for NPDES Permitting, provides guidance for the Regional Water Boards in implementing Resolution 68-16 and 40 CFR 131.12, as these provisions apply to NPDES permitting. APU 90-004 is not applicable in the context of this Order because nonpoint discharges from agriculture are exempt from NPDES permitting.

A number of key terms are relevant to application of Resolution 68-16 and 40 CFR 131.12 to this Order. These terms are described below.

High Quality Waters: Resolution 68-16 applies whenever "existing quality of water is better than quality established in policies as of the date such policies become effective,"[35] and 40 CFR 131.12 refers to "quality of waters [that] exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation." Such waters are "high quality waters" under the state and federal antidegradation policies. In other words, high quality waters are waters with a background quality of better quality than that necessary to protect beneficial uses.[36] The Water Code directs the State Water Board and the Regional Water Boards to establish water quality objectives for the reasonable protection of beneficial uses. Therefore, where water bodies contain levels of water quality constituents or characteristics that are better than the established water quality objectives, such waters are considered high quality waters.

Both state and federal guidance indicates that the definition of high quality waters is established by constituent or parameter [State Water Board Order WQ 91-10; USEPA Water Quality Handbook, Chapter 4 Antidegradation (40 CFR 131.12) ("EPA Handbook")]. Waters can be of high quality for some constituents or beneficial uses but not for others.

In order to determine whether a water body is a high quality water with regard to a given constituent, the background quality of the water body unaffected by the discharge must be compared to the water quality objectives. If the quality of a water body has declined since the adoption of the relevant policies and that subsequent lowering was not a result of regulatory action consistent with the state antidegradation policy, a baseline representing the historically higher water quality may be an appropriate representation of background.[37] However, if the decline in water quality was permitted consistent with state and federal antidegradation policies, the most recent water quality resulting from permitted action constitutes the relevant baseline for determination of whether the water body is high quality (see, e.g., SWRCB Order WQ 2009-0007 page 12). Additionally, if water quality conditions have improved historically, the current higher water quality would again be the point of comparison for determining the status of the water body as a high quality water.

Best Practicable Treatment or Control: Resolution 68-16 requires that, where degradation of high quality waters is permitted, best practicable treatment or control (BPTC) limits the amount of degradation that may occur. Neither the Water Code nor Resolution 68-16 defines the term "best practicable treatment or control."

Despite the lack of a BPTC definition, certain State Water Board water quality orders and other documents provide direction on the interpretation of BPTC. The State Water Board has stated: "one factor to be considered in determining BPTC would be the water quality achieved by other similarly

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does not require that States adopt or implement best management practices for nonpoint sources prior to allowing point source degradation of a high quality water. However, States that have adopted nonpoint source controls must assure that such controls are properly implemented before authorization is granted to allow point source degradation of water quality." Accordingly, in the context of nonpoint discharges, the BPTC standard established by state law controls.

35 Such policies would include policies such as State Water Board Resolution 88-63, Sources of Drinking Water Policy, establishing beneficial uses, and water quality control plans.

36 USEPA Water Quality Handbook, Chapter 4 Antidegradation (40 CFR 131.12) , defines "high quality waters" as "those whose quality exceeds that necessary to protect the section 101(a)(2) goals of the Act [Clean Water Act], regardless of use designation."

37 The state antidegradation policy was adopted in 1968, therefore water quality as far back as 1968 may be relevant to an antidegradation analysis. For purposes of application of the federal antidegradation policy only, the relevant year would be 1975.

situated dischargers, and the methods used to achieve that water quality" (see Order WQ 2000-07, pages 10-11). In a "Questions and Answers" document for Resolution 68-16 (the Questions and Answers Document), BPTC is interpreted to additionally include a comparison of the proposed method to existing proven technology; evaluation of performance data (through treatability studies); comparison of alternative methods of treatment or control, and consideration of methods currently used by the dischargers or similarly situated dischargers.[38] The costs of the treatment or control should also be considered. Many of the above considerations are made under the "best efforts" approach described later in this section. In fact, the State Water Board has not distinguished between the level of treatment and control required under BPTC and what can be achieved through "best efforts."

The Regional Water Board may not "specify the design, location, type of construction, or particular manner in which compliance may be had with [a] requirement, order, or decree" (Water Code 13360). However, the Regional Water Board still must require the dischargers to demonstrate that the proposed manner of compliance constitutes BPTC (SWRCB Order WQ 2000-7). The requirement of BPTC is discussed in greater detail below.

Maximum Benefit to People of the State: Resolution 68-16 requires that where degradation of water quality is permitted, such degradation must be consistent with the "maximum benefit to people of the state." Only after "intergovernmental coordination and public participation" and a determination that "allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located" does 40 CFR 131.12 allow for degradation.

As described in the Question and Answers Document, factors considered in determining whether degradation of water quality is consistent with maximum benefit to people of the State include economic and social costs, tangible and intangible, of the proposed discharge, as well as the environmental aspects of the proposed discharge, including benefits to be achieved by enhanced pollution controls. With reference to economic costs, both costs to the dischargers and the affected public are considered. Closely related to the BPTC requirement, consideration must be given to alternative treatment and control methods and whether lower water quality can be abated or avoided through reasonable means, and the implementation of feasible alternative treatment or control methods should be considered.

USEPA guidance clarifies that the federal antidegradation provision "is not a 'no growth' rule and was never designed or intended to be such. It is a policy that allows public decisions to be made on important environmental actions. Where the state intends to provide for development, it may decide under this section, after satisfying the requirements for intergovernmental coordination and public participation, that some lowering of water quality in "high quality waters" is necessary to accommodate important economic or social development" (EPA Handbook for Developing Watershed Plans to Restore and Protect Our Waters, Chapter 4). Similarly, under Resolution 68-16, degradation is permitted where maximum benefit to the people of the state is demonstrated.

Water Quality Objectives and Beneficial Uses: As a floor, any degradation permitted under the antidegradation policies must not cause an exceedance of water quality objectives or a pollution or nuisance. Furthermore, the NPS Policy establishes a floor for all water bodies in that implementation programs must address NPS pollution in a manner that achieves and maintains water quality objectives and beneficial uses. This Order allows a set time period in which the Dischargers exceed water quality objectives while establishing the controls and treatment required to meet those objectives.

Waters that are Not High Quality: The "Best Efforts" Approach

Where a water body is at or exceeding water quality objectives already, it is not a high quality water and is not subject to the requirements of the antidegradation policy. Data collected by the Central Valley

[38] See Questions and Answers, State Water Resources Control Board, Resolution 68-16 (February 16, 1995).

Water Board, dischargers, federal and State agencies, and others demonstrate that water bodies receiving discharge from the GBP are already impaired for some constituents associated with irrigated agricultural activities.

The "best efforts" approach involves the Regional Water Board establishing limitations expected to be achieved using reasonable control measures. Factors which should be analyzed under the "best efforts" approach include the effluent quality achieved by other similarly situated dischargers, the good faith efforts of the discharger to limit the discharge of the constituent, and the measures necessary to achieve compliance (SWRCB Order WQ 81-5, page 7). The State Water Board has applied the "best efforts" factors in interpreting BPTC (see SWRCB Order Nos. WQ 79-14, and WQ 2000-07).

B. Application of Resolution 68-16 Requirements to this Order

The determination of a high quality water within the meaning of the antidegradation policies is water body and constituent-specific.

As stated above, some water bodies receiving discharge from the GBP are already impaired for some constituents. Those same receiving water bodies meet objectives for particular constituents and would be considered "high quality waters" with respect to those constituents.

The temporary degradation of Mud Slough (north) and the San Joaquin River between Mud Slough (north) and the Merced River is allowed through policies established in the Basin Plan. This temporary degradation is allowed because: 1) the continuation of the GBP discharges diverts drainage away from Salt Slough and the wetland water supply channels listed in Appendix 40, as afforded by the regional drainage management project, and has long-term environmental benefits to the wildlife utilizing this portion of the Pacific Flyway and the Grasslands Ecological Area; 2) the farm-based economy of the area would be adversely affected by the discontinuation of the GBP; and 3) it provides time for the development of regional drainage management capability to meet water quality objectives.

Any application of the antidegradation requirements must account for the fact that at least some of the waters into which the subsurface agricultural wastes discharge are high quality waters for some constituents. Further, the Order provisions should also account for the fact that even where a water body is not high quality (such that discharge into that water body is not subject to the antidegradation policy), the board should, under State Water Board precedent, impose limitations more stringent than the objectives set forth in the Basin Plan, if those limits can be met by "best efforts."

The WDR and MRP for the Grassland Bypass Project are intended to allow a means for Grassland Area Farmers to implement measures to meet the discharge and receiving limitations, and eventually the water quality objectives for the San Joaquin River. Continuation of the Project will allow water quality to improve by the implementation of "best effort" measures by the Grassland Area Farmers.

C. Consistency with BPTC and the "Best Efforts" Approach

Due to the numerous commodities being grown, the different water management systems in place and the regional nature of the problem, identification of a specific technology or treatment device as BPTC or "best efforts" has not been accomplished. The Central Valley Water Board recognizes that there is often site-specific, crop-specific, and regional variability that affects the selection of appropriate management practices, as well as design constraints and pollution-control effectiveness of various practices. In addition, the board recognizes that the gains made in previous years in the area served by the GBP are a result of a combination of individual grower improvements, improvements made at the district level, and regional efforts.

The GBP needs the flexibility to explore, implement and evaluate control and treatment measure that best achieve performance expectations. These control and treatment measures will operate on a regional basis to lower the discharge loads of selenium, salts and boron. More than one means of control

or treatment has been and will likely continue to be required for these constituents in order to meet the water quality objectives for the San Joaquin River.

There is no specific set of technologies or treatment devices that can be said to achieve BPTC/best efforts universally in the watershed considering the crop variety and factors (e.g., water allocation) affecting individual farms in the Grassland Drainage Area. The Basin Plan in Chapter IV, page IV-31.00 states:

1. "In developing control actions for selenium, the Regional Board will utilize a priority system which focuses on a combination of sensitivity of the beneficial use to selenium and the environmental benefit expected from the action.
2. Control actions which result in selenium load reductions are most effective in meeting water quality objectives.
3. With the uncertainty in the effectiveness of each control action, the regulatory program will be conducted as a series of short-term actions that are designed to meet long-term water quality objectives.
4. Best management practices such as water conservation measures, are applicable to the control of agricultural subsurface drainage."

The efforts of the Grassland Area Farmers to 1) limit the discharge from the Grassland Drainage Area; 2) the projects initiated under the San Joaquin River Improvement Project; and 3) the reuse of subsurface drainage is considered "best efforts" by the Central Valley Water Board. These efforts have lowered the selenium loading from the GBP to the San Joaquin River so that a section of the San Joaquin River has been delisted for selenium under 303(d).

BPTC is not defined in Resolution 68-16. However, the State Water Board describes in their 1995 Questions and Answers, Resolution 68-16: "To evaluate the best practicable treatment or control method, the discharger should compare the proposed method to existing proven technology; evaluate performance data, e.g., through treatability studies; compare alternative methods of treatment or control; and/or consider the method currently used by the discharger or similarly situated dischargers." Measures have been implemented by the Grassland Area Farmers to eliminate tailwater from the Grassland Bypass Channel and to test different technologies for selenium removal at the SJRIPP treatment facility. These measures and other implemented actions to achieve discharge and effluent limitations constitute BPTC/best efforts.

- As part of California's Nonpoint Source Pollution Control Program, the State Water Board, California Coastal Commission, and other state agencies have identified seven management measures to address agricultural nonpoint sources of pollution that affect state waters (*California's Management Measures for Polluted Runoff*, referred to below as "Agriculture Management Measures").[39] The agricultural management measures include practices and plans installed under various NPS programs in California, including systems of practices commonly used and recommended by the USDA as components of resource management systems, water quality management plans, and agricultural waste management systems.
- USEPA's National Management Measures to Control Nonpoint Source Pollution from Agriculture (EPA 841-B-03-004, July 2003;),[40] "is a technical guidance and reference document for use by State, local, and tribal managers in the implementation of nonpoint source pollution management programs. It contains information on the best available, economically achievable means of reducing pollution of surface and ground water from agriculture."

[39] *California's Management Measures for Polluted Runoff* (<http://www.waterboards.ca.gov/water_issues/programs/nps/docs/cammpr/info.pdf>)

[40] *National Management Measures to Control Nonpoint Source Pollution from Agriculture* (<http://water.epa.gov/polwaste/nps/agriculture/agmm_index.cfm>)

Discharges from the GBP to surface waters consist primarily of subsurface agricultural drainage and stormwater runoff from agricultural lands. Both of the above guidance documents describe a series of management measures. The agricultural management measures described in the state and USEPA reference documents generally include: 1) erosion and sediment control, 2) facility wastewater and runoff from confined animal facilities, 3) nutrient management, 4) pesticide management, 5) grazing management, 6) irrigation water management, and 7) education and outreach. A comparison of the recommendations with the management practices implemented by the Dischargers and GAF is provided below.

- *Management measure 1, erosion and sediment control.* The Order places limits on the maximum flow rate in the San Luis Drain to prevent scouring and the mobilization of drain sediments. The Use Agreement states that "[t]o avoid re-suspending sediment in the Drain, the maximum rate of flow in the Drain shall be 150 cfs" and that "[u]nder normal operations, flows will be slow enough to not cause sediment movement." In addition, Grassland Area Farmers are not allowed to discharge tailwaters into water district canals.
- *Management measure 2 is not applicable*, as this Order does not address waste discharges from confined animal facilities.
- *Management measure 3, nutrient management*. As described in the State's Agricultural Management Measures document, "this measure addresses the development and implementation of comprehensive nutrient management plans for areas where nutrient runoff is a problem affecting coastal waters and/or water bodies listed as impaired by nutrients." Where nutrients are causing exceedances of water quality objectives in surface waters, this Order would require development of a detailed SQMP which would address sources of nutrients and require implementation of practices to manage nutrients. Collectively, these requirements work together in a manner consistent with management measure 3.
- *Management measure 4, pesticide management.* As described in the State's Agricultural Management Measures document, this measure "is intended to reduce contamination of surface water from pesticides." The Grassland Area Farmers are to implement practices that minimize waste discharge to surface water (such as pesticides), prevent pollution and nuisance, and achieve and maintain water quality objectives.
- *Management measure 5, grazing management*. is not applicable, as the Grassland Drainage Area contains minimal acreage used for grazing.
- *Management measure 6, irrigation water management*. As described in the state Agricultural Management Measures document, this measure "promotes effective irrigation while reducing pollutant delivery to surface and ground waters." The Grassland Area Farmers are not allowed to discharge tailwater into the Grassland Bypass Channel. Control and treatment technologies are being explored to minimize the release of selenium and salts to the discharge point. Reuse of the subsurface drainage is also being utilized to meet effluent and discharge limitations and eventually the water quality objective.
- *Management measure 7, education and outreach*. The Order requires that the Dischargers meet specific performance standards and deadlines. The Dischargers have used education and outreach to the Grassland Area Farmers in the past to inform growers of projects in the SJRIP and monitoring results for salinity and selenium. It is anticipated that this approach will be used, as necessary, in the future.

Implementation of actions to achieve the Order's effluent and receiving water limitations described above are consistent with the state and federal guidance for management measures. Implementation of these measures for compliance with the requirements of the Order will lead to implementation of BPTC/best efforts by the Project

1. Additional Planning and Implementation Measures (SQMPs)
   This Order requires development of surface water quality management plans where degradation trends are observed that threaten to impair a beneficial use or where beneficial uses are impaired (i.e., water quality objectives are not being met). SQMPs include requirements to investigate sources, develop strategies to implement actions to ensure waste discharges are meeting the Orders effluent and receiving water limitations, and implement a monitoring strategy to provide feedback on the effectiveness of the management plan. In addition, the SQMPs must include actions to "Identify, validate, and implement management practices to reduce loading of COC's [constituents of concern] to the subsurface agricultural discharge, thereby improving water quality" (see Appendix MRP-1). Under these plans, additional actions or technology will be implemented in an iterative manner, to ensure that the measures represent BPTC/best efforts and that degradation does not threaten beneficial uses. The SQMPs need to meet the performance standards set forth in this Order. The SQMPs are also reviewed periodically to determine whether adequate progress is being made to address the degradation trend or impairment. If adequate progress is not being made, then the Executive Officer can require field monitoring studies. or the board may revoke the coverage under this Order.

   It is also important to note that in some cases, other agencies may establish performance standards that are equivalent to BPTC and may be relied upon as part of a SQMP. For example, the Bureau may remove, at its discretion, sediment and organic materials deposited in the Drain at any time during the term of its present Use Agreement.

   The State Water Board indicates in its Questions and Answers, Resolution 68-16: "To evaluate the best practicable treatment or control method, the discharger should evaluate performance data, e.g., through treatability studies..." Water quality management plans, referred to as SQMPs above, institute an iterative process whereby the effectiveness of any measures taken to minimize will be periodically reevaluated as necessary and/or as more recent and detailed water quality data become available. The Dischargers are also required in the WDR to submit annually a Drainage Management Plan that details the specific control or treatment methods implemented for subsurface drainage to comply with water quality objectives contained in the Basin Plan for discharges from the GBP. This process of reviewing data and instituting additional measures where necessary will continue to assure that BPTC/best efforts are implemented and will facilitate the collection of information necessary to demonstrate the performance of the measures. This iterative process will also ensure that the highest water quality consistent with maximum benefit to the people of the state will be maintained.

   Resolution 68-16 does not require Dischargers to use technology that is better than necessary to prevent degradation (as evaluated on a constituent by constituent basis). As such, the board presumes that the requirements of this Order are sufficiently achieving BPTC for constituents and locations where degradation is not occurring.

D. Summary

The Dischargers are required to implement measures to meet the above goals and periodically review the effectiveness of implemented measures and make improvements where necessary. Also, the Order requires water quality monitoring and assessments aimed to identify trends, evaluate effectiveness of management practices, and detect exceedances of water quality objectives. The process of periodic review of SQMPs, review of monitoring data, and updates to the Drainage Management Plan provides mechanisms for the board to better ensure that the Dischargers are meeting the requirements of the Order.

The Order is designed to achieve site-specific antidegradation and antidegradation-related requirements through implementation of BPTC/best efforts as appropriate and monitoring, evaluation, and reporting to confirm the effectiveness of the BPTC/best efforts measures in achieving their goals. The Order relies on implementation of control and treatment technologies that constitute BPTC/best efforts, based to the

extent possible on existing data, and requires the water quality monitoring to ensure that the selected measures in fact constitute BPTC where degradation of high quality waters is or may be occurring, and best efforts where waters are already degraded.

This Order allows limited degradation of existing high quality waters while best efforts measures are being implemented. The Basin Plan sets performance goals to meet water quality objectives while these measures are being implemented. This limited degradation is consistent with maximum benefit to the people of the state for the following reasons:

- At a minimum, this Order requires that the effluent and receiving waters achieve and maintain compliance with the discharge limitations in the Basin Plan and protect existing beneficial uses;
- The requirements implementing the Order will result in use of BPTC where waste discharges may cause degradation of high quality waters. Where waters are already degraded, the requirements will result in pollution controls that reflect the "best efforts" approach. Confirmation of BPTC/best efforts will be shown by monitoring data.
- Consistent with the Order's stated goal of ensuring subsurface agricultural discharges do not impair access to safe and reliable drinking water, the Order protects high quality waters relied on by local communities from degradation of their water supplies by current practices in the Grassland Drainage Area. The Order is designed to prevent subsurface discharges from the Grassland Drainage Area from causing or contributing to exceedances of water quality objectives, which include maximum contaminant levels for drinking water. The Order also is designed to detect and address exceedances of water quality objectives, if they occur, in accordance with the compliance time schedules provided therein. Therefore, local communities should not incur any additional treatment costs associated with the limited degradation authorized by this Order; and
- The Order includes performance standards that will work to prevent further degradation of surface water quality.

The requirements of the Order and the limited degradation that would be allowed are consistent with State Water Board Resolution 68-16. The requirements of the Order will result in the implementation of best efforts necessary to assure no further degradation of water quality with the maximum benefit to the people of the state. The water limitations in section II of the Order, the compliance schedules in section II and the Basin Plan, and the Monitoring and Reporting Program's requirements to track compliance with the Order, are designed to ensure that further degradation of water quality will not occur and that the limited degradation will not unreasonably affect beneficial uses, or cause a condition of pollution or nuisance. Finally, the iterative process of reviewing data and instituting additional measures when necessary will ensure that the highest water quality consistent with the maximum benefit to the people of the state will be maintained.

XIII. California Water Code Section 13141

The Phase III EIR/EIS examined the socioeconomic impacts to the region under three scenarios: 1) No Action Alternative; 2) Proposed Action; and 3) Alternate Action. The No Action Alternative assumed termination of the GBP. The Proposed Action would implement the 2009 Use Agreement conditions for the GBP. The Alternative Action examined a continuation of the GBP, but at the level set in the 2001 Use Agreement.

The key farm-level variable used for measurement of impact significance was farm profit. Farm profit summarizes the effects of an alternative on the long-run viability of farming in the area and was measured relative to estimated 2007 existing conditions. All three alternatives examined the projected effects from 2010 to 2019. Each alternative had negative annual impacts when compared to the 2007 existing conditions. The most extreme impact was the No Action Alternative which soil and water salinity would increase, crop yields and revenues would decline, acreages would shift among crops, but total

cropped acreage would remain very similar between 2010 and 2019. The economic impact between the Proposed Alternative and the Alternative Action were insignificant.

The Alternative Action would not lower selenium levels below those set in the 2001 Use Agreement. The Proposed Action would lower these levels in accordance with the 2009 Use Agreement, which would lower selenium loading significantly below the TMML and improve the water quality of the lower San Joaquin River.

XIV. California Water Code Section 13263

California Water Code section 13263 requires that the Central Valley Water Board consider the following factors, found in section 13241, when considering adoption of waste discharge requirements.

(a) Past, present, and probable future beneficial uses of water
The Central Valley Water Board's Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) identifies applicable beneficial uses of surface within the Sacramento River Basin, including the Grassland Watershed. Identified beneficial uses for Salt Slough, Mud Slough (north) and wetland water supply channels include irrigation,[41] stock watering, contact recreation, other noncontact recreation, warm freshwater habitat, warm spawning, wildlife habitat, commercial use, and shellfish. The Order protects the beneficial uses identified in the Basin Plan. Applicable past, present, and probable future beneficial uses of the Grassland Watershed waters were considered by the Central Valley Water Board as part of the Basin Planning process and are reflected in the Basin Plans themselves. Mud Slough, the San Joaquin River and the wetland supply channels, the water bodies subject to discharges from the area served by the GBP, are all listed in the Basin Plan along with their designated beneficial uses.

(b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto
Environmental characteristics of the Grassland watershed have been considered in the development of this Order. This information is contained in the *August 2009 Environmental Impact Statement and Environmental Impact Report for the Grassland Bypass Project, 2010-2019*.

(c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area
This Order provides a process to review these factors during implementation of water quality management plans (SQMPs). The Order requires that agricultural subsurface discharges to surface water do not cause or contribute to an exceedance of applicable discharge limitations set in the Basin Plan or to water quality objectives. SQMPs are required in areas where discharge limitations or water quality objectives are not being met and are not being addressed by existing SQMPs. Under these plans, sources of waste must be estimated along with background water quality to determine what options exist for reducing waste discharge to ensure that the Project is in compliance with water limitations and objectives. The SQMPs must be designed to ensure that agricultural subsurface discharges do not cause or contribute to an exceedance of water limitations or a water quality objective set in the Basin Plan, and meet other applicable requirements of the Order, including, but limited to, section II.

(d) Economic considerations
The EIR/EIS for the Project from 2010 to 2019 anticipated economic effects to be farm income linked to farm investment and consumption. Regional economic activity would be affected due to the linkages between production agriculture and a myriad of other sectors of the economy. This Order allows for the continuation of farm activities and the use of the Drain. Costs for this Order into Phase III of the Project are borne by the farmers in the Grassland Drainage Area. Implementation of this

[41] Basin Plan footnote for Mud Slough (north) and wetland water supply channels states "[e]levated natural salt and boron concentrations may limit this use to irrigation of salt and boron tolerant crops. Intermittent low flow conditions may also limit this use."

Order is expected to increase farm profits from crop production compared to the No Action alternative (no use agreement for the Drain) until 2015 when an anticipated treatment facility is operational and annual costs will decrease farm profits. The decrease in profits is estimated to fall slight below profits from the No Action alternative for the period from 2015 to 2019. This Order will not unreasonably affect the Grassland Area Farmers or region adversely.

(e) The need for developing housing within the region
This Order establishes waste discharge requirements for subsurface agricultural discharges and stormwater runoff from the area served by the Grassland Bypass Project, where the land use is primarily irrigated agriculture. The Order is not intended to establish requirements for any facilities that accept wastewater from residences or stormwater runoff from residential areas. This Order will not affect the development of housing within the region.

(f) The need to develop and use recycled water
This Order does not establish any requirements for the use or purveyance of recycled wastewater. The SJRIP treatment facility will treat subsurface drainage and plans to recycle the treated lower selenium/salt effluent back into the fields where the drainage originated. No waste discharge requirements will be required for this pilot facility since the discharge will be recycled into essentially a closed loop system (see Figure 12).

The GAF and water districts have been recycling water by using tailwater recovery systems and by blending subsurface drainage with irrigation water. The subsurface drainage is also recycled to wet roads for dust controls.